

The Determinants of China's Outward Foreign Direct Investment Preferences in the countries along the "Belt and Road": Based on Principal Component Analysis and Cluster Analysis

YAN Xuchong

1. Introduction
 2. Limitations
 3. Data Source
 4. Principal Components Analysis
 5. Cluster Analysis
 6. Discussion
 7. Conclusion
- Appendix

1. Introduction

The aim of this study is to analyze the determinants of China's outward foreign direct investment (OFDI) in the countries along the "Belt and Road". The "Belt and Road" initiative was borrowing from the idea of the ancient "Silk Road" and this initiative aims to develop economic cooperation with the countries along the "Belt and Road". Since the Chinese government proposed the "Belt and Road" initiative in 2013, China's OFDI, particularly the investment in the countries along the "Belt and Road", has grown rapidly. *Statistical Bulletin of China's Outward Foreign Direct Investment (2014 to 2017)* shows that in 2014, OFDI flows of the countries along the "Belt and Road" are 13.66 billion U.S. dollars and it have increased to 20.17 billion U.S. dollars. This has an increase of 48% in four years. While OFDI stock increased from 92.46 billion U.S. dollars at the end of 2014 to 154.40 billion U.S. dollars at the end of 2017. It has increased by 67% in four years. According to Xinhua News, which is the official state-run press agency of the Chinese government, China's OFDI in the countries along the "Belt and Road" has exceeded 90 billion U.S. dollars (since 2013) until 2018¹. This shows that China's OFDI in the countries along the "Belt and Road" has

1 Xinhua News, "China's direct investment in the countries along the "Belt and Road" had exceeds

grown rapidly.

However, the countries along the “Belt and Road” have great economic differences among themselves. Regardless OFDI, China must consider these difference. Since the 2001’ the “Go Global” strategy was put forward. The Chinese government has encouraged companies to go global in order to engage OFDI. Although Chinese companies have achieved some positive results, they also have many shortcomings. The most prominent problem is consciously using Mergers and acquisitions (M & As) assets, other major problems involve choices of investment in countries. In recent years, developing countries are important investment regions for China’s OFDI, but the domestic security problems in developing countries have caused many losses which are difficult to estimate. The Chinese government has provided information services about all aspects of the host country in recent years, with the intention to reduce the losses for enterprises. China’s interest in investing in these countries is the focus of this paper.

Previous research concentrates on China’s OFDI and the “Belt and Road” initiative. Buckley et al. (2009) uses China’s official OFDI data collected from 1984 to 2001 and the log-linear model to analyze why the host country is attractive to China’s OFDI investment. Buckley et al. (2009) found that China’s OFDI is interested in high levels of political risk (host country), cultural proximity to China (Southeast Asia), customer market size (the host country), geographic proximity (host country’s capital with Beijing) and natural resources. Ding et al. (2016) selects 12 factors, which can show the comprehensive strength of the economic development and uses principal components analysis (PCA) to examine the country’s economic development and regional difference. They found that the countries along the “Belt and Road” have an economic gap and a difference between the whole “dumbbell”, at the two poles, the region’s economic development is better, but the middle region’s economic development is relatively weak. Kang et al. (2018) uses the single-equation probit approach and feasible generalized least squares to discuss whether the Chinese publicly listed firms location choices were affected by the agglomeration level and they found that the “Belt and Road” initiative was effective in firm location choices. Liu et al. (2018) uses the log-linear ordinary least square regression (OLS) to examine the effect of the “Belt and Road” initiative of China’s OFDI.

In contrast, when the Chinese government proposed the “Belt and Road” initiative in 2013, the Chinese government strictly examined Chinese companies overseas M & As and limited the larger companies’ OFDI approvals between the period of 2014 to 2015. Therefore, the Chinese governments’ attitude and purpose about encouraging Chinese enterprises to go abroad has

90 billion U.S. dollars”. http://www.xinhuanet.com/fortune/2019-04/18/c_1124386214.htm, last access at 2019/07/16.

changed. The papers published prior to 2013 did not discuss what variables attract China's OFDI to invest in the countries along the "Belt and Road". As a result, the current study selects 18 economic variables of 62 countries along the "Belt and Road" and uses principal components analysis (PCA) and cluster analysis (CA) to examine this question.

The Chinese government established "The Belt and Road Fund" on 29 December 2014, and the Asian Infrastructure Investment Bank (AIIB)'s Articles of Agreement entered into force on 25 December 2015, to support the implementation of the "Belt and Road" initiative. In this study, the data from 2015 has taken into account that the Chinese government has built a series of policies during 2015 that may have a positive impact on China's OFDI.

The structure of the study is composed as follows. Section two and section three explain the limitations of the prior research, the reasons for choosing these 18 economic factors and 62 countries. Section four uses the data from Section three to conduct PCA, and section five uses the data from section three to conduct CA. Section six is a comparative analysis with the prior research to evaluate the practical value of this study. Section seven concludes and explains the limitations of this study. This article aims to provide a reference for China's OFDI when Chinese enterprises invest in the countries along the "Belt and Road".

2. Limitations

Although previous studies have been conducted on China's OFDI, there are some limitations such as the lack of information in the host countries' economic environments. Furthermore, previous researchers have a preference for utilizing the regression analysis method which only highlights the importance of each economic variable. Nevertheless, such studies do not focus on the relation of each these economic factors.

In studying the motivation and locational determinants of China's OFDI, there are some representative previous studies. Buckley et al. (2007) use 14 factors and Log-linear model to investigate the determinants of OFDI by Chinese enterprises from 1984 to 2001. Buckley et al. (2007) focus on the host countries' economic size and growth, which is the most important research point that they focus on. Also, Yao et al. (2014) use 19 factors and the Gravity model to investigate the locational determinants of China's OFDI between the periods of 1991 to 2003 and 2003 to 2009. Yao et al. (2014) focus on the effect of natural resources and technology, which are their main research points. Yao et al. (2014) also investigate the effect of other economic variables to attract China's OFDI, such as distance. However, Yao et al. (2014) have not focused on variables of the host countries' investment environments, which is what the current study uses to examine the determinants of China's OFDI after proposing the "Belt and Road" initiative. Likewise, Li. (2016)

uses nine factors and three regression models to investigate the determinants of China's OFDI over the period of 1991 to 2003. Li. (2016) has also investigated the economic development factors (GDP, exchange rate). On the other hand, even if Li. (2016) has focused on the host countries' investment environments, such as governance. However, Li. (2016) did not focus on other factors of the host countries' investment environments.

While from 2014 to 2015, the Chinese government strictly examined companies' overseas M & As and limited the larger companies' OFDI approvals, the Chinese government proposed the "Belt and Road" initiative in 2013. Analyzing the investment motivation of China's OFDI needs to consider the impact of the above background.

Due to the excessive investment losses of China's OFDI caused by the insufficient analysis of the investment environments of the host countries, the Chinese government strengthened the control of OFDI approvals in 2014 to 2015. At the same time, the Chinese government proposed the "Belt and Road" initiative to support Chinese capital to go abroad. This initiative has the same purpose as the "Go Global" strategy proposed in 2000. Under the "Go Global" strategy, China's OFDI is supported by the government, but lacks guidance. Chinese enterprises should first research the host countries' investment environments. The results of this process are great losses due to insufficient analysis of the investment environments of the host countries. But unlike the "Go Global" strategy, the "Belt and Road" initiative has mutual support and encouragement from intergovernmental policies, which can largely protect the interests of Chinese enterprises.

The current study will focus on the above macroeconomic background. By analyzing 18 factors in the investment environments and trade, capital markets, and other economic aspects of the countries along the "Belt and Road", the current paper will examine whether China's OFDI strategy in these countries has changed.

Based on prior research and reviewed literature, the current paper will focus on the impact of the host country's investment environments. Differences with regression analysis methods used in previous literature, the current study will use PCA and CA to analyze the determinants of China's OFDI in the countries along the "Belt and Road".

3. Data Source

Data for this paper was collected from several secondary sources as outlined in Table.1. When using "R" programming language in order to conduct statistic research, it was necessary to use alphanumeric coding from A1 to A18.

Code A1 and Code A2 are the total imports and exports of the countries along the "Belt and Road" to and from China in 2015, reflecting the trade relationship between China and these

Table.1 18 economic factors

Code	Factor	Unit	Data source
A1	Import from china (2015)	Millions U.S. dollars	<i>China statistic yearbook</i>
A2	Export to china (2015)	Millions U.S. dollars	
A3	Mobile phone (2015)	Per 100 population	The Worldwide Development Indicators
A4	Gas production (2014)	Millions barrels of oil equivalent	Oil and Gas Data
A5	Oil production (2014)	Metric ton	
A6	Capital stock at current PPPs at 2011 U.S. dollars (2015)	Millions U.S. dollars	Penn World Table
A7	Population (2015)	Millions people	
A8	GDP (2015)	Millions U.S. dollars	National Accounts Main Aggregates Database
A9	Per capita GDP (2015)	U.S. dollars	
A10	GDP Annual Rate of Growth Per Capita at constant 2010 prices (2015)	%	
A11	AMA based exchange rate (2015)	Nominal value	Heritage Foundation
A12	Property rights (2015)	100 – 80: Free 79.9 – 70: Mostly Free 69.9 – 60: Moderately Free 59.9 – 50: Mostly Unfree 49.9 – 0: Repressed *	
A13	Government integrity (2015)		
A14	Business freedom (2015)		
A15	Monetary freedom (2015)		
A16	Trade freedom (2015)		
A17	Investment freedom (2015)		
A18	Financial freedom (2015)		

Note: * is from Treay Miller, & Anthony B. Kim. *2015 Index of Economic Freedom*, The Heritage Foundation.

countries and using these two factors to determine whether China's OFDI is or not a trade-driven investment.

Code A3 is the mobile phone.² As an important item in the consumer market in recent years, the mobile phone is also an important product for Chinese companies to occupy the international market. Using the mobile phone as an analytical factor wants to reflect the size of the consumer market in the host country, can determine if China's OFDI is or not the market-driven investment.

Code A4 and Code A5 are gas production and oil production.³ The increasing consumption of natural resources and the expectation of rising prices in the future have driven China's OFDI to actively engage in natural resources.⁴ This study uses the production of oil and gas to represent natural resources. If the oil and gas production of the host country is large, it is easy to attract

2 Code A3 may also refer to automatic cars to reflect the size of the host country's consumer market.

3 Code A4 and A5 may also refer to iron ore production or copper production to reflect natural resources.

4 Yao Shujie, & Wang Pan. (2014). p.xv.

resource-driven foreign investment. China's economy continues to develop at a high speed in recent years but China has a big gap in oil and gas. Using gas production and oil production as two analysis factors to discuss whether China's OFDI in the countries along the "Belt and Road" are the resource-seeking investment.

Code A6 is the total amount of capital of the host country in 2015. This factor reflects the ability of the economic development of the host country in further. The total amount of capital is conducive to economic development in the next year and the future. However, if the total amount of capital of the host country is too small, it will seriously hinder the economic development. In this case, the host country needs to borrow a large amount of money or rely on external funds to develop the economy, but this will constrain the economic development of the host country. And if a country's total amount of capital is substantial, it will reflect that the country's economic development may be more stable and conducive to attracting foreign investment in the future. In contrast, a country with a small total amount of capital is not conducive to attracting foreign investment.

Code A7 is the population. This factor reflects the labor market of the host country or the consumer market size of the host country. If the labor market of the host country is large, it is easy to attract labor-driven foreign investment. And if the consumer market size of the host country is large, it is easy to attract consumption-driven foreign for investment.

Code A8 is the gross domestic product (GDP) in 2015. This factor reflects the ability of the economic development of the host country in 2015. GDP is the most important macroeconomic indicator for describing the size of the economy. GDP is one of the most important signs of its economic strength and international status. GDP represents the long-term national strength of a country. The GDP volume of the host country also affects the choice of OFDI. It is easier for host countries to have large GDPs to attract foreign investment because larger GDP means that the country has a strong market (but it does not reflect the quality of the market). In contrast, less GDP will reduce the desire for foreign investment.

Code A9 is the per capita GDP in 2015, which reflects the status of economic and purchasing power of the host country in 2015. The per capita GDP is an important indicator for describing the level of economic development per capita. The level of per capita GDP reflects a certain extent the affluence of the host country and the level of people's living standards. Some countries have large economies, but they have large populations and low per capita economic development, such as India, and other countries. And some countries have small economies, but their per capita economic development is very high, such as Singapore, and other countries.

Code A10 is the GDP annual economic growth rate in 2015, which reflects the situation of economic development of the host country in 2015. The annual economic growth rate is the most

important macroeconomic indicator to describe the economic growth of a country. Few countries in the world do not care about the economic growth of their country, because without the proper growth of the economy, there would be no economic prosperity of the country and an improvement in living standards. Similarly, the economic growth rate of host countries is also a very important indicator for OFDI. If the economic growth rate of the host country is positive, it will attract foreign investment, because the high-growth economy will bring several economic benefits to the foreign investment. In contrast, a low economic growth rate of the host countries will cause foreign investment to decline.

Code A11 is the exchange rate. The exchange rate reflects whether the host country's rate of currency control is positive or negative. If a country's exchange rate control is stable, which means that the exchange rate fluctuation of the host country is also relatively stable, it will increase the desire for foreign investment. The stable exchange rate is conducive to protecting the economic interests of foreign investment. On the contrary, if a country's exchange rate control is weak, which means that the exchange rate fluctuation of the country is relatively drastic, it will cause a decline in foreign investment or even cancel investment. In addition, the one-year exchange rate used in this study does not reflect the positive or negative exchange rate control of the host country, so the historic exchange rate also needs to be considered.

Code A12, Code A13, Code A14, Code A15, Code A16, Code A17, and Code A18 are the investment environments of the host country. These factors can examine whether the investment environments of the host country is an important factor for China's OFDI. Since 2001, the "Go Global" policy has strongly supported Chinese enterprises to go abroad. However, Chinese enterprises have made "blind" OFDI in the initial stages. Although Chinese enterprises have made a large amount of OFDI, these enterprises only consider resources (resource-seeking), or the size of the consumer market (market-seeking), or cheap labor, not considering the investment environments of the host country. Therefore, Chinese enterprises have made significant achievements in OFDI but they also have caused significant losses. From 2014-2015, the Chinese government strictly examined Chinese companies' overseas M & As and limited the larger companies' OFDI approvals. Therefore, the current study uses these factors to examine China's OFDI considering the investment environments of the countries along the "Belt and Road"?

65 countries along the "Belt and Road" are mentioned by (www.people.com.cn, 2019)⁵. However, because of insufficient data, Afghanistan, Albania, and Palestine are excluded. Therefore, this study uses the final 62 countries, which are listed in Table.2. These 65 countries, which were originally selected by the Chinese government when implementing the "Belt and Road",

5 <http://ydy1.people.com.cn/n1/2017/0420/c411837-29225243.html>, last access at 2019/07/01.

Table.2 Country along the “Belt and Road”

	country		country		country		country
1	Armenia	16	Georgia	31	Lithuania	46	Russia
2	Azerbaijan	17	Greece	32	Macedonia	47	Saudi Arabia
3	Bahrain	18	Hungary	33	Malaysia	48	Serbia
4	Bangladesh	19	India	34	Maldives	49	Singapore
5	Belarus	20	Indonesia	35	Moldova	50	Slovakia
6	Bhutan	21	Iran	36	Mongolia	51	Slovenia
7	Bosnia and Herzegovina	22	Iraq	37	Montenegro	52	Sri Lanka
8	Brunei	23	Israel	38	Myanmar	53	Syria
9	Bulgaria	24	Jordan	39	Nepal	54	Tajikistan
10	Cambodia	25	Kazakhstan	40	Oman	55	Thailand
11	Croatia	26	Kuwait	41	Pakistan	56	Turkey
12	Cyprus	27	Kyrgyzstan	42	Philippines	57	Turkmenistan
13	Czech Republic	28	Laos	43	Poland	58	Ukraine
14	Egypt	29	Latvia	44	Qatar	59	United Arab Emirates
15	Estonia	30	Lebanon	45	Romania	60	Uzbekistan
						61	Vietnam
						62	Yemen

Note: 1) East Asia: one country; 2) Southeast Asia: 10 countries; 3) South Asia: seven countries; 4) Middle Asia: five countries; 5) Middle East: 15 countries; 6) South Caucasus: three countries; 7) Eastern Europe: three countries; 8) Southeast Europe: 10 countries; 9) Middle Europe: eight countries.

are representative countries of the initiative. Therefore, using these 65 countries to analyze the reasons why the Chinese government choosing these representative 65 countries and what is the determinants of China’s OFDI in these countries can find the change of China’s OFDI strategy under the “Belt and Road” initiative.

4. Principal Components Analysis⁶

The difference with regression analysis used in prior research can only analyze the importance of each factor. This chapter uses PCA to examine not only the importance of each factor but also the

6 “Principal component analysis (PCA) is a statistical analysis method that turns multiple indicators into a few comprehensive indicators. Method of transforming multiple variables into a few principal components by dimensionality reduction techniques. These principal components can reflect most of the information of the original variables, and they are usually expressed as a linear combination of the original variables”, Xue Yi, and Chen Liping. (2007). *Statistical Modeling and R*, Tsinghua University Press. p.497.

Table.3 the correlation matrix

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
A1	1.000																	
A2	0.750	1.000																
A3	0.199	0.298	1.000															
A4	0.437	0.501	0.194	1.000														
A5	0.392	0.632	0.291	0.749	1.000													
A6	0.663	0.444	-0.025	0.461	0.397	1.000												
A7	0.484	0.186	-0.225	0.119	0.076	0.857	1.000											
A8	0.708	0.492	0.010	0.498	0.467	0.969	0.819	1.000										
A9	0.109	0.148	0.479	0.098	0.155	-0.067	-0.168	0.014	1.000									
A10	0.065	0.012	0.407	-0.141	-0.123	0.035	0.018	0.084	0.644	1.000								
A11	0.134	0.012	0.093	-0.105	-0.108	0.104	0.145	0.119	-0.034	0.090	1.000							
A12	0.380	0.248	-0.133	0.146	0.104	0.161	0.075	0.105	-0.169	-0.299	0.035	1.000						
A13	0.090	0.033	0.424	-0.112	-0.059	-0.059	-0.119	0.010	0.732	0.884	0.194	-0.231	1.000					
A14	0.024	0.049	0.381	0.019	0.010	-0.214	-0.287	-0.161	0.362	0.455	0.040	-0.221	0.513	1.000				
A15	-0.141	-0.168	0.327	-0.286	-0.243	-0.243	-0.230	-0.225	0.380	0.509	0.145	-0.391	0.534	0.328	1.000			
A16	-0.052	-0.176	0.312	-0.097	-0.229	-0.106	-0.168	-0.093	0.303	0.463	0.010	-0.296	0.478	0.272	0.436	1.000		
A17	-0.177	-0.225	0.265	-0.272	-0.260	-0.151	-0.149	-0.113	0.346	0.653	0.086	-0.357	0.647	0.398	0.657	0.635	1.000	
A18	0.003	-0.048	0.419	-0.211	-0.184	-0.040	-0.103	-0.011	0.392	0.710	0.144	-0.285	0.674	0.424	0.650	0.636	0.870	1.000

relationships between each factor to form a principal component that can examine the determinants of China's OFDI. On the other hand, it is also possible to use the PCA scores of the individual survey subjects to classify and to examine the commonality between each other and can more easily understand the importance of these determinants of China's OFDI.

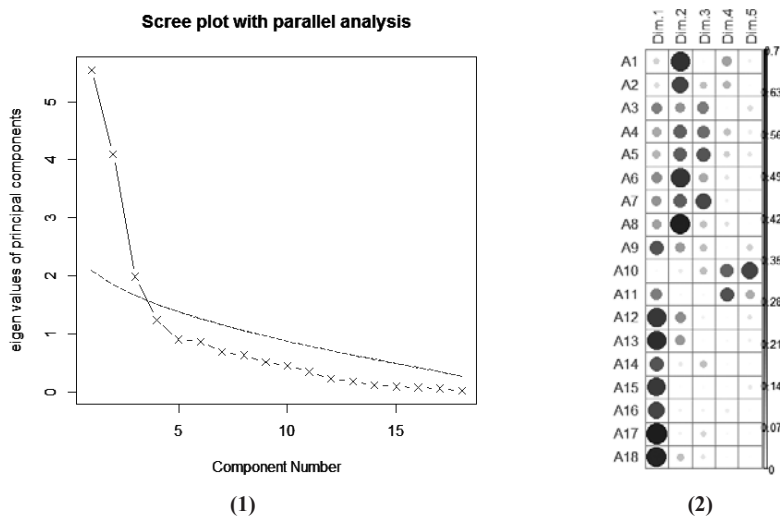
Before performing PCA, the correlation test should be conducted, and it finds that there is a strong correlation between these variables (Table.3), so PCA can be used, and based on the correlation coefficient, we found that the variables of Code A3, Code A11, and Code A12 are not related to other variables; however, the score of the KMO test is greater than 0.5⁷, it shows the KMO test yields a degree of common variance miserable. So we can use this data to perform PCA.

Although the results of the analysis of 100 times scree plot (Figure.1 (1)) shows that three

7 The standard means of KMO measure.

KMO Measure	Meaning
$KMO \geq 0.9$	Marvelous
$0.8 \leq KMO < 0.9$	Meritorious
$0.7 \leq KMO < 0.8$	Middling
$0.6 \leq KMO < 0.7$	Mediocre
$0.5 \leq KMO < 0.6$	Miserable
$KMO < 0.5$	Unacceptable

The score of the KMO test is larger than 0.5, so it also shows that this data is adequate data.



Note: 1) The number of the three principal components above the dotted line in the figure (1) is the recommended result of 100 simulation tests. 2) The size of dots and the depth of color in the figure (2) are used to reflect the importance of this factor in this principal component. The deeper color and the larger sizes of the dot which means this factor is the most important factor in this dimension.

Figure.1 scree plot and dimensions plot

principal components are optimal; however, three principal components can only explain 65% of all data and Figure.1 (2) shows that the fourth principal component is meaningful. Therefore, this study selects four principal components for analyzing, which can explain 72% of all data⁸.

The analysis results are listed as follows (Table.4).

Table.4 principal component loading

	PC1	PC2	PC3	PC4
A1	-0.26	0.78	-0.09	0.39
A2	-0.24	0.69	0.31	0.35
A3	0.45	0.41	0.46	0.08
A4	-0.37	0.53	0.49	-0.32
A5	-0.34	0.54	0.57	-0.27
A6	-0.43	0.77	-0.36	-0.2
A7	-0.42	0.54	-0.65	-0.15
A8	-0.39	0.83	-0.3	-0.21
A9	0.57	0.39	0.31	-0.03
A10	0.09	0.17	-0.31	0.53

8 Due to PC5's $\lambda = 0.9 < 1$, PC5 is deleted.

	PC1	PC2	PC3	PC4
A11	-0.46	0.09	0.11	0.58
A12	0.76	0.42	-0.12	-0.02
A13	0.79	0.41	0.01	0.1
A14	0.57	0.18	0.32	0.11
A15	0.76	0.05	-0.11	0.02
A16	0.66	0.14	-0.12	-0.16
A17	0.83	0.13	-0.25	-0.11
A18	0.82	0.3	-0.19	0.01
SS loadings	5.55	4.1	1.99	1.24
Proportion Var	0.31	0.23	0.11	0.07
Cumulative Var	0.31	0.54	0.65	0.72
Proportion Explained	0.43	0.32	0.15	0.1
Cumulative Proportion	0.43	0.75	0.9	1

- Note: 1) SS loading is λ . $\lambda > 1$ means this principal component is meaningful.
 2) Proportion Var means this principal component can explain which percentage data.
 3) Cumulative Var means sum of Proportion Var. Cumulative Var bigger than 80% is better for using. However, due to PC5's $\lambda < 1$, this study just can explain 72% of all data.
 4) Proportion Explained is proportion of variance explained, which means how much of the total variance can be explained by each of the principal components with respect to the sum.
 5) Cumulative Proportion means sum of Proportion Explained. This study selects four principal components, so these principal components' Cumulative Proportion is equal to 1.

Factor terms greater than 0.5 or less than -0.5 are extracted to explain the meaning of each principal component.

PC1 mainly reflects the information on the investment environments of the countries along the "Belt and Road" (Table.5). PC1 is the biggest principal component in four principal components, which is accounted for 31% and investment freedom and financial freedom are the most important two factors in PC1. Through PC1, it shows that the investment environments of the host country are the most attractive factor to China's OFDI in the countries along the "Belt and Road".

Table.5 PC1 main loading

Investment freedom	Financial freedom	Government integrity	Property rights	Monetary freedom	Trade freedom	Per capita GDP	Business freedom
0.83	0.82	0.79	0.76	0.76	0.66	0.57	0.57

PC2 mainly reflects the economic volume, and the trade relationship between China and the host country, and the production information of oil and gas of the host country (Table.6). PC2 is the second principal component in four principal components, which is accounted for 23% and the GDP of the host country and imports from China are the most important two factors in PC2. According to PC2, it shows that the economic scale of the host country and the scale of imports from China are important factors, which are attracted to China’s OFDI to invest in these countries.

Table.6 PC2 main loading

GDP	Import from china	Capital stock at current PPPs	Export to china	Population	Oil production	Gas production
0.83	0.78	0.77	0.69	0.57	0.54	0.53

PC3 reflects the relationship between population and oil production in the countries along the “Belt and Road” (Table.7). The negative factor of the PC3 is the size of a country’s population, which reflects the size of the labor market of the host country or the customer market size of the host country. Oil production in PC3 is a positive factor, which reflects the oil production in the host country can give the host country a positive effect, which means that the host country with a small population and is rich in oil.

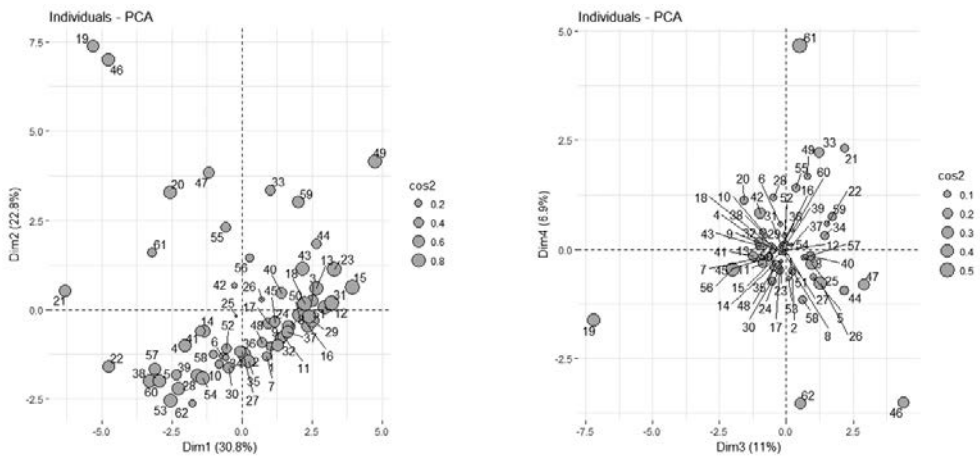
Table.7 PC3 main loading

Population	Oil production
-0.65	0.57

PC4 consists of the exchange rate and GDP Annual Rate of Growth Per Capita, which reflects the relationship between the host country’s exchange rate control and the GDP growth rate of the host country (Table.8). If the host country’s exchange rate control and economic growth are positive, it can be attracted to China’s OFDI to invest in. In contrast, if the host country’s exchange rate control and the economic development are poor, China’s OFDI may carefully consider whether if invests in this country.

Table.8 PC4 main loading

Exchange rate	GDP Annual Rate of Growth Per Capita
0.58	0.53



(1) PCA scores for 62 countries varieties on PC1 and PC2 (2) PCA scores for 62 countries varieties on PC3 and PC4

Note: \cos^2 is square cosine and squared coordinates. “High \cos^2 indicates a good representation of the variable on the principal component. Low \cos^2 indicates that the variable is not perfectly represented by the PCs”, (Alboukadel Kassambara. (2017). *Practical Guide To Principal Component Methods in R (Multivariate Analysis) (Volume 2)*,www.sthda.com, p.54). “The value of \cos^2 can help find the components that are important to interpret both active and supplementary observations”, (Herve Abdi, & Lynne J. Williams. (2010). *Principal component analysis*, John Wiley & Sons, Inc, Vol. 2, p. 438).

Figure.2 PCA scores for 62 countries

Figure.2 (1) shows the PCA scores for 62 countries varieties on PC1 and PC2.

If a country falls in the positive quadrant of PC1, which represents this country’s investment environments is better, and the representative countries are mainly 49 (Singapore), 23 (Israel), 31 (Lithuania), and 15 (Estonia). These countries are mainly developed economies or transition economies, and the domestic political environment is relatively stable and has a positive economic environment. In contrast, if a country falls in the negative quadrant of PC1, which represents this country’s investment environments is weak, and the representative countries are mainly 21 (Iran), 22 (Iraq), 19 (India), 46 (Russia).It can be seen that these countries are either in the economic blockade, or have just experienced war, or have very serious political corruption. Therefore, these countries’ investment environments is imperfect, so investing in these countries must consider risks.

If a country falls in the positive quadrant of PC2, which represents this country has a large economic size, has a considerable trade relationship with China, the country is rich in oil and gas, the representative countries of the positive quadrant of PC2 are 46 (Russia), 19 (India), 49 (Singapore), and so on. In contrast, if a country falls in the negative quadrant of PC2, which represents that this country’s economy is relatively small, and this country has a small trade relationship with China, and the country does not have rich oil and gas, and representing the country are 53 (Syria), 28 (Laos), 62 (Yemen). A considerable part of countries falls in the negative

quadrant of PC2.

Figure.2 (2) shows the PCA scores for 62 countries varieties on PC3 and PC4.

In contrast, if a country falls in the positive quadrant of PC3, demonstrates this country does not have a large population, but is rich in oil production. These countries are mainly oil-producing countries, and the respective countries are 46 (Russia), 47 (Saudi Arabia). Although these countries have moderately populated, oil production is limited these countries' industry development. These countries have the vigorous development of the oil industry; however, these countries' light industry is relatively weak.

If a country falls in the negative quadrant of PC3, which represents this country has a large population but lacks oil reserves. These countries are mainly developing countries, which sustain high population growth. The representative countries are 19 (India), 56 (Turkey). These countries have a lot of population but lack petroleum which limits these countries to develop the heavy industry; however, these countries may have a foundation of the light industry. Although some countries (for example, India) also has considerable oil production, in the high-speed economic development oil has been heavily dependent on imports in recent years.

If a country falls in the positive quadrant of PC4, which represents that the host country's exchange rate control is strong and these countries have a better economic growth rate. The representing countries are 61 (Vietnam), 33 (Malaysia). These countries have a positive exchange rate control and have a better economic development which is an attractive aspect for Chinese enterprises to invest in. In contrast, if a country falls in the negative quadrant of PC4, representing these countries have a negative exchange rate control and have a terrible economic growth rate. The representing countries are 62 (Yemen), 46 (Russia). If the host country's exchange rate control is negative and the host country not have a strong economic development, Chinese enterprises may carefully consider the risks when they invest in this country.

The PCA scores of 18 factors in four principal components are listed as follows (Table.9).

Table.9 four principal components' ratios

	PC1	PC2	PC3	PC4
A1	-0.047	0.191	-0.047	0.315
A2	-0.042	0.169	0.158	0.279
A3	0.081	0.101	0.233	0.067
A4	-0.066	0.130	0.249	-0.257
A5	-0.061	0.131	0.288	-0.219
A6	-0.078	0.188	-0.184	-0.165
A7	-0.075	0.132	-0.326	-0.118
A8	-0.070	0.202	-0.153	-0.169

	PC1	PC2	PC3	PC4
A9	0.103	0.095	0.159	-0.027
A10	0.017	0.042	-0.158	0.426
A11	-0.083	0.021	0.053	0.469
A12	0.138	0.103	-0.060	-0.018
A13	0.143	0.099	0.003	0.081
A14	0.102	0.045	0.161	0.091
A15	0.137	0.013	-0.056	0.017
A16	0.120	0.034	-0.061	-0.130
A17	0.150	0.032	-0.124	-0.091
A18	0.147	0.074	-0.098	0.004

Note: These ratios are the coefficient of each variable and used to make up the principal component.

According to the different ratios of the above 18 factors in the four principal components (Table.9), it can get the composition of these four principal components.

$$PC^9 = (5.55*PC1^{10} + 4.1*PC2^{11} + 1.99*PC3^{12} + 1.24*PC4^{13}) / 12.88$$

$$= 0.431*PC1 + 0.318*PC2 + 0.155*PC3 + 0.096*PC4$$

Therefore, it can also get the total PCA score and ranking of the four principal components for 62 countries along the "Belt and Road".

According to Table.10, these countries with PC > 0, which have a large economic scale and a strong relationship of trade with China and these countries also have better economic growth. The top 10 countries for PC > 0 are Singapore, United Arab Emirates, Malaysia, Qatar, Estonia,

9 The coefficient of each principal component is their proportion explained.

10 $PC1 = -0.047*A1 - 0.042*A2 + 0.081*A3 - 0.066*A4 - 0.061*A5 - 0.078*A6 - 0.075*A7 - 0.070*A8 + 0.103*A9 + 0.017*A10 - 0.083*A11 + 0.138*A12 + 0.143*A13 + 0.102*A14 + 0.137*A15 + 0.120*A16 + 0.150*A17 + 0.147*A18$

11 $PC2 = 0.191*A1 + 0.169*A2 + 0.101*A3 + 0.130*A4 + 0.131*A5 + 0.188*A6 + 0.132*A7 + 0.202*A8 + 0.095*A9 + 0.042*A10 + 0.021*A11 + 0.103*A12 + 0.099*A13 + 0.045*A14 + 0.013*A15 + 0.034*A16 + 0.032*A17 + 0.074*A18$

12 $PC3 = -0.047*A1 + 0.158*A2 + 0.233*A3 + 0.249*A4 + 0.288*A5 - 0.184*A6 - 0.326*A7 - 0.153*A8 + 0.159*A9 - 0.158*A10 + 0.053*A11 - 0.060*A12 + 0.003*A13 + 0.161*A14 - 0.056*A15 - 0.061*A16 - 0.124*A17 - 0.098*A18$

13 $PC4 = 0.315*A1 + 0.279*A2 + 0.067*A3 - 0.257*A4 - 0.219*A5 - 0.165*A6 - 0.118*A7 - 0.169*A8 - 0.027*A9 + 0.426*A10 + 0.469*A11 - 0.018*A12 + 0.081*A13 + 0.091*A14 + 0.017*A15 - 0.130*A16 - 0.091*A17 + 0.004*A18$

Table.10 the total score and ranking of four principal components for 62 countries

	PC1	PC2	PC3	PC4	PC	Ranking
Armenia	0.433	-0.514	-0.142	-0.022	-0.001	34
Azerbaijan	0.054	-0.607	0.131	-0.439	-0.192	39
Bahrain	1.052	0.127	0.456	-0.170	0.548	10
Bangladesh	-0.854	-0.503	-0.721	0.168	-0.623	52
Belarus	-0.991	-0.899	0.697	-0.566	-0.660	54
Bhutan	-0.293	-0.634	-0.172	0.515	-0.305	44
Bosnia and Herzegovina	0.374	-0.644	-0.709	-0.175	-0.170	38
Brunei	0.719	-0.235	0.192	-0.475	0.219	23
Bulgaria	0.587	-0.382	-0.302	0.002	0.085	26
Cambodia	-0.341	-0.746	-0.613	0.367	-0.444	47
Croatia	0.619	-0.374	-0.619	-0.291	0.024	30
Cyprus	1.245	0.037	0.040	-0.011	0.553	9
Czech Republic	1.117	0.298	-0.712	0.054	0.471	12
Egypt	-0.564	-0.291	-0.300	-0.292	-0.410	45
Estonia	1.671	0.305	-0.160	-0.070	0.785	5
Georgia	0.993	-0.232	-0.094	0.131	0.352	19
Greece	0.399	-0.198	-0.189	-0.429	0.038	28
Hungary	0.944	0.073	-0.401	0.082	0.376	18
India	-2.240	3.618	-5.073	-1.464	-0.738	56
Indonesia	-1.079	1.608	-1.117	1.010	-0.028	35
Iran	-2.668	0.260	1.519	2.063	-0.634	53
Iraq	-2.005	-0.788	1.084	0.511	-0.898	59
Israel	1.388	0.554	-0.136	-0.242	0.730	6
Jordan	0.693	-0.231	-0.193	-0.357	0.161	24
Kazakhstan	-0.085	-0.088	0.653	-0.294	0.008	33
Kuwait	0.302	0.139	0.902	-0.704	0.246	21
Kyrgyzstan	0.029	-0.664	-0.040	-0.022	-0.207	41
Laos	-0.952	-1.092	-0.343	1.061	-0.709	55
Latvia	1.056	-0.146	-0.153	0.058	0.390	16
Lebanon	-0.190	-0.807	-0.388	-0.642	-0.461	48
Lithuania	1.354	0.087	-0.118	0.042	0.597	8
Macedonia	0.534	-0.490	-0.331	0.025	0.025	29
Malaysia	0.423	1.635	0.866	1.982	1.027	3
Maldives	-0.250	-0.654	1.012	0.285	-0.132	37
Moldova	0.099	-0.719	-0.332	-0.370	-0.273	43
Mongolia	-0.026	-0.580	-0.104	0.091	-0.203	40
Montenegro	0.687	-0.306	0.139	0.085	0.228	22
Myanmar	-1.381	-0.987	-0.548	0.279	-0.967	61
Nepal	-0.669	-0.909	0.008	0.121	-0.564	50

	PC1	PC2	PC3	PC4	PC	Ranking
Oman	0.602	0.230	0.639	-0.140	0.418	13
Pakistan	-0.629	-0.293	-0.877	-0.141	-0.514	49
Philippines	-0.112	0.327	-0.682	0.729	0.021	31
Poland	0.910	0.566	-0.601	0.047	0.484	11
Qatar	1.118	0.902	1.533	-0.851	0.924	4
Romania	0.500	-0.173	-0.461	-0.161	0.074	27
Russia	-2.006	3.430	3.094	-3.143	0.403	15
Saudi Arabia	-0.487	1.880	2.051	-0.731	0.635	7
Serbia	0.305	-0.450	-0.274	-0.289	-0.082	36
Singapore	2.002	2.041	0.560	1.489	1.742	1
Slovakia	0.859	-0.070	-0.349	-0.032	0.291	20
Slovenia	1.010	-0.088	-0.087	-0.092	0.385	17
Sri Lanka	-0.226	-0.531	-0.048	0.274	-0.248	42
Syria	-1.076	-1.244	0.044	-0.591	-0.910	60
Tajikistan	-0.597	-0.944	-0.110	0.039	-0.571	51
Thailand	-0.245	1.132	0.254	1.257	0.415	14
Turkey	0.109	0.713	-1.411	-0.412	0.016	32
Turkmenistan	-1.315	-0.815	0.510	-0.152	-0.762	57
Ukraine	-0.435	-0.612	0.424	-1.038	-0.417	46
United Arab Emirates	0.850	1.476	1.200	0.664	1.085	2
Uzbekistan	-1.235	-0.987	0.164	0.382	-0.784	58
Vietnam	-1.343	0.778	0.368	4.157	0.126	25
Yemen	-0.744	-1.288	0.370	-3.155	-0.977	62

Note: Ranking is according to the PC scores. The score of a single principal component also can be used for ranking.

Israel, Saudi Arabia, Lithuania, Cyprus, & Bahrain. These 10 countries are developed countries or have strong economic growth countries (Malaysia and Qatar), and can also find that these top10 countries have a high score in the positive quadrant of the PC1 and PC2.

The countries with $PC < 0$, which means that the host country's economy has regressed, even stagnated, the host country has just experienced the war, the host country has an economic blockade from the international market, and the host country has a negative exchange rate control. The top 10 countries for $PC < 0$ are Iran, Belarus, Laos, India, Turkmenistan, Iraq, Syria Uzbekistan, Myanmar, & Yemen. The current study finds that these top10 countries have a high score in the negative quadrant of the PC1 and PC2. Iraq, Yemen, and Syria have just experienced war or are still in the war. Iran is still in the economic blockade. Belarus and Uzbekistan have weak economic environments because of long-term dictatorship. Myanmar and Laos are the least developed countries in the world, and their domestic economic base is the weakest. Therefore, the risk of

investing in these countries is greater than the economic benefits.

According to the Table.10, it shows that the country of $PC > 0$ (the positive score country) and the country of $PC < 0$ (the negative score country) is almost half and half, which indicates that Chinese enterprises' OFDI's choice of the countries along the "Belt and Road" not only focus on the investment environments, trade relations, GDP, oil and gas production, but also have other objectives. This result can reflect that China's OFDI in the countries along the "Belt and Road" is not only getting the economic profits but also meant to expand China's global influence.

Through PCA, it can be found that the investment environments of the host country, which are the first principal component, are the determinant of China's OFDI in these countries (Table.2). This result is the same as the result expected by this research. Focusing on the changes in the macroeconomic environment of China's OFDI and the increasing influence from government support over the period of 2013 to 2015, China has begun to consider the investment environments of the host country to protect the Chinese enterprises' investment interests.

The results of the positive PCA scores reflect that the determinants of China's OFDI in the countries along the "Belt and Road" are the investment environments of these countries, which is different from the results of the previous research. The prior studies mainly focused on the time before the "Belt and Road" initiative was proposed. Although China's OFDI also had support from the Chinese government at this time, there were many deficiencies in protecting the investment interests of Chinese companies in the host country. The reason was mainly the government has no corresponding cooperation agreement with the host country and when Chinese enterprises are threatened by losses or other unsafe factors in these countries, intergovernmental coordination is insufficient.

However, the "Belt and Road" initiative has strengthened construction in this regard. In the memorandum of cooperation signed between China and the countries along the "Belt and Road", there are relevant provisions protecting the investing interests of Chinese enterprises in the host countries and how to resolve the interest conflicts by government interactions, in order to reduce the loss of Chinese enterprises' investment interests. At the same time, China's OFDI in these countries is also a win-win activity. By investing in these countries that are suitable for investment, Chinese companies can not only obtain greater economic benefits but also reduce the threat of unsafe factors. According to *Statistical Bulletin of China's Outward Foreign Direct Investment*¹⁴ published by the Ministry of Commerce, the pioneers in investing in these countries, which are suitable for

14 Ministry of Commerce of the People's Republic of China, National Bureau of Statistics of China, & State Administration of Foreign Exchange. *Statistical bulletin of China's outward foreign direct investment 2003-2015*, China Statistics Press.

investment, are mainly private enterprises. Private enterprises need to pay more attention to the safety of the investment environments of the host countries when they decided to invest abroad.

The results of the negative PCA scores show that Chinese OFDI in these countries is not focused on the investment environments of these countries. Although this result conflicts with the expected result of this study, it is more real in the real world.¹⁵ According to this study's results, these countries, which are not suitable for investment, have various problems, such as having a war, unrest, dictatorship, corruption. But in the real world, most of these countries have abundant natural resources, especially oil or gas resources, which is an essential strategic resource for China's rapid economic development. So even if it is known that these countries have various problems, China's OFDI will still invest in these countries.

However, Chinese enterprises invest in these countries not only to invest in natural resources but also to expand China's influence in the international world. China, whose economy is gradually increasing (China's GDP surpassed Japan and become the second large economy in the world in 2010), began to seek to change its past weak attitude in the international political world while strengthening its right to speak. In order to achieve this goal, China needs to expand China's international influence. In terms of culture, the Confucius Institute's branches are constantly growing, and in terms of economics, Chinese companies' OFDI also has constantly increased. Chinese enterprises investing in countries, which are not suitable for investment, are mainly large state-owned enterprises (SOEs). In order to achieve the political goals of the Chinese government, large SOEs continue to increase investment in basic economic construction in these countries, in order to access natural resources to protect domestic economic construction resources' stable supply. At the same time, China's influence in the international political world has expanded and China's soft power has improved.

However, this result may have some limitations. This study used four principal components to do research and these four principal components can only explain 72% of all data, not enough 80%. Because of the limitations of PCA, this study next will use CA to analyze the determinants of China's OFDI in the countries along the "Belt and Road".

15 However, the prior literature finds Chinese OFDI is associated with high levels of political risk, such as Buckley et al. (2007), and so on. When Chinese enterprises go abroad in the early stage, they always choose the host country with poor investment environments because these countries are easily enter. This study wants to examine Chinese enterprises invest in the countries along the "Belt and Road" are focusing on their best investment environment, so there are writing "this result conflicts with the expected result of this study", but in the real Chinese enterprises' OFDI activity, some enterprises like to invest in the host country with poor investment environments.

5. Cluster Analysis¹⁶

This chapter uses CA to circumvent the limitations of PCA. By interpreting 100% of the research data, the CA can better classify the countries along the “Belt and Road” and use convincing results to explore the determinants of China’s OFDI in these countries.

When using the K-means model to do CA, it should determine the cluster core at first. In this study, the cluster core is determined by the NbClust library¹⁷ and the Calinski-Harabasz Criterion¹⁸. The following is the analysis result from “R” programming language.

The NbClust library and the Calinski-Harabasz Criterion together suggest using 3 cluster cores.

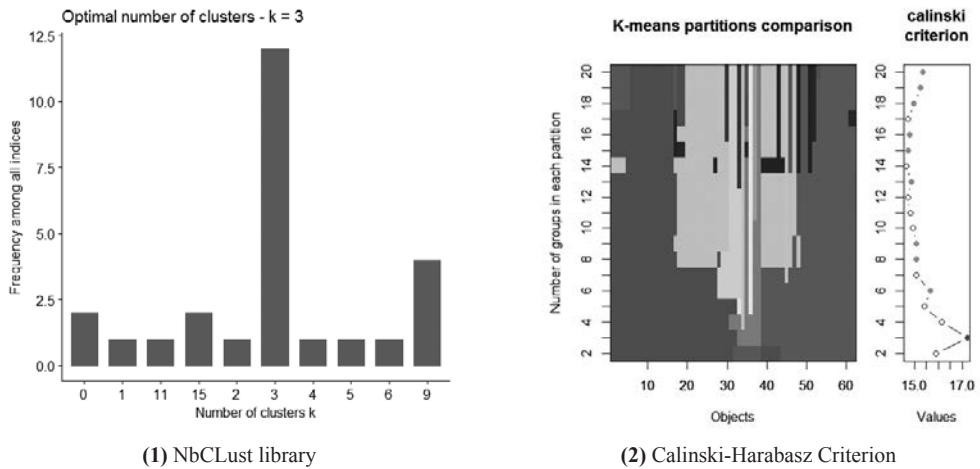
Cluster 1 includes 32 countries. These countries are: 1, 3, 7, 8, 9, 11, 12, 13, 15, 16, 17, 18, 23, 24, 26, 29, 31, 32, 33, 37, 40, 42, 43, 44, 45, 48, 49, 50, 51, 55, 56, & 59 (Armenia, Bahrain, Bosnia and Herzegovina, Brunei, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Georgia, Greece, Hungary, Israel, Jordan, Kuwait, Latvia, Lithuania, Macedonia, Malaysia, Montenegro, Oman, Philippines, Poland, Qatar, Romania, Serbia, Singapore, Slovakia, Slovenia, Thailand, Turkey, & United Arab Emirates). These countries almost have a better economic situation. They are mainly developed economies or have stable economic growth and large economic volume. For example, Singapore, Estonia, Czech Republic, Greece, Hungary, Israel, and Poland are developed economies. And Malaysia, Philippines, and Thailand have stable economic growth in recent years. These countries have higher PCA scores, almost in the head position of $PC > 0$.

16 “Clustering analysis (CA) is a type of statistical amplification that classifies the objects by the data. The common feature of this kind of amplification is that the number and structure of the categories are unknown. According to the data that has been analyzed, the data of similarity or dissimilarity between objects. These similar or dissimilar data are seen as a measure of the distance between objects, classifying these objects which are closed together into one class, and objects which are far from each other into another class.”, Xue Yi, and Chen Liping. (2007). *Statistical Modeling and R*, Tsinghua University Press. p. 466.

$$\text{This study uses Euclidean distance. } D_{ij} = \sqrt{\sum_{k=1}^p (x_{ik} - x_{jk})^2}$$

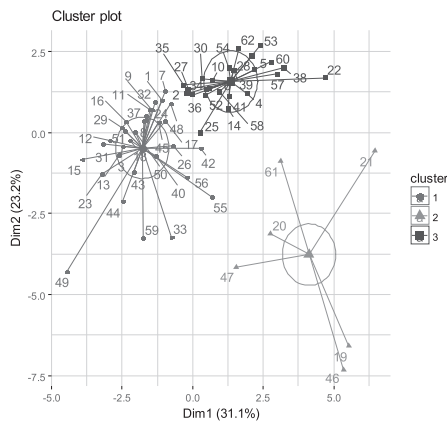
17 “NbClust package provides 30 indices for determining the number of clusters and proposes to use the best clustering scheme from the different results obtained by varying all combinations of number of clusters, distance measures, and clustering methods”, Malika Charrad, Nadia Ghazzali, Veronique Boiteau, & Azam Niknafs. (2014). “NbClust: An R Package for Determining the Relevant Number of Clusters in a Data Set”, *Journal of Statistical Software*, 61(6). <http://www.jstatsoft.org/v61/i06/>. p. 1.

18 “A method for identifying clusters of points in a multi-dimensional Euclidean space is described and its application to taxonomy considered”, Calinski, T., and J. Harabasz.(1974). *A dendrite method for cluster analysis*, *Communications in Statistics*. Vol. 3, No. 1, p. 1.



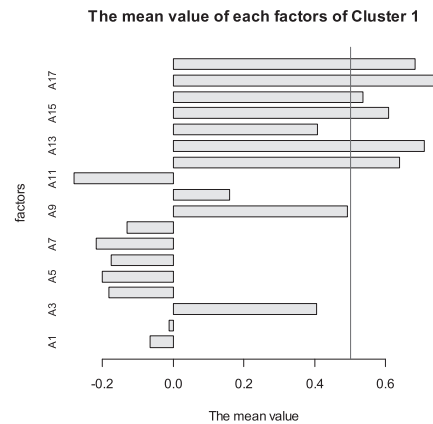
Note: When using the K-means method, the most important point is the number of K. In order to ensure the accuracy of the research, this study uses the above two methods to find the number of K. 14 variables propose 3 as the best number of clusters using the NbCLust library, and 17 variables propose 3 as the best number of clusters using the Calinski-Harabasz Criterion.

Figure.3 number of clusters



Note: The group on the top is Cluster 3, the group in the middle is Cluster 1, and the group at the bottom is Cluster 2.

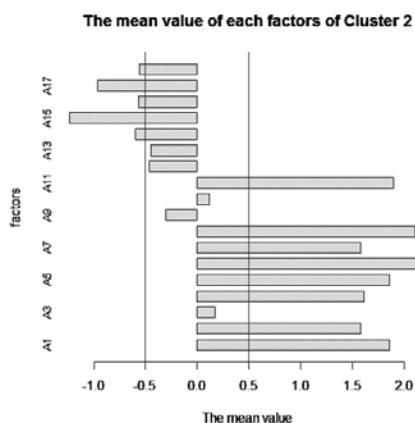
Figure.4 Cluster plot



Note: This line is equal to 0.5. Variables, which are above 0.5, has a bigger contribution on this cluster.

Figure.5 the mean value of each factor of Cluster 1

Figure.5 shows the mean value of each factor of cluster 1, although this cluster also has negative contributors, the main contributing factors are all positive. The main contributing factors are Code A12, Code A13, Code A15, Code A16, Code A17, & Code A18 (Property rights, Government integrity, Monetary freedom, Trade freedom, Investment freedom, & Financial freedom). It can be



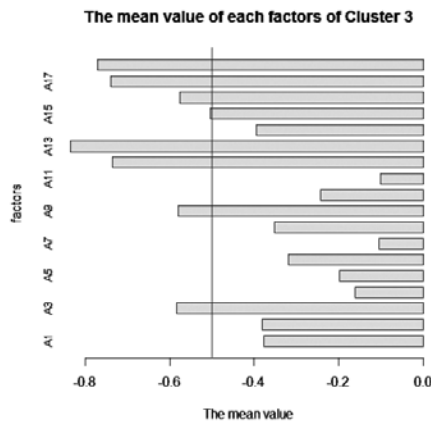
Note: This left line is equal to -0.5 and the right line is equal to 0.5. Variables, which are less -0.5 or above 0.5, has a bigger contribution on this cluster.

Figure.6 the mean value of each factor of Cluster 2

seen that the main contributing factors of this cluster are mainly positive effects for Cluster 1 and these main contributing factors are mainly reflecting the positive investment environments and strong economic growth of the host country.

Cluster 2 includes six countries. These countries are: 19, 20, 21, 46, 47, & 61 (India, Indonesia, Iran, Russia, Saudi Arabia, & Vietnam). These countries can be considered “extreme-countries”. Each country has its special character. India has a very large population like China, which means India has either a huge labor market or a big customer market, and India’s 2015 GDP growth rate is 7.2%. Indonesia also has a large population and it has rapid economic growth. The population of Indonesia has reached 255.4 million in 2015 and 2015 GDP growth rate is 4.79%. Iran and Vietnam have a positive exchange rate control and have a sharp depreciation of the exchange rate. Iran has experienced an economic blockade, which causes a sharp depreciation of the exchange rate, and Vietnam has learned from the experience of the East Asian financial crisis and China’s experience, the government wants to hold a sharp depreciation to help Vietnam to avoid foreign investment withdrawal. Russia also has a large population (reaching 146.3 million in 2015) and it has vast reserves of oil and gas. However, the Russian economy has experienced a serious decline in the past few years. Saudi Arabia is also rich in oil and gas and its economy maintains sustained and steady growth in recent years.

Figure.6 shows the mean value of each factor of Cluster 2. The contribution of each factor in Cluster 2 is significant, and both positive and negative contributions exist. Code A1, Code A2, Code A4, Code A5, Code A6, Code A7, Code A8, & Code A11 (Import from china, Export to china,



Note: This left line is equal to -0.5. Variables, which are less -0.5, has a bigger contribution on this cluster.

Figure.7 the mean value of each factor of Cluster 3

Gas production, Oil production, Capital stock at current PPPs, Population, GDP, & exchange rate) are mainly positive contributions; however, Code A14, Code A15, Code A16, Code A17, & Code A18 (Business freedom, Monetary freedom, Trade freedom, Investment freedom, & Financial freedom) are negative contributions. Moreover, it can be seen that the contribution of each factor in Cluster 2 is much larger or much lesser, which more than plus one or less than minus one and even the contribution of individual factors has exceeded plus two. Although this cluster has a large contribution value, it has a few clustering countries. It can be seen that each country has an abnormal value in these factors.

Cluster 3 includes 24 countries. These countries are: 2, 4, 5, 6, 10, 14, 22, 25, 27, 28, 30, 34, 35, 36, 38, 39, 41, 52, 53, 54, 57, 58, 60, & 62 (Azerbaijan, Bangladesh, Belarus, Bhutan, Cambodia, Egypt, Iraq, Kazakhstan, Kyrgyzstan, Laos, Lebanon, Maldives, Moldova, Mongolia, Myanmar, Nepal, Pakistan, Sri Lanka, Syria, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, & Yemen). The countries of Cluster 3 have a weak economic situation, these cluster countries are the least developed countries in the world or have an unstable economic development or these countries' economic volume is too small. For example, Iraq, Syria, Ukraine, and Yemen have just experienced war or are still in the war, investing in these countries has considerable uncertainty risk, which means risk is greater than economic benefits. Myanmar, Laos, and Nepal are the least developed countries in the world. These countries have lower PCA scores, almost in the reciprocal position of $PC < 0$. Although some countries have stable economic development; however, these countries' economic volume is too small. China's OFDI in these countries is intended to expand China's

political influence.

Figure.7 shows the mean value of each factor of Cluster 3 is all less than zero. The main contributing factors are Code A3, Code A9, Code A12, Code A13, Code A15, Code A16, Code A17, & Code A18 (Mobile phone, Per capita GDP, Property rights, Government integrity, Monetary freedom, Trade freedom, Investment freedom, & Financial freedom). The main contributing factors have a negative impact on Cluster 3. In particular, the investment environments and economic growth of the host country are the contributors to this cluster, but they are all negative contributing factors.

Through CA, this study finds that China's OFDI in Cluster 3 of 24 countries has more risks than benefits, while China's OFDI in Cluster 1 of 32 countries is the opposite, and has more benefits than risks, China's OFDI in the countries along the "Belt and Road" is not only to gain economic benefits but also meant to expand China's global influence. The CA has almost the same result as the PCA.

Removing the six countries of Cluster 2, the remaining 56 countries can be divided into two clusters. The classification of these two clusters mainly depends on the investment environments and the economic growth of the host country. This also reflects that when China's OFDI investing in the countries along the "Belt and Road", pays special attention to the investment environments and the economic growth of these countries. Among these 56 countries, 32 countries have positive investment environments and faster economic growth. It can be seen that China's OFDI in these countries pays more attention to economic benefits, investing in these countries can achieve more economic benefits; however, China's OFDI in the remaining 24 countries, the economic benefits are much smaller than the risks, so China's OFDI investing in the remaining 24 countries is intended to expand China's political influence.

The host country's investment environments have the largest positive contribution in Cluster 1, but the investment environments have the largest negative contribution in Cluster 2. It can be seen that the investment environments is an important influencing factor determining cluster classification. This is the same as expected in this study. The investment environments have become a determining variable in China's OFDI.

In contrast to PCA, which can only explain 72% of the data, CA explains 100% of the data and it is more efficient at classifying countries, which are both suitable for investment and not suitable for investment. The number of countries that are suitable for investment in Cluster 1 is more than the number of countries that are not suitable for investment in Cluster 3. It shows that when choosing the host country, China will opt for the host country with positive investment environments. This is mainly due to the relaxation of OFDI control of Chinese private enterprises after the government proposed the "Go Global" strategy in 2000 and the rapid development of Chinese

private enterprises conducting OFDI has gradually become the leading player of investing abroad¹⁹. However, the scale of Chinese private enterprises is small which means these enterprises do not have enough capital to avoid investment risk when they invest abroad and the investment research on the investment environments of the host country is not sufficient in the early stage, which causes relatively large losses for these enterprises.

But this result has also contributed to the Chinese government doing research on the investment environments of investment countries and regularly releases "White Papers" about the host country's investment environments that supports and warns Chinese private companies to be careful about their overseas investment activities. However, there is still a lack of inter-governmental interaction. Although Chinese enterprises can avoid some investment risks in the early stage, when troubles are encountered in production processes in the host county, inadequate intergovernmental coordination will be a big problem. Furthermore, with the introduction of the "Belt and Road" initiative and the signing of intergovernmental agreements, it has provided not only capital support but also legal support to Chinese private enterprises. On the other hand, Chinese large state-owned enterprises (SOEs)' OFDI often with government political purposes, the scrutiny of these enterprises' OFDI is relatively strict. So vigorously supporting Chinese private enterprises to go abroad not only circumvents these stringent scrutiny issues but also expands China's international influence.

The investment environments of the host country in Cluster 3 are poor, therefore, investing in these countries shows that Chinese companies do not pay attention to the investment environments of these countries. Although this result conflicts with the expected results of this study, it exists in actual investment activities.²⁰ The main reason is why Chinese companies investing in these countries are that these large scales of OFDI are mainly by large SOEs. These large SOEs with national economic construction tasks, which are the acquisition of large-scale mining (LSM) companies and they are also keen to build infrastructure in these countries, such as building ports

19 Ministry of Commerce of the People's Republic of China, National Bureau of Statistics of China, & State Administration of Foreign Exchange. *Statistical bulletin of China's outward foreign direct investment (2003-2015)*, China Statistics Press.

20 There are the same as the host country with negative PCA scores. Buckley et al. (2007) find Chinese OFDI is associated with high levels of political risk. When Chinese enterprises go abroad in the early stage, they always choose the host country with negative investment environments, because these countries are easily enter. This study wants to examine Chinese enterprises invest in the countries along the "Belt and Road" are focusing on their best investment environments, so there are writing "this result conflicts with the expected result of this study", but in the real Chinese enterprises' OFDI activity, some enterprises like to invest in the host country with weak investment environments.

and railways, in order to expand the China's influence and to enhance China's soft power.

6. Discussion

Through PCA and CA, this study finds that when China's OFDI invests in the countries along the "Belt and Road", the first attractive factor is the investment environments of this country. This result is consistent with the purpose of this study. At the same time, it can be seen that China's OFDI in countries along the "Belt and Road" is mostly profit-driven OFDI, which is mainly commercial investment. Another part of China's OFDI is invested in countries with weak economic performance²¹, which may be political investments or tentative investments.

After more than a decade of foreign investment, China has accumulated a lot of experience and lessons. Drawing lessons from past investment failures and carefully analyzing the various risks of the host country has become a must for Chinese companies to go abroad.

The "Belt and Road" initiative is a large-scale international project promoted by the Chinese government and is welcomed by many developing countries. However, when Chinese companies invest abroad, they should not only pay attention to the market size and economic development rate of the host country but also conduct a more detailed analysis of the various risks of the host country. With the rapid growth of China's economy in recent years, China's international influence is also increasing. The "Belt and Road" initiative, which proposed "mutual assistance and win-win" at the end of 2013, reflects China increasing investment in the international economy and international politics. Through the analysis of this study, we can find that the investment in countries along the "Belt and Road" is not only in line with the economic goals of Chinese capital but also consistent with the purpose of expanding China's political influence in the international community.

Besides, compared with the previous research, it is found that the analysis results of this study have certain similarities and shortcomings with the prior research. Buckley et al. (2007) find that Chinese OFDI is associated with high levels of political risk, cultural proximity to host countries and with host market size and geographic proximity (1984 to 1991) and host natural resources endowments (1992 to 2001). Because this study has not used the factors of cultural proximity and geographic proximity to do PCA, we cannot find such result. However, this paper has also found high levels of political risk, the market size and natural resources endowments of the host country are attracted to Chinese firms to invest in. The results of CA are the same as the above results.

Doloiite et al. (2019) shows that the three major risks faced by the countries along the "Belt and Road" are: economic stability risks brought by the single industrial structure; political

21 Under PCA, these countries' PCA scores < 0, and under CA, these countries are in Cluster 3.

environmental risks caused by geopolitics, political change and religious conflicts; and high government debt and credit risk. The report reminds Chinese firms to pay more attention to the risks of host countries when investing in countries along the "Belt and Road". Through PCA, this study shows the investment risk of the host country which Chinese firms should pay attention to when investing in these countries, which is the same as the above results. Moreover, Liu et al. (2018) find that Chinese firms invest in the host countries where Chinese investment is concentrated and invest in industries which already had large Chinese OFDI agglomeration. This means Chinese firms invest in these countries focusing on Chinese OFDI agglomeration and the host country's industries. The results of PCA show that the host country with $PC > 0$ is suitable for OFDI by Chinese firms, mainly because these countries have large economic aggregates and have better economic relations with China.

The current research's result finds that the investment environments variables of the host country are the main reasons for Chinese companies choosing a host country. However, overseas investment activities in the real world may not focus on these variables. This result can also be seen from the PCA scores of each research object. Chinese companies should not have invested in these countries with lower PCA scores (and Cluster 3 from CA), but there are a large number of Chinese enterprises making overseas investment activities in these countries in the real world. That is to say, even if Chinese companies know that this country is not suitable for investment, they are still to make OFDI in a lot of cases. The existence of this phenomenon is caused by a variety of reasons, such as backward production technology which leads to Chinese companies only transferring their backward technology to the host country with more backward technology; Vietnam and Cambodia, for example. On the other hand, even though the Chinese government encourages and supports Chinese companies to invest in the country with positive investment environments, which are generally developed countries or sub-developed countries with high technology; Singapore, for example. Due to the production capability and management ability of Chinese companies, they cannot compete with peer companies in these countries.

However, with the continuous expansion of the scale of Chinese companies' OFDI and the gradual enrichment of their investment experience, some Chinese enterprises have begun to shift their focus of OFDI to these countries with positive investment environments, which have better scores from PCA in this study (and Cluster 1 from CA). The representative case is the Geely Automobile Group has acquired the Volvo brand in 2010, which also means that China's private enterprises have gradually grown up and their management capabilities are also constantly improving.

Under the "Belt and Road" initiative proposed by the Chinese government, Chinese capital has gone abroad and moved towards these countries along the "Belt and Road" to promote and

stimulate these countries' economic development. But it should also be seen that this initiative is a long-term plan. Because of the Chinese enterprises' existing technical levels, even if Chinese companies intend to invest in these countries, they also need to overcome a large number of existing problems, such as sales channels.

Through PCA and CA, this study has observed the specific situation of these 62 research countries and using the PCA score to do the raking for these countries. By observing the characteristics of these countries, we can see why Chinese enterprises chose these countries to invest in at the early stage, which is to consolidate the existing trade and investment relations and is also to expand China's influence in these countries, so the Chinese government stimulates and encourages Chinese companies to invest in these countries. On the other hand, although this study does not use data with other years, through comparative analysis with the previous research, we can also see that the proposal of the "Belt and Road" initiative over the period of 2013 to 2015 is a major turning point for China's overseas investment strategy. The transition from extensive-support to regulatory-support is a big change in China's OFDI strategy and this also is an attempt to realize China's dream of a strong OFDI country.

The above comparison with the prior research shows that although the analysis results of this study has certain deficiencies in data selection, it is also found that the research results of the research on the investment environments of the host country has certain application value.

7. Conclusion

This study uses 18 economic indicators (in 2015) of 62 countries along the "Belt and Road" to conduct PCA and CA, examining the determinants of China's OFDI in the countries along the "Belt and Road". The conclusions are as below.

The difference between this study and the prior literature is that this study uses PCA and CA to examine the interconnections between factors and the relationships between the analysis objects. By analyzing the relationship between these variables, we can observe that those variables play a major role in the determinants of China's OFDI. At the same time, we can also see the commonalities of these countries in the same categories. Therefore, through this research, it can be objectively observed that the similarities between these host countries and the strategy that Chinese capital chooses to invest in these countries.

Through PCA, the result shows that the priority of China's investment in countries along the "Belt and Road" is the investment environments of the host country. Due to a lack of sufficient attention to the investment environments of the host country, China's OFDI has suffered significant losses in recent years. Since the Chinese government has built the "Go Global" policy in 2001, the Chinese

government has strongly supported Chinese enterprises to make OFDI. With the strong support of the "Go Global" policy, Chinese enterprises have launched arbitrary OFDI or blind OFDI. Although Chinese enterprises have made a large amount of OFDI, these enterprises only consider resources (resource-seeking), or the size of the consumer market (market-seeking), or cheap labor, not considering the investment environments of the host country. Therefore, Chinese enterprises have not only made significant achievements in OFDI but also they have caused a lot of losses. A part of the losses is due to the inability to rationally integrate the economic resources acquired by M & As, the other part is due to the lack of sufficient attention to the investment environments (security issues, finance environment issues) of the host country. Therefore, since the Chinese government proposed the "Belt and Road" initiative in 2013, the Chinese government has made more recommendations, which is to consider the investment environments of the host country, on Chinese enterprises' OFDI.

The result of PCA is that half of the countries, which along the "Belt and Road", are suitable for investment and half of the countries are not suitable for investment. Countries, which are $PC > 0$, are suitable for doing investment; investing in such countries can ensure that profits outweigh risks. In contrast, countries, which are $PC < 0$, are not suitable for investment, investing in such countries risks more than economic profits. This result shows that when China's OFDI in the countries along the "Belt and Road", China not only pays attention to economic profits but also meant to expand China's global influence. Through CA, the results show that removing six "extreme-countries" when China's OFDI in 62 countries along the "Belt and Road". Of the remaining 56 countries, 32 countries have better economies, while 24 countries have weak economies. The classification of these two clusters is mainly depending on the investment environments and the economic growth of the host country. This reflects that China's OFDI pays special attention to the investment environments and the economic growth of these countries. China's OFDI in a country with strong economy can obtain more economic benefits. In contrast, China's OFDI in a country with weak economy, the risk is much greater than economic benefits, so China's OFDI in these countries is intended to expand China's political influence.

Through PCA, this study finds that the host country's investment environments variables play a major role in all factors examined in this thesis. It can be considered that after China's government proposed the "Belt and Road" initiative in 2013, the determinants of the host country's choices are the investment environments, and by examining the PCA scores of 62 host countries, these countries can be divided into two groups, which are countries that are suitable for investment ($PC > 0$) and countries that are not suitable for investment ($PC < 0$). The results of the CA also shows that excluding six "extreme-countries", the remaining 56 countries can be divided into two categories, which are countries that are suitable for investment (Cluster 1) and countries that are not suitable

for investment (Cluster 3), as same as the results of PCA. By analyzing these two cluster countries, this research finds that the investment environments of the host country are the main classification variables. Chinese enterprises investing in these countries, which are suitable for investment, can be considered that Chinese enterprises focus on the investment environments of these countries; however, Chinese enterprises investing in these countries that are not suitable for investment, it is concerned with the investment environments of these countries conflicts with the result expected by this research.

However, the prior literature has found that when Chinese enterprises choosing the host country, they mainly choose the country with dictatorships or the country with weak policy governance²². The main reason is that when Chinese companies start to make OFDI, they have insufficient foreign investment experience, weak capital, and weak competitive ability in the international OFDI market. When Chinese companies began to make OFDI and chose a host country, companies from developed countries had already invested in that host country, which had positive investment environments. Therefore, Chinese enterprises do not have the competitive ability to compete with developed countries' enterprises in the initial stage. Therefore, Chinese enterprises can only choose to invest in a country without developed countries' enterprises invested in, due to these countries' worst investment environments. This investment method has continued to the present. It is also under the guidance of this investment strategy that Chinese enterprises suffered a large loss of overseas investment in the early stage. The "Belt and Road" initiative was proposed in 2013 in order to change this existing investment strategy and also to protect the overseas interests of Chinese companies and to promote Chinese capital to go abroad. Under the "Belt and Road" initiative, the countries along the "Belt and Road" have signed the agreement with the intent to cooperate with the Chinese government, which can strengthen exchanges and cooperation between governments, and also provided legal support for Chinese enterprises to enter these countries. At the same time, as China's capital in the international OFDI market continues to grow, Chinese private enterprises have gradually become the main player in the OFDI market, and Chinese capital has begun to invest in the country with more stable investing return rate and positive investment environments. Also, OFDI from SOEs is subject to stricter scrutiny, in contrast with SOEs, Chinese private enterprises' OFDI activities such as overseas mergers are easier to carry out. This has also forced the Chinese government, which is eager to expand its international influence, to strongly support Chinese private enterprises' OFDI activities.

According to the classification from PCA and cluster CA, it can be found that although the

22 Buckley et al. (2007), Alessia et al. (2011), Bala et al. (2011), for example. However, Li. (2016) has found China' OFDI has no relation with poor governance of the host country.

Chinese government has tried to change its investment strategy, Chinese enterprises' OFDI has still existed in these countries with negative investment environments. This phenomenon of Chinese enterprises' OFDI shows that Chinese companies investing in these countries may have other benefits (not only economic benefits but also political or military benefits), which requires Chinese companies need to take measures to avoiding investment risks when they investing in these countries. On the other hand, it also reflects that although the Chinese government supports Chinese companies to invest in the country with positive investment environments, it is difficult to change the present investment strategy in the short-term due to present production technology, management experience, and marketing channel.

Since the 21st century, China has enjoyed rapid economic growth over many years. Although China's economic growth has slowed down in recent years, China can also jointly carry out economic development under the "Belt and Road" initiative. Through PCA and CA, this study finds that the investment objectives of China's "Belt and Road" initiative, not only to make economic profits but is also meant to expand China's global influence.

Finally, the results of this study have some limitations. In this study, only 62 countries along the "Belt and Road" are selected. However, there are 131 countries and regions that have signed the agreement of the Belt and Road Agreement with China until 30 April 2019²³. If selecting 131 countries to do analysis, the results may change. In this study, only 18 economic indicators are selected and among the 18 indicators, seven indicators are reflecting the investment environments of the host country. If using other relevant economic indicators, the results may change. Moreover, this study mainly selects the 2015 data of China's "Belt and Road" initiative. If selecting the data of the "Belt and Road" initiative has implemented several years' data (for example, 2018), the results may change.

References:

- Alessia Amighini, Roberta Rabellotti, & Marco Sanfilippo. (2011). "China's Outward OFDI: An Industry-level Analysis of Host Country Determinants", *CESifo Working Paper*, No. 3688, pp. 1-39.
- Bala Ramasamy, Matthew Yeung, & Sylvie Laforet. (2012). "China's outward foreign direct investment: Location choice and firm ownership", *Journal of World Business*, No. 47, pp. 17-25.
- DEMIR. A.O. (2018). "OFDI ATTRACTIVENESS: AN ATTEMPT TO COMPARE COUNTRIES", *Ecoforum Journal*, 7, issue 1 (14), pp. 54-65.
- Dilip K. Das. (2013). *The Asian economy: Spearheading the recovery from the global financial crisis*, Routledge.
- Ding Guangwei, & Zhang Lei. (2016). "Spatial-Temporal Evolution of Economic Disparity for One Belt and

23 https://www.yidaiyilu.gov.cn/info/iList.jsp?tm_id=126&cat_id=10122&info_id=77298, last access at 2019/07/16.

- One Road”, *Journal of Shanghai Business School*, No. 3, Vol. 17, June, pp. 17-23. (in Chinese)
- Du Julan, & Zhang Yifei. (2017). “Does One Belt One Road initiative promote Chinese overseas direct investment?”, *China Economic Review*, pp. 1-61. (in Chinese)
- Deloitte, & Shanghai Municipal Commission of Commerce. (2018). *the “Belt and Road” National Investment Index Report*. (in Chinese)
- Deloitte, & Shanghai Municipal Commission of Commerce. (2019). *the “Belt and Road” National Investment Index Report*. (in Chinese)
- Felix Barahona Márquez.(2019). “The presence of Chinese businesses in the world”, *Journal of Evolutionary Studies in Business, Volume4*, pp. 1-12.
- Fu Xiumei, Chen Hanxue, & XUE Zhenkai. (2018). “Construction of the Belt and Road Trade Cooperation Network from the Multi-Distances Perspective”, *Sustainability*, 10 (5),1439, pp. 1-16.
- Ika Pratiwi. (2016). “Clustered Regression Models for Analysis and Prediction of Foreign Direct Investment Inflows”, *Linköping University*, pp. 1-64.
- Ivar Kolstad, & Arne Wiig. (2012). “What determines Chinese outward OFDI?”, *Journal of World Business*, No. 47, pp. 26-34.
- Junya Sano. (2017). “Economic relations between China and other countries along the “Belt and Road” ”, *JRI Review, Vol. 4, No. 43*, pp. 24-39. (in Japanese)
- Kang Lili, Peng Fei, Zhu Yu, & Pan An. (2018). “Harmony in Diversity: Can the One Belt One Road Initiative Promote China’s Outward Foreign Direct Investment? ”, *Sustainability*,10 (9), 3264, pp. 1-28.
- Li Shi. (2016). “EMPROCS OF THE DETERMINANTS OF CHINA’S OUTWARD DIRECT INVESTMENT”. *Waseda University Journal of the Graduate School of Asia-Pacific Studies*, No. 31, pp. 1-18.
- Liu Haiyue, Jiang Jie, Zhang Lei, & Chen Xiaolan. (2018). “OFDI Agglomeration and Chinese Firm Location Decisions under ‘the Belt and Road’ Initiative”, *Sustainability*, 10, 4060, pp. 1-22.
- Ministry of Commerce of the People’s Republic of China, National Bureau of Statistics of China, & State Administration of Foreign Exchange. *Statistical bulletin of China’s outward foreign direct investment 2003-2015*, China Statistics Press.
- Miriam Moeller, Michael Harvey, David Griffith, & Glenn Richey. (2013). “The impact of country-of-origin on the acceptance of foreign subsidiaries in host countries: An examination of the ‘liability-of-foreignness’”, *International Business Review*, No. 22, pp. 89-99.
- Peter J. Buckley, Jeremy Clegg, Adam R Cross, Xin Liu, Hinrich Voss, & Ping Zheng. (2007). “The Determinants of Chinese Outward Foreign Direct Investment”, *Journal of International Business Studies* 38 (4), pp. 499-518.
- Peter J. Buckley. (2010). *Foreign Direct Investment China and the World Economy*, PALGRAVE MACMILLAN, pp. 81-162.
- Shen Xianjie, & Xiao Jincheng. (2014). “The New Situation of International Regional Economic Cooperation and China’s “Belt and Road ” Cooperation Strategy”, *MACROECONOMICS*, pp. 30-38. (in Chinese)
- Wang Chengqi, Hong Junjie, Mario Kafouros, & Agyenim Boateng. (2012). “What drives outward OFDI of Chinese firms? Testing the explanatory power of three theoretical frameworks”, *International Business Review* No. 21, pp. 425-438.
- Wang Fangfang, Liu, & Su Cong. (2017). “Outward Foreign Direct Investment and Export Performance in

China", *Canadian Public Policy*, 43(S2), pp. 72-87.

Yao Shujie, & Wang Pan. (2014). *China's Outward Foreign Direct Investments and Impact on the World Economy*, PALGRAVE MACMILLAN.

Yang Dexin. (2003). "Foreign Direct Investment From Developing Countries: A Case Study Of China's outward Investment", *VICTORIA UNIVERSITY, MELBOURNE*, pp. 1-216.

Yang Shu, & Wang Shusen. (2014). "The strategic Conception of the Silk Road Economic Belt and Its Challenges", *Journal of Lanzhou University (Social Sciences)*, Vol. 42, No. 1, pp. 23-30. (in Chinese)

Zheng Nan, Wei Yingqi, Zhang Yabin, & Yang Jingjing. (2016). "In search of strategic assets through cross-border merger and acquisitions: Evidence from Chinese multinational enterprises in developed economies", *International Business Review*, No. 25, pp. 177-186.

Appendix:

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
Armenia	112.4	208.97	119	0	0	84231	2.92	10553337528	3617.94	2.86	477.92	20	36	83	71	85	75	70
Azerbaijan	439.15	222.9	111	135	42126844	193345	9.62	53076244755	5518.72	-0.15	1.02	20	28	75	80	76	55	50
Bahrain	1011.85	111.54	184	99	2465305	281956	1.37	31125910649	22688.92	0.21	0.38	60	48	73	74	79	65	80
Bangladesh	13894.71	816.85	81	156	199200	1815943	161.20	19400000000	1206.36	5.37	77.95	20	27	62.2	68	59	45	30
Belarus	748.9	1010.82	121	1	1494000	548555	9.49	5645477260	5951.52	-3.84	1.59	20	29	72	45	81	20	10
Bhutan	8.12	0.35	86	0	0	40643	0.79	2058875292	2614.82	5.12	64.15	60	63	62	66	49	20	30
Bosnia and Herzegovina	59.98	53.73	97	0	0	120541	3.54	16209779402	4584.26	3.95	1.76	20	42	54	84	87	70	60
Brunei	1407.41	101.16	111	78	5569551	137964	0.42	12930298314	30967.66	-1.79	1.37	35	60	68	77	82	70	50
Bulgaria	1043.26	748.31	128	1	49800	379208	7.18	50201297892	6994.36	4.12	1.76	30	41	69	83	88	65	60
Cambodia	3763.39	666.6	134	0	0	114479	15.52	18049954289	1163.19	5.33	4067.75	25	20	29	79	72	60	50
Croatia	985.56	111.79	104	11	501684	537212	4.24	49518979092	11689.99	2.92	6.86	40	48	56	80	87	80	60
Cyprus	589.67	49.91	132	0	0	170916	0.85	19681499053	23236.50	2.62	0.90	70	63	80	83	88	70	50
Czech Republic	8226.13	2780.45	117	2	149400	2088833	10.60	187000000000	17619.21	5.26	24.60	75	48	68	81	88	80	80
Egypt	11958.58	917.84	100	315	23825412	1446858	93.78	318000000000	3388.26	2.18	7.69	20	32	65	67	70	50	40
Estonia	953.29	234.96	145	0	0	172700	1.32	22566956982	17157.00	1.91	0.90	90	68	82	78	88	90	80
Georgia	768.68	43.79	140	0	49800	89166	3.95	13993289817	3541.24	3.94	2.27	40	49	89	83	89	80	60
Greece	3664.98	285.5	112	0	57850	2444531	11.22	197000000000	17524.95	-0.02	0.90	40	40	73	78	83	60	50
Hungary	5197.45	2875.55	120	12	568266	1331487	9.78	123000000000	12579.21	3.85	279.33	55	54	75	79	88	75	70
India	58228.03	13368.55	76	222	38225456	28852528	1309.05	215000000000	1639.00	6.90	64.15	55	36	43	65	65	35	40
Indonesia	34341.97	19886.19	131	474	39333540	15735569	258.16	861000000000	3334.55	3.65	13389.41	30	32	49	75	75	40	60
Iran	17770.11	16057.45	94	1113	161137792	5202117	79.36	393000000000	4957.58	-2.50	29011.49	10	25	57	49	41	0	10
Iraq	7909.23	12674.63	93	47	16772848	894749	36.12	161000000000	4466.66	0.64	1167.33	0	16	58	74	0	0	0
Israel	8615.95	2802.03	131	50	19422	1054747	8.06	300000000000	37258.24	1.02	3.89	75	61	72	82	89	80	70
Jordan	3424.4	287.52	151	1	1096	297003	9.16	37922655824	4140.34	-1.34	0.71	60	45	59	81	80	70	60
Kazakhstan	8441.24	5848.95	148	223	81277424	1043418	17.75	184000000000	10388.29	-0.34	221.73	25	26	74	75	79	40	50
Kuwait	3772.67	7497.07	149	99	130404368	607879	3.94	115000000000	29113.71	-3.33	0.30	45	43	59	74	76	55	50
Kyrgyzstan	4282.12	58.57	129	0	49800	72440	5.87	6678177483	1138.57	2.27	64.46	20	24	74	74	80	60	50
Laos	1225.76	1547.34	56	0	0	123026	6.66	14390395091	2159.43	5.86	8147.91	15	26	60	75	59	30	20
Latvia	1022.51	144.59	130	0	0	351142	1.99	26972836776	13536.08	4.18	0.90	50	53	82	84	88	85	50
Lebanon	2285.53	17.32	80	0	0	436966	5.85	49973893304	8540.39	-3.84	1507.50	20	28	55	72	76	60	60
Lithuania	1210.9	138.79	143	0	99600	305151	2.93	41516701871	14160.21	3.06	0.90	60	57	85	81	88	80	80
Macedonia	86.53	132.7	100	0	0	138621	2.08	10064513038	4840.32	3.77	55.54	35	44	79	79	86	60	60
Malaysia	43980.39	53277.33	144	459	29753930	2468706	30.72	297000000000	9655.14	3.40	3.91	55	50	94	81	80	55	60
Maldives	172.65	0.18	177	0	0	18560	0.42	4109416452	9821.67	0.39	15.37	25	22	86	74	48	30	30
Moldova	99.96	21.47	91	0	0	89944	4.07	6512894429	1601.80	-0.33	18.82	40	35	67	76	80	50	50
Mongolia	1570.7	3795.38	103	0	1038175	150862	2.98	11749628125	3946.96	0.56	1970.31	30	38	68	69	75	50	60
Montenegro	134.15	24.27	160	0	0	138621	0.63	4053084542	6452.13	3.31	0.90	40	44	77	80	85	65	50
Myanmar	9650.91	5449.3	78	96	996000	507124	52.40	62543490878	1193.49	6.01	1162.62	10	21	29	66	74	15	10
Nepal	832.71	32	96	0	0	224163	28.66	20801203122	725.89	2.12	102.41	30	31	66	71	62	5	30

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
Oman	2116.39	15047.42	158	216	46985288	627353	4.20	68921363014	16410.59	-1.30	0.38	55	47	68	76	77	65	60
Pakistan	16441.89	2474.76	66	241	4662945	1772808	189.38	267000000000	1410.05	2.61	102.77	30	28	66	71	66	50	40
Philippines	26670.79	18965.65	116	24	1045800	2445688	101.72	293000000000	2878.34	4.38	45.50	30	36	55	79	75	60	60
Poland	14344.87	2741.95	143	40	959025	2399120	38.27	478000000000	12480.72	3.91	3.77	60	60	67	81	88	70	70
Qatar	2275.64	4614.37	151	1056	76713152	1088489	2.48	165000000000	66346.51	-0.92	3.64	70	68	71	80	82	45	50
Romania	3162.24	1294.95	116	73	4152404	1675339	19.88	178000000000	8950.85	4.48	4.01	40	43	70	77	88	80	50
Russia	34756.88	33258.66	158	4248	503332960	16027297	143.89	137000000000	9510.19	-2.59	60.94	20	28	76	64	75	25	30
Saudi Arabia	21612.93	30021.05	167	553	484820064	6127395	31.56	654000000000	20732.86	1.53	3.75	40	46	66	68	76	40	50
Serbia	415.1	133.74	130	4	838550	480564	7.10	37160324271	5237.25	1.27	108.81	45	42	58	72	78	75	50
Singapore	51942.44	27580.76	149	0	0	1930808	5.54	304000000000	54937.28	0.64	1.37	90	86	97	84	90	85	80
Slovakia	2794.47	2237.32	123	1	9960	636763	5.44	87769595120	16136.14	4.05	0.90	50	47	70	76	88	80	70
Slovenia	2091.74	289.51	113	0	249	415995	2.07	43101994937	20774.17	2.11	0.90	60	57	81	81	88	70	50
Sri Lanka	4304.05	258.52	115	0	0	850571	20.71	80604076558	3891.28	4.55	135.86	35	37	73	68	72	30	40
Syria	1022.57	3.59	76	34	1128482	375078	18.73	19090102132	1018.95	-3.79	237.03	10	17	57	72	72.8	0	20
Tajikistan	1795.39	52.04	99	0	10259	442417	8.55	7854581151	918.81	3.66	6.16	20	22	65	70	75	25	30
Thailand	38290.8	37168.75	150	241	11628626	4800820	68.66	401000000000	5846.39	2.66	34.25	40	35	73	70	75	45	60
Turkey	18607.84	2943.64	94	3	2374027	7915223	78.27	860000000000	10984.77	4.40	2.72	45	50	61	72	85	75	60
Turkmenistan	815.47	7827.66	141	574	12097580	512610	5.57	36051602135	6477.94	4.56	3.48	5	17	30	64	80	0	10
Ukraine	3515.71	3555.8	144	128	2016544	2181731	44.66	91030968761	2038.42	-9.32	21.84	20	25	59	79	86	15	30
United Arab Emirates	37020.16	11514.03	196	367	140436000	2697431	9.15	358000000000	39122.04	4.11	3.67	55	69	75	84	82	40	50
Uzbekistan	2228.76	1267.06	70	396	3227313	415330	30.98	66903881610	2159.86	6.21	2567.99	15	17	73	64	70	0	10
Vietnam	66017.02	29831.75	129	70	14858273	1426517	93.57	193000000000	2065.17	5.51	21697.57	15	31	62	67	79	15	30
Yemen	1429.97	898.14	56	64	6229639	233432	26.92	26660296291	990.49	-32.02	214.89	30	18	54	69	78	50	30

Keywords: the “Belt and Road”, China’s outward foreign direct investment, Principal component analysis, Cluster analysis, investment environments

(YAN Xuchong)