

Empirical Analysis of Kyrgyz Trade Patterns

Elvira KURMANALIEVA *

Abstract

Being naturally located between two big markets in Europe and Asia, Kyrgyzstan together with other Central Asian countries does not have a direct access to sea ports. Landlockedness limits volumes of international trade and creates obstacles for economic growth. Results of statistical analysis show that Kyrgyz trade neither follows Heckscher-Ohlin model nor intra-industry trade model. Another finding is that open and liberal trade policy of Kyrgyzstan has a large positive effect on trade volumes, suggesting that bilateral trade will expand markedly if country continues liberalization of its trade policy with other countries. Quality of infrastructure and transportation costs play a crucial role for landlocked countries and a free trade agreement with other countries looks like a good opportunity to overcome natural barriers and diversify their trade.

Keywords: Geography and Trade, Kyrgyzstan

JEL Classification Codes: F10, F13, F17

* National Graduate Institute for Policy Studies, Japan, email: ekurmanalieva@yahoo.com

1. Introduction

Together with other Central Asian republics Kyrgyzstan used to play an important role in international trade. The Silk Road, linking China and the Roman Empire, forked through the central Asian region, was an important trade route between the East and the West. Goods were passing on from stage to stage, requiring sophisticated trade arrangements, financial transactions and political stability. The sea route connecting the East and the West was not yet discovered. These days being over 3600 km from the nearest open sea port, Kyrgyzstan is the second (after neighboring Kazakhstan) most remote of all landlocked countries.

The first years after the dissolution of the Soviet Union in 1991 were especially painful: collapse of the command economy triggered breakdown of trade links among the former Soviet Union republics, surge of inflation and led to the shortages of necessity products. However, by the end of XX century, Kyrgyz government had largely succeeded in stabilizing economy and establishing rudimentary market institutions. Despite the geographic backwardness, overall trade had increased rapidly - from 0.7 billion US dollars in 1992 to 1.1 billion US dollars in 1999. After a slight decline in the wake of the Russian crisis in late 1990s, overall trade has risen by 2.5 times from 2000 to 2006. The increase in trade has been accompanied with two notable developments: 1) trade shares of European Union and China has risen at the expense of the former Soviet Union (FSU) countries; 2) the concentration of export in primary products has further accelerated.

Despite achieved macroeconomic stability and the most open trade policy among former USSR, it still faces challenges in finding its comparative advantages and its niche in the world markets. With the rapid economic growth in China and the recent economic rebound in Kazakhstan and Russia, Kyrgyzstan should be naturally positioned to take advantage of increased demand from its large neighbors. The land route between East Asia and the European Union (EU) can be a potential trade corridor that will remake the country as an important trade route in the world. Trade with its large neighbors presents a great opportunity for a country to enter into a stage of potentially strong economic growth when the trade patterns between the country and its neighbors are largely complementary.

This paper's objective is to identify major factors behind the changes in Kyrgyzstan's trade patterns and estimate their relative importance. The gravity model framework also allows us to address the specific questions in mind with

regard to Kyrgyzstan trade. What are the fundamental determinants of trade in Central Asia? Are traditional variables of gravity models such as economic size, per capita income, distance, and common border are significant explanatory variables? Does institutional quality matter in facilitating trade within Central Asia and with the rest of the world? Finally, does Kyrgyz trade fit into the Heckscher-Ohlin trade model?

The remainder of this paper is organized as follows. Section 2 describes recent developments of Kyrgyz trade. Section 3 provides a presentation of the methodology and the data used in the empirical analysis, followed by presentation of the empirical results and Section 4 concludes.

Specific underwriting criteria whose effects can be studied include the depth and scope of a medical or paramedical exam, the usage of these tests can be included in the study by incorporating historical underwriting guidelines. In the United States, the top five medical tests used to evaluate preferred lives business are blood pressure, cholesterol, cholesterol ratio, built and family history. In each case it is the actual result of the test, and not just the existence of the test, that is important. Currently, however, few companies store this level of historical underwriting data electronically.

2. Trade Patterns of Kyrgyzstan

Political and economic transition proved to be difficult and challenging process in Kyrgyzstan. The independence brought both opportunities and dilemma to the country as regards to its foreign trade policy. Should it try to keep trade links that existed before 1991, or should it liberalize trade and undertake industrial restructuring? Structural transformations have made past trade links neither efficient, nor possible. The possible reorientation of the trade from Russia and other FSU republics to China and South Asia needed time for creating infrastructure and overcoming political problems.

Kyrgyzstan embraced relatively fast privatization and liberalization. According to EBRD, a private sector to GDP ratio is the highest in the region. However, macroeconomic stabilization mostly relied on external borrowings. A discovery of gold deposits in the early 1990s attracted foreign direct investments to this sector. Various regional arrangements have been initiated (see Figure 1): the Economic Cooperation Organization (ECO) in 1992, the Central Asian Cooperation (CACO) in 1997, the Eurasian Economic Community (EEC) in 1997 and Shanghai Cooperation Organization in 2001. All these agreements proved to be formal political regional

groupings rather than effective regional trading arrangements (Pomfret, 2003). In addition, the country has been granted access to the European Union’s Generalized System of Preferences (GSP) and signed GSP agreements with the United States. These agreements were aimed at opening new markets and diversifying trade. Together with regional arrangements the country tried to make inroads into the world markets. Kyrgyzstan passed through the admission process to WTO membership first in the region because there has been little concern over its impact on the world trading system.

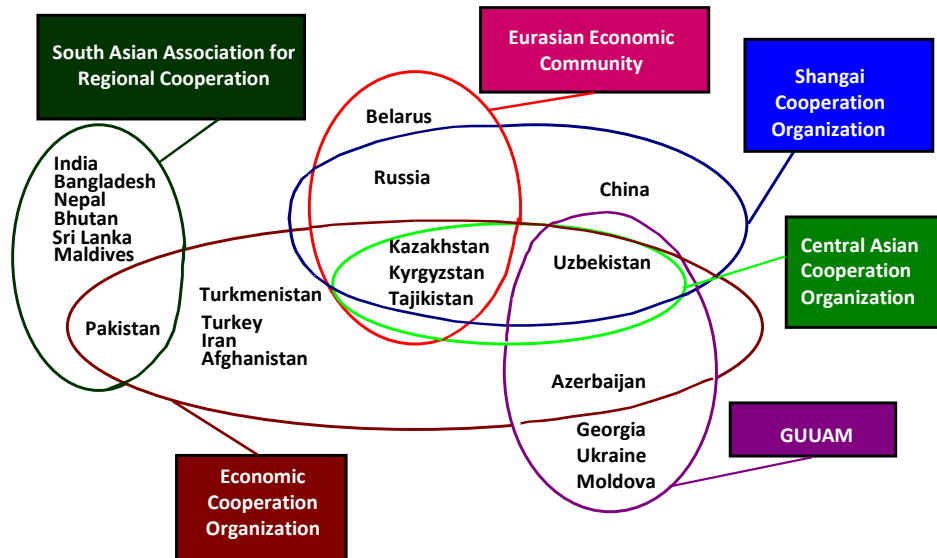


Figure 1: “Spagetti-bowl” of regional agreements in Central Asia

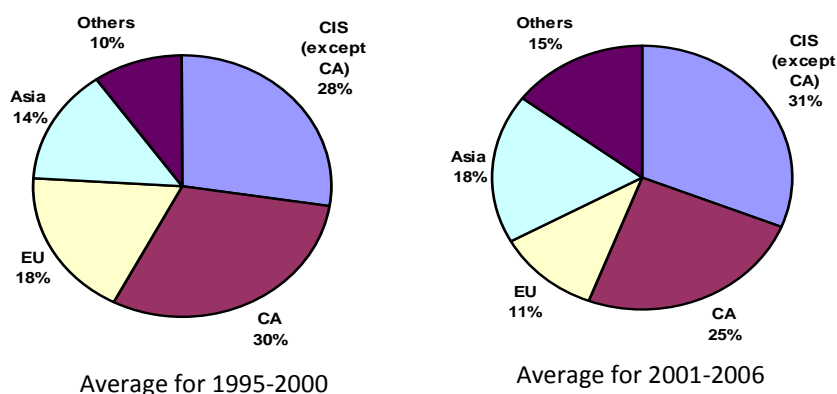
Against the background of these reforms, there has been some trade expansion. Kyrgyz trade increased from about USD 0.7 billion per annum in the early 1990s to 1.3 billion in 1998. The eruption of currency and financial crisis in Russia in August 1998, led to a strong contagious effect on Central Asia due to remaining strong trade links with Russia (Ohno and Zhakparova, 1999). The external shock brought about a significant slowdown in economic activity throughout the region and downward pressure on the exchange rates. The country has managed to recover

from consequences of financial crisis very soon, and reported steady growth figures for 1999 with optimistic outlook for the future. Economic recovery in the country was driven by strong domestic demand (Odling-Smee, 2003). Inflation remained moderate that gradually improved trade competitiveness of the Kyrgyzstan relative to that of Russia. By the early 2000s it overcame the temporary decline in imports and exports, and trade volumes gradually recovered from the impact of crisis.

However, in response to crisis neighboring countries imposed foreign exchange restrictions and trade controls, setting unusually high import tariffs of 200 per cent in Kazakhstan, complete isolationist policies in Uzbekistan and Turkmenistan. Trade regimes in Central Asia differ substantially between countries with extreme cases of import substitution and export promotion as well as intermediate cases. Uzbekistan imposes restrictions on the transit of Tajik exports, Kazakhstan put barriers for Uzbek and Kyrgyz exports to the northern markets, and Tajikistan levies discriminatory transit fees on Uzbek vehicles. Kyrgyzstan has the most liberal trade regime in the region and pursues policy consistent with WTO rules. (Odling-Smee, 2003).

Geography is believed to be another important factor in trade. Together with golden deposits, nature endowed the country with high Tien-Shan mountains, which impede trade with China. Absence of direct access to sea imposes additional barrier for international trade. Remoteness from trade centers, landlockness, mountainousness and other nature-created variables are often associated with increased transportation costs, difficult cross-border migration, poor infrastructure development. (Gallup et al, 1999; MacKellar et al, 2000; Henderson et al; Limao and Venables, 2000; Redding and Venables, 2004). Empirical literature on landlocked countries shows that a median landlocked country with shipping costs 50 percent higher than similar coastal country (Limao and Venables, 2001) could expect reduction of international trade by 84 percent (Raballand, 2003) and growth of about 0.3 percent per year (Radelet and Sachs, 1998).

Throughout the 1990s significant reorientation of the foreign trade has taken place. Although Former Soviet Union (FSU) countries remain to be the largest trade partners, their share in the Kyrgyz trade has shrunk significantly. In contrast, trade with all other destinations except FSU has been increasing. Inside Europe, Germany and Switzerland are the main export destinations for Kyrgyz gold. The role of China as one of the biggest trade partners is steadily increasing both in exports and imports. Central and Eastern Europe and South Asia are emerging as potentially important trade destinations (Figure 2).



Source: *Direction of trade statistics, IMF*

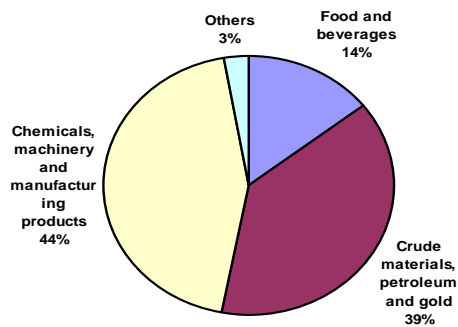
Figure 2. Trade Reorientation (Trade Share in Percents)

Despite changes in geographical distribution, the FSU countries still comprise 56 percent in Kyrgyz's trade. Several previous studies tried to give explanations to this bias. Conventional gravitation law suggests geographical proximity as one of those explanations. Slow adjustment of infrastructure, past linkages, lack of international distribution networks are among other main forces supporting trade within the FSU, rather than comparative advantages and tastes (Djankov and Freud, 2000).

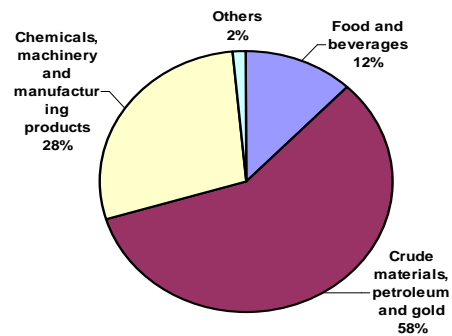
According to conventional trade theory, if a country specializes in trading the good in which it is "most best" or "least worse" at producing, this would imply that this country has comparative advantage. We try to assess comparative advantage by looking at export and import structures (Figure 3) and Revealed Comparative Advantages (RCA) index, which is the ratio of trade shares (Table 1).

It is evident that raw materials, like gold, cotton and electricity are main export components of Kyrgyz exports, while imports are to some extent diversified but still highly dependent on petroleum products. The concentration of exports on a few primary commodities makes country extremely vulnerable to changes in world market prices and developments in natural resource production (Elborgh-Woytek, 2003).

Imports



Exports



Source: International Trade Centre (2008)

Figure 3: Trade Structure (for the Year 2006 in Percents)

The index of revealed comparative advantages was calculated using Balassa formula for each country with respect to the whole world. When RCA index is above 1, the country is believed to be specialized in some particular sector, and vice versa when RCA index is below 1. It also shows ranking of specialization indices across countries: rank 1 indicates that country has the highest specialization index in the world. Calculated RCA index shows significant comparative advantages for Kyrgyzstan in leather products, fresh food, clothing and minerals. It also reveals a huge potential for intra-regional trade. In particular, food, cement and steel were found as having high opportunities for trade within Central Asia (ITC, 2002). Despite Chinese leadership in supplying electronic goods, manufactures and clothing, there are still few commodity groups that China would see profitable to import from Kyrgyzstan and other countries in Central Asia.

Table 1: Revealed comparative advantages

	KYRGYZSTAN		KAZAKHSTAN		CHINA		RUSSIA		UZBEKISTAN		TAJKISTAN	
	Rank	RCA	Rank	RCA	Rank	RCA	Rank	RCA	Rank	RCA	Rank	RCA
Leather products	33	1.98			18	3.34						
Fresh food	40	8.01	99	1.62	134	0.68	148	0.37	29	11.02	45	7.06
Clothing	44	2.58			33	3.46			79	0.75	74	0.84
Non-electronic machinery	49	0.43	95	0.07	40	0.52	62	0.3	80	0.16		
Electronic components	49	0.5			20	1.04	87	0.07	93	0.05		
Miscellaneous manufactures	56	0.65			9	1.48	108	0.14				
Minerals	57	2.11	31	5.38	123	0.28	30	5.67	110	0.36	140	0.15
Basic manufactures	61	0.98	11	3.64	62	0.96	21	1.93	33	1.6	3	7.42
Transport equipment	80	0.1			55	0.27	52	0.33	35	0.57		
Processed food	98	0.9	145	0.14	122	0.47	139	0.2	119	0.53	128	0.31
Chemicals	99	0.21	92	0.29	81	0.42	71	0.49	70	0.52	121	0.08
Consumer electronics					3	2.43						
Textiles					10	2.39	47	1.45	3	6.21	16	2.21
Wood products					95	0.43						

Source: International Trade Centre (2006)

The index of revealed comparative advantages was calculated using Balassa formula for each country with respect to the whole world. When RCA index is above 1, the country is believed to be specialized in some particular sector, and vice versa when RCA index is below 1. It also shows ranking of specialization indices across countries: rank 1 indicates that country has the highest specialization index in the world. Calculated RCA index shows significant comparative advantages for Kyrgyzstan in leather products, fresh food, clothing and minerals. It also reveals a huge potential for intra-regional trade. In particular, food, cement and steel were found as having high opportunities for trade within Central Asia (ITC, 2002). Despite Chinese leadership in supplying electronic goods, manufactures and clothing, there are still few commodity groups that China would see profitable to import from Kyrgyzstan and other countries in Central Asia.

3. Kyrgyzstan Trade in the World Economy: A Quantitative Assessment

This paper adopts an econometric gravity model approach to study the Kyrgyzstan trade. The gravity model originally stems from Newtonian physics, which simply states that the attraction between two physical objects is proportional to their masses, but inversely related to the distance between them. It first appeared in 1960s, when Tinbergen (1962) provided some initial foundations for gravitation of trade flows. However, this paradigm has long been disregarded by economists due to its lack of theoretical foundation. Due to successive works of various economists, it has been gradually developed into a systematic economic model with a strong economic foundation. Anderson (1979) provided first micro-foundations based on constant elasticity of substitution (CES) preferences and good that differentiated by country of origin. Later, Bergstrand (1985) tried to justify the use of gravity idea using models of monopolistic competition. Helpman and Krugman (1985) showed that the basic gravity equation could be derived from the differentiated products trade. It is a theory that suggests that flows of goods depend on the demand in the importing country and the supply of differentiated products from the exporting country. Deardorff (1998) proved that the gravity model is also consistent with Heckscher-Ohlin international trade theory, but at the same time accepted that even simple form of gravity equation can justify any trade model.

Even though the debate on the theoretical grounds of the model continues, it is more or less clear that whether because of the monopolistic competition nature of industries or because of comparative advantage and countries' specialization trade flows obey the law of gravity. Despite criticism gravity model has proved its rights for life. As Baldwin and Taglioni (2006) mentioned, its popularity rests on three

pillars: (i) there is always a demand to know determinants of international trade flows; (ii) the data for estimation is easily accessible; (iii) a number of high profile papers have established the gravity model's respectability.

In simplest form (Deardorff, 1998), empirical gravity model relates bilateral trade to the economic mass of the two countries and barriers to trade:

$Trade_{ij} = (Y_i Y_j)^\alpha C_{ij}^\theta$, where $Trade_{ij}$ is trade between country i and country j , Y is GDP, and C_{ij} are trade barriers. Trade is expected to be negatively related to trade barriers ($\theta < 0$), and positively related to economic mass ($\alpha > 0$). Our specification of gravity model for total trade takes the following form:

$$T_{ijt} = \alpha + \beta_1 (Y_{it} Y_{jt}) + \beta_2 \frac{E_{it}}{E_{jt}} + \beta_3 TC_{ij} + \sum_k \theta_k C_{ijkt} + \sum_k \delta_k P_{ijkt} + \mu_{ijt} \quad (1)$$

where T_{ijt} indicates average trade volumes between country i and country j at time t . Y_{it} and Y_{jt} are GDPs of countries i and j at time t . Real GDPs of both importing and exporting countries have traditionally been used as a proxy for Newton's original mass in gravity equation. Larger economic mass is associated with higher volumes of trade. In empirical literature GDP per capita is also routinely included along with the GDP variable to control for size of economies and/or differences in initial endowments. E_{it} and E_{jt} are factors that cause differences in countries' relative endowments. As proxy for economic endowments we use per capita GDP (Limao and Venables, 2000). Expected sign of per capita GDP is ambiguous, since it can be interpreted in various ways.

The trade complementarity index (TC) measures the degree of trade complementarities between two countries.¹ TCI value ranges from 0 (perfectly

¹ The TC between countries k and j is defined as:

$$TC_{ij} = 100 - \sum \left(\frac{|M_{ik} - X_{jk}|}{2} \right)$$

Where X_{jk} is the share of good k in global exports of country j and M_{ik} is the share of good k in all imports of country i . The index is zero when no goods are exported by one country or imported by the other and 100 when the export and import shares exactly match.

competitive trade structure between two countries) to 1 (perfectly complementary trade structure). The TCI coefficient β_3 becomes positive when trade volume increases with rising trade structure complementarities: it precisely represents the Heckscher–Ohlin trade model of inter-industry trade. On the other hand, β_3 becomes negative when the trade volume increases with falling trade structure complementarities; in other words, it refers to cases where trade volume increases with increasing competitive trade structures, representing the differentiated product model with intra-industry trade (Sohn, 2005). The estimated coefficient of β_3 allows to distinguish three mutually exclusive hypotheses:

$\beta_3 > 0$: Heckscher–Ohlin trade model with dominant inter-industry trade;

$\beta_3 < 0$: increasing returns model with dominant intra-industry trade;

$\beta_3 = 0$: indeterminacy of the model.

C_{ijt} is the trade cost vector, represented by distance, common border effect and infrastructure variables. Distance is calculated as a great circle surface distance between capital cities in kilometers and expected to have a negative sign. Our distance variable is measured in km and taken from <http://www.mapcrow.info/>. Common border dummy is intended to capture the fact that countries with common border tend to trade with each other much more. Countries with common border may trade more with each other due to many factors such as historical ties, cultural proximity and small distance-related costs. Numerous studies have shown that availability and quality of transport infrastructure is an important determinant of trade flows. We follow Redding and Venables (2004) and use a ratio of roads to area as a proxy for quality of infrastructure. Higher road density is expected to be associated positively with trade.

Various regional and sub-regional effects of regional trade agreements and regional integrations are tested by vector P_{ijt} . The idea of regional agreement variables is that, since trade flows are usually due to political circumstances, some countries may have diverted trade from certain traditional trade partners to other traditional partners. We test effects three regional agreements: Commonwealth of Independent States (CIS), Economic Cooperation Organization (ECO) and Eurasian Economic Community (EEC).

Except dummy variables, all other variables are in logarithmical form. All trade data come from International Monetary Fund's Direction of Trade Statistics (DOTS) database. Data on real GDP, real GDP per capita, infrastructure quality are taken

from World bank's World Development Indicators (WDI) database. Our dataset comprises trade data for 178 countries over the period 1996-2005.

Table 2 presents results of estimation, presence of stars indicate statistical significance of coefficients. First two columns represent results for the whole sample of countries; last two columns are only for trade of Central Asia with the world. Most variables in a world trade regression have statistically significant correlation coefficients with an expected sign. As theory predicts, distance and international trade are correlated negatively. A magnitude of this coefficient indicates that 1 percent increase in distance (measured in miles) decreases the volume of trade on average by 0.2-0.3 percent. On the other hand, relative size variable measured by per capita GDP, affects international trade positively; its coefficient says that 1 percent increase in product of per capita GDP leads to about 0.1 percent increase in international trade. Infrastructure variable shows that having good transport infrastructure in principle facilitates trade. The coefficient of complementarity index shows a positive value with high statistical significance, suggesting that world trade pattern follows a Heckscher-Ohlin trade model (Sohn, 2005), which predicts that two countries in a complementary trade structure are more likely to expand their bilateral trade volume through inter-industry trade.

Results of Central Asian trade regressions are different from the first two regressions of world trade volumes: economic forces have less power and transport infrastructure is more significant. Absence of correlation with complementarity index and relative size variable can be explained by high concentration of raw materials in Central Asian trade, which rules out both the Heckscher-Ohlin and intra-industry trade hypotheses.

The magnitude and sign of variable for Kyrgyzstan is positive and significant in almost all regressions, indicating that after controlling for all other variables in regression, Kyrgyzstan's trade is higher than average trade volumes. This aspect proposes an argument that Kyrgyzstan's openness in foreign trade policy is a right direction for the country. Now let us look at impact of regional trade agreements. The CIS variable is highly significant, with a positive coefficient; this reflects the increasing market integration and deepening trade network in this group of countries. ECO and EEC seem to be more important for Central Asian trade rather than on world trade sample.

Table 2: Results of Estimation

	(1)	(2)	(3)	(4)
Product of GDP	0.052*** [0.007]	-0.007 [0.004]	0.320*** [0.038]	-0.039* [0.020]
Product of percapita GDP	0.156*** [0.008]	0.109*** [0.003]	-0.077* [0.045]	0.122*** [0.014]
Distance	-0.227*** [0.034]	-0.309*** [0.016]	-0.173 [0.15]	-0.065 [0.077]
Common border	1.200*** [0.130]	1.031*** [0.082]	0.455 [0.30]	0.747*** [0.28]
Trade complementarity	0.286*** [0.047]		-0.027 [0.26]	
Infrastructure of i	0.099*** [0.013]	0.051*** [0.005]	0.115 [0.12]	0.166*** [0.045]
Infrastructure of j	0.045*** [0.012]	0.017*** [0.005]	0.164 [0.10]	0.196*** [0.034]
Kyrgyzstan	0.491*** [0.150]	0.616*** [0.100]	0.067 [0.10]	0.431*** [0.087]
CIS	0.254 [0.260]	0.266* [0.160]	0.997*** [0.20]	0.542*** [0.16]
ECO	0.355 [0.300]	0.244 [0.200]	0.4 [0.24]	0.651*** [0.19]
EEC	0.874 [0.550]	0.609* [0.330]	0.369 [0.31]	0.639** [0.27]
Constant	-2.218*** [0.420]	2.113*** [0.210]	-12.75*** [1.97]	-0.118 [1.01]
Observations	36594	123064	1246	5686
<i>Number of pairs</i>	8835	11443	384	549
R-squared	0.7519	0.5478	0.7493	0.5421

4. Concluding remarks

Kyrgyzstan, a small landlocked economy endowed with few natural resources, has emerged as a result of dissolution of the USSR. It has gone through the process of deep economic and structural transformation. Thus, it should be of interest to examine the extent to which the gravity model is applicable in explaining Kyrgyz bilateral trade flows.

Statistical analysis shows that Kyrgyzstan bilateral trade is growing and becoming more significant in the region. However, the coefficient on the trade structure variable verifies that Central Asian trade pattern does not follow comparative advantage pattern. Thus, trade flows, which largely depend on raw materials, does not depend on factors such as comparative advantage and different development

stages. The significance of the coefficients of road to area ratio indicates that infrastructure quality and trade barriers are important determinants for the trade volumes of landlocked countries.

The world trade data does not show a significant positive effect of Central Asian trade agreements, meaning that there exist large untapped potential for economic integration in the region. However, we suggest that open and liberal trade policy of Kyrgyz government creates good opportunity for the country to increase trade volumes.

While this paper has attempted to identify empirically the underlying trade model, interpret the estimated coefficients and provide practical trade policy applications in the gravity model approach, we did not investigate the trade data in details. Further theoretical and empirical developments are needed in order to distinguish and identify the different determining factors for Kyrgyzstan's international trade.

References

- Anderson J. E. (1979) "A Theoretical Foundation for the Gravity Equation," *American Economic Review* 69: 106-116.
- Baldwin, R. and Taglioni, D. (2006) "Gravity for Dummies and Dummies for Gravity Equations", NBER Working Paper 12516
- Bergstrand J. (1985) "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence", *The Review of Economics and Statistics* 67(3): 474-481
- Deardorff, A. (1998) "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?" in J.A. Frankel, ed., *The Regionalization of the World Economy*. Chicago: University of Chicago Press, 1998: 7-22.
- Djankov S., Friend C. (2000) "Disintegration and trade flows: evidence form the Soviet Union." *World Bank Policy Research Working Paper No. 2378*
- Elborgh-Woytek, K. (2003) "Of openness and distance: trade developments in the Commonwealth of Independent States, 1993-2002." *International Monetary Fund Working Paper, WP/03/207*
- Gallup J., Sachs J., Mellinger A. (1999) "Geography and economic development." *Center for International Development at Harvard University Working paper No.1*
- Helpman, Elhanan and Krugman, Paul (1985) "Market Structure and Foreign Trade", Cambridge, MA: MIT Press
- Henderson J., Shalizi Z., Venables A. "Geography and Development." *Journal of Economic Geography* 1(1): 81-105

- ITC (2002) "Trade promotion in Central Asia. Identifying export potential among selected Central Asian CIS member countries." UNCTAD/WTO May, 2002
- Limao N., Venables A. (2000) "Infrastructure, geographical disadvantage and transport costs." World Bank Policy Research Working Paper 2257
- Mackellar L., Worgotter A., Worz J. (2000) "Economic development problems of landlocked countries." Transition Economic Series No.14, Institute for Advanced Studies, Vienna
- Odling-Smee, J. (2003) "Economic performance and trade in the CIS", International Conference dedicated to the 10th Anniversary of the National Currency of the Kyrgyz Republic, Bishkek, Kyrgyzstan
- Ohno K., Zhakparova S. (1999) "Responding to regional currency crisis. Kazakhstan in the aftermath of the 1998 Russian crisis." International Conference on Exchange Rate Regimes in Emerging Market Economies, Tokyo, Japan
- Pomfret, R. (2003) "Trade and exchange rate policies in formerly centrally planned economies." *The World Economy* 26: 585-612
- Raballand, G. (2003) "The determinants of the negative impact of land-lockedness on trade: an empirical investigation through the Central Asian case." *Comparative Economic Studies* 45(4): 520-536
- Radelet S., Sachs J. (1998) "Shipping costs, manufactured exports, and economic growth." Unpublished paper
- Redding S., Venables A. (2004) "Economic geography and international inequality." *Journal of International Economics*, 62(1): 53-82
- Sohn, C. (2005) "Does the gravity model explain South Korea's trade flows?" *The Japanese Economic Review* 56(4): 417-430
- Tinbergen, J. (1962) "Shaping the World Economy; Suggestions for an International Economic Policy", *The Economic Journal* 76(301): 92-95