

Study on the Factors Influencing the Import of China Energy and Mineral Trade from Central Asian Countries

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Abstract: *In the background of "the Silk Road Economic Zone" and the establishment of "Asian Infrastructure Investment Bank", the trade cooperation between china and Central Asian countries is particularly important. The energy and mineral fields have been the focus of cooperation between Central Asian countries and china. Therefore, firstly, this paper makes analysis on energy mineral products trade, in-depth understanding of the status of this kind of trade between the two countries, following this, we analyze panel data from 1995to2013 in China from Central Asian countries to import of mineral products trade . The result shows that the four elements are most important for import trade between china to Central Asian countries on energy mineral products. These four factors are the production capacity of the Central Asian countries, the degree of economic cooperation between China and Central Asian countries, the overall index of the logistics performance of the Central Asian countries to measure the degree of development of the country's infrastructure, whether there is a common border. Finally, we put forward relevant policy recommendations according the empirical results.*

Keywords: Central Asian countries, factors, gravity model, energy

1. Introduction

Central Asian countries are adjacent to China's Xinjiang, not only have a wealth of natural resources, but also a huge market potential, since ancient times, China and Central Asian countries have close trade ties. In 2001 China cooperation with Central Asian countries continue to expand ,such as transportation, energy, mining, telecommunications, logistics and other areas Under the background of the establishment of the Shanghai Cooperation Organization.

In 2013, President Xi Jinping proposed the strategy of "The Belt and Road", the Central Asian countries is an important part of the construction of Silk Road Economic Belt ", in 2016, the Asian investment banking open, it will continue to improve the domain of emerging markets and developing countries, It will promote economic development in Asia, especially the construction of infrastructure, which will broad prospects for trade cooperation with Central Asia countries. Therefore, the Central Asian countries will usher in opportunities for development, China's trade cooperation with Central Asian countries will also be a new situation.^[1]

Under the background of "The Belt and Road, Cooperation between China and Central Asian countries has New opportunities , so studying the factors affecting China and Central Asia countries in the trade become the key. Cooperation in the field of energy and mineral resources has been an important area of cooperation between China and Central Asia. Which factors restrict the further improvement of trade cooperation? Which is the key on the development of energy and mineral field between china and Central Asian countries? These are the problems to be solved in this paper. The research of this paper provides an empirical basis for the formulation of energy and mineral trade strategy, which is important to the construction of the Silk Road Economic belt.

2. Analysis of China's import of energy and mineral products trade from Central Asian countries

China's consumption of mineral resources such as crude oil, natural gas, iron ore and non-ferrous metals is gradually increasing, due to the constraints of resources and production capacity, China has to rely on a large number of imports to meet domestic demand. ^[2]Central Asia is the third largest energy mineral reserves in the Middle East and Siberia. Therefore, this section including three aspect: scale, market structure, product structure, to analyze the current situation of china's import from Central Asian countries.

2.1 Scale

Table 1:China imports of energy and mineral products from Central Asian countries

Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
1995	129	32.3	1.432	1.19	1.96
2000	722	26.66	21.4	0	0.32
2005	2250	16.6	8.29	0.052	30.3
2010	13161	15.69	47.8	885	22.2
2011	14830	29.2	64.5	4120	16.9
2012	14871	47.7	85.4	7560	66.03
2013	12862	38.01	70	7910	871.93

From view of trade scale, trade volume is so different between two countries. Kazakhstan is the largest trading partner of Chinese, 1995 -2013, China imported mineral products increased from \$129 million to \$12 billion 862 million, a huge increase in trade volume, especially from 2005 to 2010 five years, the trade volume increased by 4.8 times.

After 2010, the trade volume changes small, basically maintained at a higher level; in recent years, Chinese imports from Turkmenistan and Uzbekistan is the most obvious change, before 2005, the trade volume is almost zero, since 2005, imports from Turkmenistan rise rapidly, from \$52 thousand in 2005 rose to \$7 billion 910 million in 2013, became the second largest trade partner of energy and mineral products in Central Asian countries.^[3]

Similarly, China's imports of energy and mineral products from Uzbekistan also showed rapid growth, in 2012 -2013, only one year, the trade volume increased by 12.2 times. Thus, China and Uzbekistan has great potential in energy and mineral field. Relatively speaking, the trade volume has Smaller change between China and Kyrgyzstan in mineral products in recent 30 years, the annual trade volume of 1995-2010 gradually declined, then rebounded in 2013 showed a small decline in the trend; trade volume of mineral products fluctuates greatly between china and Tajikistan, especially before 2010, showing the phenomenon of change rapidly, after 2010, steady growth.

In general, 1995-2013 years, China's imports amount from the Central Asian countries have a large change in energy and mineral products, in addition to their own resources endowments, which is closely related to the field of energy and mineral cooperation projects.

2.2 The Market Structure

The first section analysis the scale between China's and Central Asian countries in energy and mineral products, this section as the total number of countries to analyze the proportion of five countries. From table 2 ,we can see that the 2000-2010 Chinese and Central Asian countries can mineral products trade plays a decisive role in the Kazakhstan, in recent years, Turkmenistan natural gas exports to China soared in 2013 the proportion of up to 36.4%. Uzbekistan's share has also risen. Kazakhstan and Turkmenistan become an important partner of China's trade in mineral products in central Asia.

Table 2: The distribution of China's mineral products import market in Central Asian countries
 Million dollar

Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
1995	0.778	0.195	0.009	0.007	0.012
2000	0.937	0.035	0.028	0.000	0.000
2005	0.976	0.007	0.004	0.000	0.013
2010	0.931	0.001	0.003	0.063	0.002
2011	0.778	0.002	0.003	0.216	0.001
2012	0.657	0.002	0.004	0.334	0.003
2013	0.591	0.002	0.003	0.364	0.040

2.3 Analysis on the structure of imported mineral products from five Central Asian countries

Table 2 shows the proportion of China's imports of from Central Asian countries in energy and mineral products. In 2013, Chinese imported from Kazakhstan mineral products

accounted for as high as 89%, of which the amount of imports of crude oil imports accounted for 60%, thus, energy and mineral products Play an important role in trade. From the vertical perspective, proportion that China imports crude oil from Kazakhstan increased, the proportion of copper, iron, zinc, products have been a large proportion; in 2013, the data accounted for 55%, of which a large proportion of the crude copper and oil refining, aluminum products in recent years, the proportion of the rapid decline; from the recent trade situation, products are mainly concentrated in aluminum, lead ore, zinc ore, ore and other aspects.

The products are single that Uzbekistan and Turkmenistan exports to china compared to Kazakhstan 's.2000-2010, Uzbekistan exports a lot of refine oil to China, and in 2013 exports of oil and natural gas accounted for 47% of total exports to China soared; before 2010, China and Turkmenistan's energy and mineral trade almost zero. After2010, with the natural gas pipeline the soil built, the output of oil and natural gas exports to China accounted for 99% of the total.

3. An Empirical Analysis on the Influencing factors of China's Import of mineral Products trade from Central Asian Countries

3.1 The construction of gravity model and the description of variables

In the empirical analysis, the gravity model is derived from Newtonian gravitation. As early as the gravity model is applied to the field of international trade is Tin Bergen (1962) and Poyhonen (1863), they think their economic size and quantity is proportional to the bilateral trade flows between the two countries, and is inversely proportional to the distance between the two countries. This is the basic gravity model.^[4]

$$X_{ij} = A(Y_i Y_j) / D_{ij}$$

Where X_{ij} represents export volume from country i to country j, Y_i , Y_j , respectively, said I countries and j countries GDP, D_{ij} said the distance between i and j. Since then, the researchers have introduced the population, preferential trade agreements, trade restrictions, colonial relations, etc. Based on the above analysis, we introduce variables to get the following model.

$$\ln Y_{ij} = c + \alpha_1 \ln X_{ij} + \alpha_2 \ln disr + \alpha_3 \ln wgdp + \alpha_4 \ln zgdp + \alpha_5 \ln eco + wto + sco + B + \alpha_6 \ln dp + \alpha_7 \ln w$$

Y_{ij} represents Export volume from country I to country j, X_i stand for country mineral products GDP (taking into account the availability of data and consistency, we use the classification standard of energy and mineral products of global exports instead of smaller economies, Central Asian countries, the production of energy mineral products, mainly for export, so this alternative has certain rationality), $Disr$ shows the relative distance from I and j.

$$Disr = gdp_i / gdp_w * Dis$$

Which gdp_i said I country's GDP, gdp_w said the total global GDP. Using the relative distance is mainly because the

cross section data is less, the absolute distance, every state of the distance is constant, the singular matrix, so that the model cannot be estimated, the absolute distance will eliminate this phenomenon. WTO is a dummy variable, if the two countries are joining the WTO, it uses 1 to stand it, or is 0. SCO is a dummy variable, if both countries joined the Shanghai cooperation organization, it uses 1 to stand it, or 0. Similarly, B representatives of the two countries have a common boundary, if it has, use 1 to stand it. DP representatives of Per capita income gap in two countries, ECO on behalf of the amount of economic cooperation between the two countries.

Table 3: Shows the explanatory variables

Variable symbol	Expected symbol	theoretical explanation
X1	+	The output value of the export country can reflect the supply capacity of the country's mineral products, the greater the output value, the greater the export potential
DISR	-	Distance is a repulsive force in the trade gravity model, which is commonly used to measure the resistance between bilateral trade. Distance reflects the distance of transportation, thereby increasing the cost, not conducive to the expansion of trade flows
WGDP	+	The per capita GDP of the exporting country represents the export capacity of the country and has a positive effect on trade flows.
ZGDP	+	The per capita GDP of the importing country represents the import demand of the importing country and is also positive to the trade flow
B	+	Dummy variable. Generally speaking, if there is a public boundary between the two countries, there will greatly reduce the cost of international trade transportation, communication barriers between countries
WTO	+	Dummy variable. The world trade organization, if the two countries belong to a trade organization, with the help of trade coordination mechanism and the reduction of trade barriers, it can increase trade flows between the two countries
SCO	+	Dummy variable. Shang Hai cooperation organization. If the two countries belong to a trade organization, trade barriers can be increased by reducing trade barriers and trade barriers.
Ln DP	-	Linde demand similarity theory pointed out that the main influence factors of the demand structure is the level of per capita income, the income gap is bigger, the demand structure is different, which restricted the development of trade.
Ln EC	+	Japanese economist Zhou Qing believes that foreign direct investment and trade promotion. Since the five Central Asian countries are smaller, the FDI value is too small before 2000, it is difficult to obtain, so this paper uses the economic cooperation between China and the five Central Asian countries.
Ln w	+	Logistics performance index. Comprehensive index to reflect the efficiency and quality of transport facilities, trade related basic clearance process quality, difficulty of freight. The more perfect infrastructure, the more conducive to trade between China and central Asia.

3.2 Sample and Data Sources

The research object of this paper is five countries of China and Central Asia. According to the availability of data, the panel data of trade flows between China and Central Asian countries from 1995 to 2013 were selected. Among them, China's imports trade data from UN Comtrade, the HS standards are used to classify energy and mineral products. [4]The per capita GDP of all countries from the world bank website, the volume of economic cooperation from the National Statistical Yearbook (the lack of 1995-1998 China and the five Central Asian countries will complement the data, according to the growth trend of data). [5]The distance between the capitals of the two countries comes from <http://www.indo.com>, and the time for each country to join WTO and SCO comes from the official website of the World Trade Organization and the Shanghai cooperation organization.

3.3 Analysis of model results

In this paper, we study the panel data of 5 countries with 1995-2013 section data, using Eviews7.2 regression. First, test of stationarity using Eviews7.2, respectively, the unit root test on variable LN_{DP}, ln_wgdp, ln_x1, ln_Y, ln_ZGDP, ln_{Disr}, due to the constant variables and dummy variables cannot be tested here, so don't test the class variable. Finally, the results of each variable are shown in the following table. The results show that the data is stable and can be used for regression analysis.

Table 4: results of unit root test

variable	Representative variable	method	P-Statistic	conclusion
D (lnx1)	total output value	Levin, Lin & Chu t*	0	stable
		ADF - Fisher Chi-square	0	
		PP - Fisher Chi-square	0	
D (ln _{dp})	Per capita income gap	Levin, Lin & Chu t*	0.0157	stable
		ADF - Fisher Chi-square	0.0001	
		PP - Fisher Chi-square	0	
D (ln _w gdp)	Per capita GDP	Levin, Lin & Chu t*	0	stable
		ADF - Fisher Chi-square	0.0011	
		PP - Fisher Chi-square	0.001	
D (ln _y)	China Import amount in energy and mineral from five countries	Levin, Lin & Chu t*	0	stable
		ADF - Fisher Chi-square	0	
		PP - Fisher Chi-square	0	
D(ln _Z GDP)	China's per capita GDP	Levin, Lin & Chu t*	0	stable
		ADF - Fisher Chi-square	0	
		PP - Fisher Chi-square	0	
D(ln _{Disr})	Relative	Levin, Lin &	0	stable

	distance	Chu t*	
		ADF - Fisher Chi-square	0.0005
		PP - Fisher Chi-square	0.0001

Secondly, we can find that in the fixed model, stochastic model and mixed model, the mixed model is the best choice. We can see that the three models adjusted R2 are about 0.98, indicating that the model explained the dependent variable of 98%, has a strong explanatory power, indicating that the model has a good fit.

Table 5: The three models

variable	Model 1	Model 2	Model3
C	-2.2685	-0.9050	-10.0003
	(-1.3134)	(-2.3242*)	(-2.4432*)
lnX1?	0.3628	0.2665	0.2564
	(2.6276*)	(1.8291)	(1.8543*)
lnDISR?	2.0024	1.8593	1.7622
	(5.7220*)	(5.1183*)	(5.0062*)
lnWGDP?	-0.9461	-0.9892	-0.8279
	(-1.6737)	(-1.8163)	(-1.5549)
lnZGDP?	0.9451	1.1906	1.1145
	(2.3283*)	(1.1906*)	(3.0060*)
B?	3.7144	4.1245	4.0254
	(7.6176*)	(8.2601*)	(8.2108*)
WTO?	-0.0126	-	-
	(-0.0402)	-	-
SCO?	0.0657	0.0267	-
	(0.1867)	(0.0819)	-
lnDP?	-0.0728	-	-
	(-0.4908)	-	-
lnEC?	0.0985	0.1063	0.1150
	(1.3342*)	(1.5468*)	(1.8069*)
lnw?	-	6.0276	5.7493
	-	(2.0725*)	(2.0585*)
Adjusted-R2	0.9815	0.9793	0.9816
F-Statistic	483.3985	486.6783	604.7170

In model 1, we can see x1, disr, zgdp, EC, B of the five variables through a significant test showed that the output value, relative distance, GDP per capita, economic cooperation, the existence of a common boundary has a strong explanatory power. However, the per capita GDP of Central Asian countries, whether to participate in the world trade organization, whether to participate in the SCO, the GDP gap between the two countries are not important. Model 2 was removes two variable, adding a new variable W. Model 3 is further modified to model 2.

According to the model 3, it can be obtained, first, each increase of the five Central Asian countries energy, mineral products 1% of GDP, China trade volume increased by 0.26 percentage points; second, the relative distance is positive, contrary to expectations, mainly because the actual distance of the five Central Asian countries and China are similar, the difference is small proportion of GDP as weight, influence the reverse distance; third, the amount of Chinese economic cooperation with Central Asian countries increased by 1%, China's trade volume increased by 0.12 percentage points;

fourth, logistics performance comprehensive index increased 1%, the trade volume increased by 5.75 percentage points; fifth, whether there is a common boundary has great influence on the trade volume; sixth, per capita GDP Chinese 1%, trade volume increased by 1.11 percentage points. Have a greater impact.

In short, the production capacity, economic cooperation with Central Asian countries, logistics performance index, whether there is a common boundary for China from Central Asian countries have a greater influence on trade of china import energy and mineral products from the five countries. The production capacity of energy mineral products in five countries mainly depends on the natural resources and the mining technology. Comprehensive performance index reflects the comprehensive index of logistics facilities efficiency, trade and transport quality related basic clearance process quality, difficulty of freight. It has a great impact on China's imports of energy and minerals from Central Asian countries.

4. Conclusions and Recommendations

To sum up, from the current situation of c imports of five Central Asian countries energy, mineral products trade, the past 20 years, China's trade volume changes greatly, especially between China, Kazakhstan, Uzbekistan, shows that China and the cooperation in the field of energy and mineral resources gradually. Therefore, it is necessary for us to analyze further, in addition to their own natural resources, which factors affect China's imports from the Central Asian countries

The model shows that the production capacity, China economic cooperation with Central Asian countries, logistics performance index, there is a common boundary have a greater influence on trade of china import energy and mineral products from the five countries.

Central Asia is second only to the Middle East and Siberia, the third largest energy mineral reserves, in recent years, China's imports from Central Asia can rapidly increase the number of mineral products. Cooperation between Central Asia and the United States, India, Russia and other countries in the energy sector has gradually expanded, and in the deployment of China's "The Belt and Road" strategy, Central Asia is an important hub in East Asian economic circle, European economic circle, and Turkmenistan and other Central Asian countries to carry out energy cooperation with China under the new situation along the strategy. Therefore, China and the five Central Asian countries should seize this important strategic opportunity to deepen cooperation between China and Central Asia in the field of energy and mineral.^[6]

Firstly, seize the opportunities of Asian investment bank, improve infrastructure construction in Central Asian countries. According to the analysis of this paper, the impact of infrastructure construction is great. Therefore, in the context of the construction of the Silk Road Economic Zone, it is necessary to increase investment in infrastructure in Central Asian countries. Asian investment bank is a regional multilateral development institution of an intergovernmental

nature, focusing on infrastructure construction, the Central Asian countries should seize the opportunity to attract funds, China should expand investment in Central Asian countries at the same time, and also transfer advanced technology to Central Asian countries.

Secondly, strengthen economic cooperation with Central Asian countries, in particular, deepen cooperation in the field of energy. First of all, from the empirical results, the economic cooperation between China and Central Asian countries will greatly promote Import volume; secondly, China's energy cooperation with Central Asian countries has achieved initial success, and gradually change mine cooperation mode, the construction project of the five Central Asian countries share or invest directly involved in the development of energy and mineral resources in Central Asia, enriching the bilateral energy industry and mineral resources development cooperation. The Central Asian countries to Chinese industrial backwardness, the biggest demand is the equipment manufacturing industry, energy and mineral exploration equipment and mineral processing technology and equipment, the equipment for resources mainly refers to meet the demand for the infrastructure of the five Central Asian countries actively.

Thirdly, from the geopolitical point of view, the cooperation of China and Central Asia should have different points in the energy and mineral filed. [7]China have a common border with Kazakhstan, Kyrgyzstan, Tajikistan, energy cooperation in the field of time is longer, but in recent years, It has greater potential with Turkmenistan, Uzbekistan. Therefore, the cooperation of the Central Asian countries should break through the limitations of the original geographical position.

References

- [1] Zhang Xiaojing, Li Liang. "Belt and Road Initiative" and Chinese export trade: trade facilitation [J]. Asia Pacific Economic Perspective Based on 2015 (3): 21-27.
- [2] Wang Shuyi, Liang Danhui, et al. Analysis of factors affecting agricultural trade between China and Central Asia [J], 2014,10(12):65-69.
- [3] Wang Yunfeng, Meng Shuo. Analysis of the gravity model to China in developing the agricultural product market potential -- Taking Kazakhstan, Kyrgyzstan as an example [J]. based on world agriculture, 2012 (4): 66-69.
- [4] Aisai provided Jiang, Guo Yu Christmas. The five Central Asian countries trade facilitation degree analysis [J]. Xinjiang Social Sciences, 2012 04:75-80.
- [5] Ma Li. Study on the influencing factors and potential of trade between Northwest China and Central Asian countries [J]. Gansu Social Sciences, 2014 (6): 179-181.
- [6] Gong Xinchu, Ma Jun. the influence of transportation infrastructure on the regional trade of the Silk Road Economic Zone [J]. business economics, 2014 (3)
- [7] Tan Xiujie, Zhou Maorong. The trade potential and its influencing factors of the maritime Silk Road in twenty-first Century: An Empirical Study Based on Stochastic Frontier gravity model [J].international trade issues, 2015, 02:3-12.

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