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Abstract

The thesis explores bilateral trade between Kazakhstan and two countries – Russian Federation and Belarus, within the Eurasian Economic Union, based on a gravity model and panel data for years 2000 to 2014. Estimates indicate that economic size, market size and real exchange rate of Kazakhstan and two countries – Russian Federation and Belarus play the main role in bilateral trade between Kazakhstan and these countries. Distance, however, do not seem to drive the bilateral trade. The gravity model's results are also applied to calculate the potential trade between Kazakhstan, Russian Federation and Belarus. It shows that Kazakhstani trade with these countries has significant room for growth.

Key word: Gravity model, panel data, trade potential, Eurasian Economic Union, Kazakhstan.

Аннотация

Бұл зерттеу, Қазақстан мен елдер арасындағы екі жақты сауда зерттеу жүргізген - Ресей Федерациясы мен Беларусь, Еуразиялық экономикалық одақ, гравитациялық моделі және панельдік деректер негізінде 2000 жылдан жыл бойы 2014 жылдар. Бағалау экономиканың мөлшері, нарық мөлшері мен нақты көрсеткендей Қазақстан мен екі ел арасындағы айырбас бағамы - Ресей мен Беларусь Қазақстан мен осы ел арасындағы екі жақты сауда негізгі рөл атқарады. Қашықтық, алайда, меніңше, сауданың негізгі компоненті болып табылмайды. гравитациялық моделін нәтижелері, сондай-ақ Қазақстан, Ресей Федерациясы мен Беларусь арасындағы әлеуетті сауда есептеу үшін қолданылады. Бұл осы елдермен қазақ сауда өсуі үшін айтарлықтай әлеуетке ие екенін көрсетеді.

Түйінді сөздер: гравитациялық моделі, панельдік деректер, сауда әлеуетті, Еуразиялық экономикалық одақ, Қазақстан.

Аннотация

В данной работе проводится исследование двусторонней торговли между Казахстаном и странами - Российской Федерацией и Беларусью, в рамках Евразийского экономического союза, основанное на гравитационной модели и панели данных в течение многих лет с 2000 по 2014. Оценка показывает, что размер экономики, размер рынка и реальный обменный курс Казахстана и двух стран - России и Беларусии играют основную роль в двусторонней торговле между Казахстаном и этими странами. Расстояние, тем не менее, кажется, не основная составляющая товарооборота. Результаты гравитационной модели являются также применимыми для расчета потенциальной торговли между Казахстаном, Российской Федерации и Белоруссии. Это показывает, что казахстанская торговля с этими странами имеет значительный потенциал для роста.

Ключевые слова: гравитационная модель, панельные данные, торговый потенциал, Евразийский экономический союз, Казахстан.

1 Introduction

In 2014 Kazakhstan, Russian Federation and Belarus signed the Agreement for creation of new Eurasian Economic Union (EEU), which came in force starting from 2015. This was the final result of long unsuccessful effort for creation Post-Soviet economic integration.

Since the period of independence bilateral relations of Former Soviet Union countries and European Union (EU) increased significantly. EU became the source of foreign aid and foreign direct investment (FDI). EU also initiated a several number of projects the purpose of which was to promote the conversion from centrally planned to market economy. FDI from European countries to CIS economies went basically in energy resources. Kazakhstan and Russian Federation are the holders of large stocks of raw materials such as natural oil and gas.

There are two purposes of this paper: to identify significant factors influencing the levels of trade between Kazakhstan, Russian Federation and Belarus and to test whether trade between countries of EEU fully exploits their potentials or there is still room for more trade. The findings of this paper may be served as recommendations for policy makers to improve the bilateral trade between Kazakhstan, Russia, and Belarus.

Gravity model has been used intensively in literature to investigate bilateral trade. For example, Blomqvist (2004) applies gravity model to explain the trade flow of Singapore. Montanari (2005) examines the EU trade with Balkans by applying a gravity model. Countries in Association of South East Asia Nations (ASEAN) have also been included in a number of studies used gravity approach such as Anaman and Al-Kharusa (2003) for Brunei's trade with EU, Thornton and Goglio (2002) for intra-trade in ASEAN. However, it appears that there are a limited number of studies applying gravity model for the case of Kazakhstan. Moreover, it seems that there has not been any study of bilateral trade between Kazakhstan and EEU countries in a gravity model framework. This paper tries to fill the gaps in literature concerning Kazakhstan and EEU countries by utilizing gravity model to explore the relationship between Kazakhstan and EEU for years 2009 to 2014. The gravity model estimated in this

paper is based on panel data with fixed effect estimation and allowing for proper representation of individual country effects and business cycle (time effects). The estimated results of gravity model are then used to calculate the trade potential between Kazakhstan, Russia and Belarus by applying method of speech of convergence.

The remainder of the paper is structured as follows: Part 2 provides an overview of Kazakhstani foreign trade and the analysis of Kazakhstan, Russian Federation and Belarus bilateral trade. Part 3 presents a brief theory of international trade and literature review of gravity model. Part 4 applies the gravity model to analyse the trade flow and calculation's results of the trade potential between Kazakhstan, Russia and Belarus. Part 5 concludes the paper.

1.1 Kazakhstani Foreign Trade Overview

Exporter rank	***36/124***
Importer rank	***49/124***
Trade Balance rank	***9/124***

The main priorities of the foreign policy of Kazakhstan in the last few years are: Kazakhstan's accession to the WTO (from July 2015), the formation of the Eurasian Economic Union (From January 2015), the development of trade relations and attract foreign investment.

The effectiveness of foreign policy is determined by the level of development of the business climate, the ability of domestic enterprises to become competitive and bring their products to foreign markets, the degree of trade liberalization. According to the World Bank «Doing Business 2014", in which Kazakhstan is ranked 50th out of 189 countries, rising to 3 positions compared to 2013 year. Kazakhstan also left behind most of the CIS countries: Belarus -63 place, Kyrgyzstan -68 th, Russia -92 place.

According to international experts, Kazakhstan is one of the most attractive for foreign investment countries. By the end of 2014 the total volume of foreign direct investments attracted in the

economy amounted to about 128,02 billion USD. China (19 percent of total exports and 14 of imports) and Russia (8 percent of exports and 41 percent of imports).

Table 1 Direct Investments in Kazakhstan, mln.USD

	as of 31.12.09	**as of 31.12.10**	**as of 31.12.11**	**as of 31.12.12**	**as of 31.12.13**	**as of 31.12.14**	**as of 30.06.15**
Direct investment in Kazakhstan	71 846,1	82 647,8	107 395,8	119 943,9	125 218,1	128 017,2	128 283,8
Equities and stocks / shares of investment funds	29 084,9	33 100,6	49 253,2	57 163,6	55 859,5	52 612,4	53 008,7
Debt instruments	42 761,2	49 547,2	58 142,5	62 780,2	69 358,6	75 404,8	75 275,1

Source: National Bank of Kazakhstan

As can be seen in table 2 export sector has expanded by over 13 %; import has increased over 45 percent during the transition period 2009 – 2014. The foreign trade turnover of the Republic of Kazakhstan in the 1st half of 2015 amounted to 46 billion USD, which is 36 % lower than in the same period last year (72 billion USD in the 1st half of 2014). The export of Kazakhstan decreased by 43 % to 28 billion USD, and imports by 21 % and amounted to 18 billion USD in the 1st half of 2015 compared to the 1st half of 2014. The trade balance (net export) for 1st half of 2015 is 9.7 million USD, which is 60 % lower than in the same period last year (25.9 million USD).

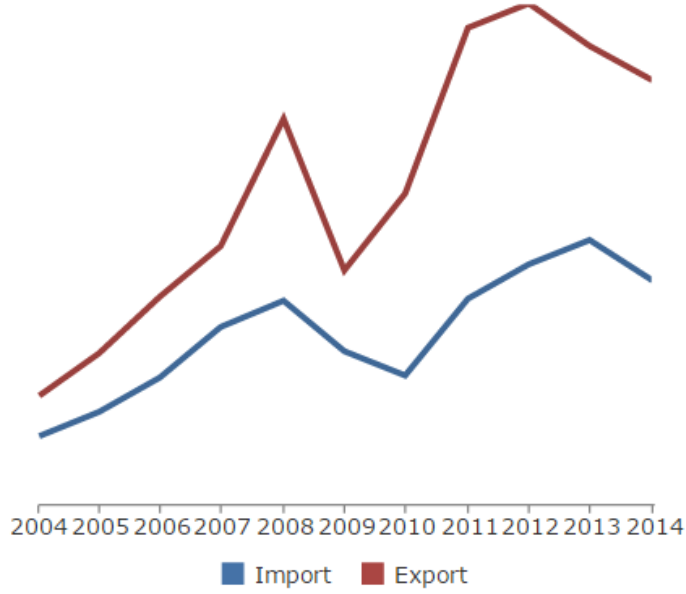
Table 2 Foreign Trade Indicators of Kazakhstan

							For information current situation	
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**1st half of 2014**	**1st half of 2015**
Foreign trade turnover								
billion USD	71 604	91 398	121 242	132 807	133 506	120 755	71 944	45 922
% of the previous year	-	128	133	110	101	90	-	64
Export								
billion USD	43 196	60 271	84 336	86 449	84 700	79 460	48 946	27 790
% of the previous year	-	140	140	103	98	94	-	57
Import								
billion USD	28 409	31 127	36 906	46 358	48 806	41 296	22 999	18 132
% the previous year	-	110	119	126	105	85	-	79

Source: Statistics agency of Kazakhstan.

Visually dynamic growth and decline of Kazakhstani import and export during the period from 2004 to 2014. has shown below in Figure 1.

Figure 1 Import and Export of Kazakhstan



Source: World Bank

The table below shows the top 10 goods that was exported and the top 10 goods that was imported by Kazakhstan during the 2014. The first place among exported goods took oil and mineral fuels (more than 60 billion USD), while among imported goods this position took industrial machinery (over 7 million USD).

Table 3 Top 10 Export and Import

Top 10 Export Goods as of 2014	**Export Volume mln.USD**	**Top 10 Import Goods as of 2014**	**Import Volume mln.USD**
Oil & Mineral Fuels	60 696	Industrial Machinery	6 807
Iron & Steel	3 078	Motor Vehicles & Parts	4 394
Inorganic Chemicals	2 668	Electrical Machinery	3 972
Ores	2 552	Iron & Steel Articles	2 458
Copper	1 830	Oil & Mineral Fuels	2 302

Cereals	1 135	Plastics	1 482
Precious Stones & Metals	746	Pharmaceuticals	1 420
Zinc	588	Precision Instruments	1 116
Natural Minerals & Stone	585	Iron & Steel	1 043
Milling Products	575	Railway Equipment	891

Source: World Bank

From 1 January 2010, Kazakhstan with the Russian Federation and the Republic of Belarus operates within the Customs Union. The main task of the Customs Union is to form a single customs territory in which in respect of goods originating in the territory, as well as products from third countries released for free circulation on it, without customs duties, and economic deprivation. In this case, the State party apply a common customs tariff and other common measures regulating trade with third countries. The Customs Union has been dictated by external challenges, the global trends towards integration, the need to ensure the integrity and the creation of competitive conditions for domestic producers, but also due to the overall goals of the participating countries to achieve sustainable economic growth through macroeconomic stability and the search for new models of economic development that will enable the development of competitive advantage within the common customs area.

The EEU is an international organization for regional economic integration. It has international legal personality and is established by the Treaty on the EEU. The EEU provides for free movement of goods, services, capital and labor, pursues coordinated, harmonized and single policy in the sectors determined by the Treaty and international agreements within the union. The Member-States of the union are the Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic and the Russian Federation. The Union is being created to comprehensively upgrade, raise the competitiveness of and cooperation between the national economies, and to promote stable development in order to raise the living standards of the nations of the Member-States.

Kazakhstan's trade turnover between the countries of the Customs Union (CU) (from 2011 to 2014) and other countries shown in the table below.

Table 4 Foreign Trade Turnover of Kazakhstan, mln.USD

	2011	2012	2013	2014
CIS countries	30 834,6	33 530,3	33 553,6	28 599,5
Other countries	90 407,1	99 276,9	99 952,4	92 155,8
Total with the CU countries	23 029,1	23 888,3	24 603,7	21 031,3
Export	**84 335,9**	**86 448,8**	**84 700,4**	**79 459,8**
CIS countries, out of them:	11 972,3	11 417,7	10 881,5	11 052,5
Russian Federation	6 998,6	6 136,9	5 875,3	6 388,5
Belarus	104,7	91,6	58,3	61,3
Total with the CU countries	7 103,3	6 228,7	5 933,6	6 449,8
Other countries	72 363,6	75 031,1	73 818,9	68 407,3
Import	**36 905,8**	**46 358,4**	**48 805,6**	**41 295,5**
CIS countries, out of them:	18 862,3	22 112,6	22 672,1	17 547,0
Russian Federation	15 332,0	16 959,7	17 971,8	13 807,7
Belarus	593,8	699,9	698,3	773,8
Total with the CU countries	15 925,8	17 659,6	18 670,1	14 581,5
Other countries	18 043,5	24 245,8	26 133,5	23 748,5

Source: Kazakhstani Customs control committee

Kazakhstan's trade turnover between the countries of the EEU (from 2011 to 2014) and other countries shown in the table below.

Table 5 Foreign Trade Turnover of Kazakhstan 2, mln.USD

	1 half of 2015	1 half of 2014	Growth rate, %
Foreign trade turnover	**45 921,7**	**71 944,4**	**63,8**
CIS countries	12 274,8	16 050,7	76,5
Other countries	33 646,9	55 893,7	60,2

Total with the EEU countries	9 187,9	11 777,0	78,0
Export	**27 789,6**	**48 945,7**	**56,8**
CIS countries, out of them:	4 568,0	6 373,3	71,7
Russian Federation	2 719,6	3 750,5	72,5
Belarus	50,1	39,6	126,5
Armenia	0,599	0,178	3,3p.
Total with the EEU countries	2 770,3	3 790,3	73,1
Other countries	23 221,6	42 572,4	54,5
Import	**18 132,1**	**22 998,7**	**78,8**
CIS countries, out of them:	7 706,8	9 677,4	79,6
Russian Federation	6 142,1	7 595,0	80,9
Belarus	272,9	387,1	70,5
Armenia	2,600	4,600	56,5
Total with the EEU countries	6 417,6	7 986,7	80,4
Other countries	10 425,3	13 321,3	78,3

Source: Kazakhstani Customs control committee

The EEU has outlined that members should take steps to harmonize their legislation platforms and create common gas and oil markets by 2025, and electricity by 2019. It has also been declared that the members have until 2025 to establish a Joint Center in Kazakhstan to regulate the EEU financial market. That it will take 10 years to form certain common markets illustrates that those economic sectors that are considered strategically important (especially for Russia) continue to function beyond the scope of integration. This situation has been severely criticized by the President of Belarus, Aleksandra Lukashenka. During the EEU negotiations, he even suggested postponing its creation, because it was not possible to agree about common markets on oil and gas. Most progress is evident within the aim of facilitating free access to the common EEU labor market. The members have agreed to mutually-recognize education degrees in certain areas and established common regulations on paying income taxes.

As a result of the creation of a new business environment and conditions for interaction between different businesses, all countries will see structural benefits that manifest themselves in the use of workforce, production and infrastructure cooperation and mutual investments. According to analysts,

this will generate up to 25 per cent growth in member states by 2030 (15 years after the creation of the economic space), or around 600 bln. USD.

2 Literature Review

Presently, countries are more closely linked through trade. Developed and developing countries are moving upwards their trade barriers to appeal to more trade from others. The words like free trade, trade liberalization are often mentioned in public's news. Why do countries trade with each other? Do all countries advantage from trade? How huge are their trade flows? To understand these questions carefully, it is a good idea to look for answer in the trade theory. In the following part there is introducing some theories of international trade such as the classical trade theory, new trade theory and the gravity model. A brief introduction of classical and new trade theory will justify the "why" behind trading reasons, while gravity model will answer the question of the significance of trade between countries, which cannot be explained by other theories of international trade.

2.1 Absolute and Comparative Advantage

The first, which is studied the father of trade theory, is absolute advantage theory by Adam Smith. In his acclaimed book The Wealth of Nation, Adam Smith compared nations to households. The clothier makes a shirt then exchanges it for a shoe with the shoe-maker, thus both of them gain and the same should implement to nations. Countries specialize in the manufacture of goods according to their absolute advantage, then trade with others, they all gain in international trade (see also Lindert, 1991). Smith's argument is authentic, however, only for country which has absolute advantage, it cannot clarify the reason for a country which does not have absolute advantage to be present at international trade.

David Ricardo resolve questions left by Adam Smith satisfactorily and founded a fundamental theory of international trade, known as the principle of comparative advantage. The principle condition that " a nation, like a person, gains from trade by exporting the goods or

services in which it has its greatest comparative advantage in productivity and importing those in which it has the least comparative advantage" (Lindert, 1991). Comparative advantage and comparative disadvantage as made clear by Ricardian model mean that the opportunity cost of producing the good is lower or higher at one country than in the other country.

It is define that comparative advantage is a basis for international trade. However the Ricardian model is still unfinished in many ways. First, the model conclude an extreme degree of specialization, which is unrealistic because Sweden, for example, imports and generate machinery at the same time. Second, it anticipate that every country gains from trade because it does not take into consideration the effects of international trade on income distribution within countries. Third, various resources among countries, role of economies of scale, intra industry trade are absent in Ricardian model.

2.2 Hecksher-Ohlin Model

The classical theory has various defects, which are the motivation for economists of nineteenth and twentieth centuries to change. Two Swedish economists Eli Hecksher and Bertil Ohlin had lengthened the Ricardian model and grown an influential theory of trade, known as factor endowment theory or Hecksher-Ohlin model. The model foretells that "countries export products that use their abundant factors intensively and import the products using scarce factors intensively" (Lindert, 1991).

The Hecksher-Ohlin (H-O) model had changed the simple Ricadian model in that it has additional one more factor of production, capital, beside labour, the original factor in the classical model. The H-O model also believes that the only dissimilarity between countries is the differences in the relative endowments of factors of production, the production technologies are the identical, whereas the Ricardian model assumes that production technologies distinct between countries. The supposition of same technology is to see what impacts on trade will appear due to difference

proportion in factors of production in difference countries

In H-O model, trade mainly does not lead to complete specialization between countries; this can overwhelmed the defect in Ricardian model which approve that trade leads to complete specification. Other argument that divide H-O model from Ricardian model is that not every country has benefit from trade; international trade has strong income distribution effects. The owners of the country's affluent factors gain from trade while the owners of infrequent factors lose (see Husted and Melvin, 2001).

2.3 New Trade Theory

The classical trade theory encompass that countries which are less corresponding tend to trade more. Therefore it is incapable to explain the huge proportion of trade between nations with similar factor of endowments and intra industrial trade which dominate the trade of developed economies. This is the impulse for new trade theory which has been established in the 1980s by research workers like Krugman, Lancaster, Helpman, Markusen, and many others. New trade theory makes clear the world trade based on the economic of scale, imperfect competition and product differentiation which mitigate (relax) the stringent assumptions of classical theory of fixed return to scale, perfect competition and homogeneous goods. Under these assumptions each country can concentrate in specific area in producing a restricted range of products at larger scale with higher performance and lower costs. Then it can increase the diversity of goods available to its consumers through trade. Trade happen even when countries do not differ in their resources or technology (see also Markusen et al, 1995; Krugman and Maurice, 2005).

2.4 Gravity Model

The classical and new trade theory can successfully interpret the reasons for countries to join in world trade; however they can not answer the question of the scale of the trade flows. Other trade theory, the gravity model, which has been used actively in analysing patterns and

performances of international trade recently, can be applied to quantify the trade flows experimentally. The model applies Newton's universal law of gravitation in physics, which brings out that the gravitational attraction between two objects is proportional of their masses and vice versa relate to square of their distance. The gravity model is expressed as follows:

$$Fij = \frac{M_i M_j}{D_{ij}^2} \quad (1)$$

Where:

Fij is the gravitational attraction

Mi, Mj are the mass of two objects

Dij is the distance

Tinbergen was first used this gravity model to analyze international trade flows in 1962 and many others had followed to set up a series of econometric model of bilateral trade flows. The general gravity model used in bilateral trade has the coming form (see also Krugman and Maurice, 2005):

$$T_{ij} = A \frac{Y_i Y_j}{D_{ij}} \quad (2)$$

Where

A is a fixed term

Tij is the total trade flow from basis country i to destination country j

Yi, Yj are the economic size of two country i and j. Yi, Yj are gross domestic product (GDP) or gross national product (GNP).

Dij is the distance between two country i and j.

The gravity model has long been disapproved for being ad special and missing of theoretical foundation. Therefore recently there has been becoming larger interest in provision the theoretical support for the gravity model. Linneman (1966) (cited in Radman, 2003) is perhaps the first author who provided theoretical circumstances for gravity model; he showed that the gravity equation can be derived from a partial equilibrium model. Trade flows between two countries i and j are interpreted by factors that signify total potential supply of country i, total potential demand of country j, and the opposition factors to trade flow between i and j. The gravity model is then received by equality of supply and demand.

Bergstrand (1985), however, disapproves this approach for disability to interpret the multiplicative functional form of the gravity equation and asks that the gravity equalization may be misspecified due conceding price variable. Bergstrand used a microeconomic foundation to make clear the gravity model. The country trade supply is clipped from firms profit maximization and trade demand is derived by maximizing the constant elasticity of substitution utility function subject to income constraint. Then gravity equation is gotten by using market equilibrium clearance.

Other authors, contrariwise, tried to obtain gravity model from theories of international trade. Eaton and Kortum (1997) cultivated a Ricardian model and showed that gravity equation could be obtain from a Ricardian framework but recognized underlying parameters of technology. While Deardorff (1998) proved that gravity model could arise from two extreme cases of Hecksher-Ohlin model with and without trade obstacles.

Gravity model has been intensively successful empirically. Models of this type have presently been estimated for a wide range of countries. Radman (2003) makes use of import export and total trade, three equations to explore trade flow between Bangladesh and its major trading partners. He detects that Bangladesh's trade in general is determined by the size of the economy, GNP per capita, distance and openness. Blomqvist (2004) uses gravity model to explain the trade flow of Singapore and as usual with gravity model, a very high degree of interpretation is achieved especially for the GDP and distance variable. Anaman and Al-Kharusa (2003) contrariwise show that in a gravity model framework, the determinant of Brunei's trade with EU is mostly from the population of Brunei and EU countries.

Gravity model is also used to interpret the trade relationship between trade blocs and intra trade of economic blocs. Using this model Tang (2003) finds that EU integration has caused in significant trade decrease with ASEAN, NAFTA (North American Free Trade Agreement) during 1981- 2000 years. Thornton and Goglio (2002) argue the important of economic size, geography distance and common language in intra regional bilateral trade for ASEAN

Martinez-Zarzoso and others (2004) classify export sectors according to their sensibility to geographical and economic distance and under gravity model framework they can match which commodities make use of export strength. The results show that sectors such as shoes, furniture make use of high and significant geographical effect in bilateral trading between EU and countries in Southern Common Market (comprising Argentina, Paraguay, Uruguay and Brazil).

There are an extremely large number of empirical applications of gravity model; it is not weird to have many variations of gravity equation. However, within the framework of that intensive literature gravity model also shares others common features. First, gravity model is used to explain bilateral trade, the gravity equation dependent variable is always trade variable. Second, economics mass of exporting and importing country are measured by GDP, GNP or GNP per

capita ,GDP per capita in some augmented gravity model such as Radman (2003), Montanari (2005). The idea over this is countries with higher income incline to trade more and those with lower income trade less.

Third, distance is different usually used variable in gravity model. Geographical distance between countries is the distance; it is as well a proxy for transport cost, which is commonly measured as the straight-line distance between the countries' economic centers (usually capitals). Nevertheless it is not very exact measure in some cases such as using Beijing, capital of China maybe under or over estimate the distance between China and other trading partners because China has lot of economic centers that are thousand kilometres by itself.

3 Findings and Analysis

3.1 Model

Amid the above noted trade theories, the gravity model will be chosen to measure the quantity of Kazakhstani trade with its two countries of EEU trading partners (Russia, Belarus). The model applied in this paper is a variation of the gravity model given by Krugman and Maurice (2005). The model is augmented first by including a financial variable, exchange rate, which acts as a proxy for price, then by adding history and population of original and target countries as supplementary mass for bilateral trade. The estimated gravity model has the following form:

$$Log(T_{ijt}) = \alpha_1 log(Y_{it}Y_{jt}) + \alpha_2 log(N_{it}N_{jt}) + \alpha_3 Er_{ijt} + \alpha_4 logD_{ij} + e_{ijt} \quad (3)$$

Where:

j= 1 (Russian Federation), 2 (Belarus).

i=1 (Kazakhstan).

t=2000, 2001,…, 2014.

Tijt : Kazakhstani trade with country j in year t.

Yit : Kazakhstani GDP in year t.

Yjt : Country j GDP in year t.

Nit : Population of Kazakhstan in year t.

Njt : Population of country j in year t.

Erijt: Real exchange rate between Kazakhstan and country j in year t.

Dij: Distance in kilometers between Kazakhstan and country j.

eijt: Error term

3.2 Data

Data set contains annual trade flows, GDPs, population, exchange rate and distance of Kazakhstan and EEU (Russian Federation, Belarus) which are taken from World Bank database, Statistics Agency of Kazakhstan, National Bank database and database of Kazakhstani Customs control committee.

The product of GDP of Kazakhstan and EEU (Russian, Belarus) in time t is used as a measure of economic size. This variable is expected to be positively and significantly related to trade. Gross domestic product of EEU (Russian, Belarus) and Kazakhstan are obtained from World Bank, both of them are in US current dollars. Population is included in the set of variables inform of product of both parties' population with the intention to estimate the market size, another measure to the concept "country mass". The bigger the market the more it trades; therefore, market size is expected to turn out with positive sign. Data of EEU's (Russian, Belarus) and Kazakhstan population are obtained also from World Bank.

Empirical studies have demonstrated that exchange rate in addition to gravity equation is great in explaining trade variations among participating countries, see Bergstrand (1985), Dell'Ariccia (1999). Therefore, exchange rate will be included as an explanatory variable in the model. The nominal exchange rate is calculated as the annual average of the national currency unit of EEU (Russian, Belarus) per US dollar divided by the annual average of the national currency unit of Kazakhstan per US dollar. The nominal exchange rate is then multiplied by EEU (Russian, Belarus) GDP deflator and divided by Kazakhstani GDP deflator to get the real exchange rate.

Data of exchange rate for both EEU (Russian, Belarus) and Kazakhstan are obtained from World Bank database.

Real exchange rate variable's effect on bilateral trade between Kazakhstan and EEU (Russian, Belarus) is expected to be negative. Kazakhstani currency appreciation is represented by an increase in real exchange rate, as a result exports would be more expensive and imports would be cheaper. It seems sensible to assume that the former effect will prevail in bilateral trade between Kazakhstan and EEU (Russian, Belarus), or an increase in real exchange rate will lead to a decrease in bilateral trade. It is because Kazakhstan has had trade surplus with EEU (Russian, Belarus) for many years and exports are more sensitive to fluctuation in market price.

Distance is engaged in the analysis as proxy for transportation cost between Kazakhstan and EEU (Russian, Belarus); it is calculated by distance in kilometers between Astana, capital of Kazakhstan, and the capital city of Russian, Belarus (2 715 km, 3 448 km). This variable is estimated to have negative effect to trade as transport cost increase with the distance between countries.

3.3 Estimation Issues

A panel framework is destined to cover trade variation between Kazakhstan and its trading partners (Russia, Belarus) during a period of 14 years. Panel estimation disclose several advantages over cross section data and time series data as it controls for individual heterogeneity, time series and cross section studies do not monitor for this heterogeneity may give tendentious estimated results. Panel data offer much more changeability, more power of freedom and reduce the collinearity among explanatory variables therefore improving the efficiency of the econometric estimates. It is more important, panel data can measure effects that are not detectable in cross sections and time series data. (see Baltagi, 1995).

Some betimes studies generally inquire into the gravity model with single-year cross-sectional data or time series data. These methods are probably affected by problem of misspecification and yield biased estimates of volume of bilateral trade because there is no checking for heterogeneity (see Cheng and Wall 2005). Egger (2000), Matyas et al (1997) suggest applying panel data in gravity model, because panel data is a common case of cross-sectional data and time series data. According to Matyas et al (1997), the majority natural representation of bilateral trade flows with gravity equation is a three-way specification, which is expressed as:

$$y= D_N\alpha+D_J\gamma+D_T\lambda+Z\beta+\varepsilon \quad (4)$$

Where:

y is vector of dependent variable

Z is the matrix of explanatory variables DN, DJ, DT are dummy variable matrics α is local country effect

γ: target country effect λ is time effect

β is parameter vector of explanatory variables

ε is error term

When the cross section data is used with one specific year it means there are no time effects, $\lambda =0$, when time series is used it can just contain effect for specific pair of countries which means $\alpha= \gamma=0$. When panel data is used there is no such necessary limitation, it can take into account both country and time effects at the same time.

Panel estimation can be accomplished using pool estimation, fixed effect and random effect (Gujarati, 2003). Pool estimation is the elementary approach; its function is as follow:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} \quad (5)$$

Where i stance for cross sectional unit, t stance for time period and error term is normally distributed with mean zero and constant variance. Pooled estimation supposes there is one single set of slope coefficients and one overall intercept. It neglect the time and space measurement of panel data; the error term captures the distinction over time and individuals. The pooled estimation, however, may ensure inefficient and biased estimated results because it assumes there are no individual effects and time effects.

The fixed effect takes into consideration the individual and time effects by letting the intercept varies for each individual and time period, but the slope coefficients are constant, the model is:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} \quad (6)$$

Where it is commonly supposed that ε is independent and identically distributed over individuals and time with mean zero and variance σ2, and all Xit are independent of all error terms. By presenting different intercept dummies we can permit for intercept vary according to individuals and time.

Another approach put into use to evaluate panel data is random effect estimation. This random effect refers the intercept as a random variable and the individuals embedded in the sample are drawn from a bigger population. The model is written as follows:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + w_{it} \quad (7)$$

Where: $w_{it} = \varepsilon_i + u_{it}$

It is assumed that the individual error components are not correlated with each other and are not auto correlated across both cross section and time series units.

$\varepsilon i \sim N(0, \sigma 2\varepsilon)$ $uit \sim N(0, \sigma 2u)$

$E(\varepsilon i, uit) = 0$, $E(\varepsilon i, \varepsilon j) = 0$ $(i \neq j)$

$E(uit, uis) = E(uit, ujt) = E(uit, ujs) = 0$ $(i \neq j, t \neq s)$

Empirical work on application gravity model does not let a completely answer on which estimation method combined estimation, random or fixed effect does provide more effective results. Therefore, first, trade equalization will be supposed by using the fixed effect method.

3.4 Inputs Data for Analysis

Table 6 Inputs data for analysis

	Tij1t	Tij2t	Yit	Yj1t	Yj2t	Nit
2000	4 191	59	18 292	259 708	12 737	14 883 626
2001	4 645	51	22 153	306 603	12 355	14 858 335
2002	4 047	67	24 637	345 110	14 595	14 858 948
2003	5 250	108	30 834	430 348	17 825	14 909 018
2004	7 651	162	43 152	591 017	23 142	15 012 985
2005	9 518	235	57 124	764 016	30 210	15 147 029
2006	12 804	355	81 004	989 931	36 962	15 308 084
2007	16 286	525	104 850	1 299 706	45 276	15 484 192
2008	19 994	567	133 442	1 660 846	60 752	15 674 000
2009	12 432	422	115 309	1 222 644	49 209	16 092 701
2010	17 974	914	148 047	1 524 917	55 221	16 321 581
2011	22 331	699	188 049	1 904 794	59 735	16 556 600
2012	23 097	792	203 517	2 016 112	63 615	16 791 425
2013	23 847	757	231 876	2 079 025	73 098	17 035 275
2014	18 908	757	212 248	1 860 598	76 139	17 289 111

	Nj1t	Nj2t	Erij1t	Erij2t	Dij1	Dij2
2000	146 596 557	10 005 000	0,352813	10,99672	2 715	3 448
2001	145 976 083	9 928 000	0,374747	27,52328	2 715	3 448
2002	145 306 046	9 865 000	0,420872	46,49053	2 715	3 448
2003	144 648 257	9 797 000	0,429976	63,82013	2 715	3 448
2004	144 067 054	9 730 000	0,459705	78,06511	2 715	3 448
2005	143 518 523	9 663 000	0,467584	80,42224	2 715	3 448
2006	143 049 528	9 604 000	0,448845	76,88895	2 715	3 448

2007	142 805 088	9 560 000	0,427969	77,34392	2 715	3 448
2008	142 742 350	9 528 000	0,413158	78,61795	2 715	3 448
2009	142 785 342	9 507 000	0,419272	84,62475	2 715	3 448
2010	142 849 449	9 490 000	0,38354	83,92981	2 715	3 448
2011	142 960 868	9 473 000	0,367703	205,1194	2 715	3 448
2012	143 201 676	9 464 000	0,38895	565,7148	2 715	3 448
2013	143 506 911	9 466 000	0,377009	652,1931	2 715	3 448
2014	143 819 569	9 470 000	0,400092	728,0244	2 715	3 448

Tijt	Kazakhstani trade with country j in year t (mln.USD)
Yit	Kazakhstani GDP (mln.USD) in year t
Yjt	Country j GDP (mln.USD) in year t
Nit	Population of Kazakhstan in year t
Njt	Population of country j in year t
Erijt	Real exchange rate between Kazakhstan and country j in year t
Dij	Distance in kilometres between Kazakhstan and country j
j1	**Russian Federation**
j2	**Belarus**
i	**Kazakhstan**

3.5 Estimation Results

The results of estimation of bilateral trade between Kazakhstan and countries of EEU (Russian Federation and Belarus) using equation (3) are presented in tables bellow.

Table 7 Estimation results of applying model between Kazakhstan and Russian Federation

Variable	Coefficient	Std. Error	t-Statistic
Yit*Yj1t	0,4889	0,0282	17,3168
Nit*Nj1t	3,7356	1,0448	3,5754
Er1ijt	-2,3509	0,8375	-2,8070
Dij1t	16,4598	4,6228	3,5606

Table 8 Estimation results of applying model between Kazakhstan and Belarus

Variable	Coefficient	Std. Error	t-Statistic
Yit*Yj2t	0,7322	0,0436	16,7789
Nit*Nj2t	0,9914	2,7441	0,3613
Er2ijt	-0,5105	0,0304	-1,3685
Dij2t	0,0064	0,0258	0,2497

The determinants of bilateral trade between Kazakhstan and Russian Federation are: economic size, market size and the real exchange rate volatility. Distance appears to have no effect on bilateral trade between Kazakhstan and EEU (Russian Federation, Belarus), they are statistically insignificant. Significantly positive related to trade volume is economic size variable results, showing that Kazakhstan tends to trade more with Russian and Belarus. A growth by 1% of product of Kazakhstan GDP and Russia, Belarus GDP will go in increasing bilateral trade between them by an average index of 0,48% and 0,73% respectively. Market size of Kazakhstan and Russian Federation have large and strong effect on trade, increasing market size by 1% will tend to the increase the bilateral trade between Kazakhstan and Russian Federation up to 3,73% on average. The estimate coefficient for real exchange rate is significant and negative correlation with trade variation indicating that price competitiveness is important for bilateral trade between Kazakhstan and these two countries – Russian Federation, Belarus – 1 percent depreciation of Kazakhstani currency will tend to increasing of bilateral trade about 2,35% and 0,5% respectively. In case of trading with Russian, the depreciation of national currency of our country has more effect.

The revelation of this work (thesis) is successive with other empirical work in explaining bilateral trade variation using gravity model. Economic size and market size have large influence on trade as larger country can manufacture more goods and services for export, high income and big market size will rise the demand for importing goods. In case of trading of Kazakhstan with Belarus, it is important to note that the value of the real exchange rate coefficient is rather narrow of only 0,5, which proposes that fluctuation of exchange rate of Kazakhstani currency has not well-supported trade activities in this period. This low impact can be interpreted by the effect of change

in exchange rate on imports and exports are cancelling each other. However, it also demonstrates that Kazakhstani exchange rate policy in recent has not been effective in rising the competitiveness of export product.

The distance variable turns out with sudden signs and insignificant, it can be because there are still other variables, which are unexplained apart from the distance, regression between these variables against the country individual effects.

3.6 Trade Potential

Calculating trade potential is a line of explore that has been used completely with the gravity model, such as study of Maurel and Cheikbossian (1998), Montanari (2005). They use the point estimated coefficients to data on the expository variables to calculate the trade potential predicted by the gravity model. After this trade potential will be distinguished with the actual trade to see whether trade between two countries have been overused or underused.

Taking into account the criticisms about the uncertainty of calculating potential trade based on point estimates, Jakab et al (2001) suggest the concept of speed of convergence to change the old method used for calculating potential trade. The average speed of convergence is determined as the average growth rate of potential trade divided by average growth rate of actual trade between the years of observation:

Speed of convergence = (Average growth rate of potential trade / average growth rate of actual trade)*100-100. (8)

For evaluate the trade potential I use results gotten from regression of equation (3) with fixed effects and apply the speed of convergence in equation (8) to calculate the potential of trade between Kazakhstan and Russian Federation, Belarus. The speed of convergence is calculated as

ratio of average growth rate of potential trade and growth rate of actual trade over fourteen years of the exploration.

The results of potential trade are presented in table bellow. Kazakhstan's trade with Russian Federation and Belarus presents an interesting context reflecting potentials to develop trade. In other words, Kazakhstan has not exploited all the potentials in trading with Russian Federation and Belarus. Trade between Kazakhstan and EEU countries (Russian and Belarus) still has large room for growth.

Table 9 Trade Potential between Kazakhstan and EEU Using Speech of Convergence

Country	Potential trade
Russian Federation	-52,142
Belarus	-59,4484

4 Conclusion

The basic goal of this work (thesis) is to find out the factors affecting the level of trade between Kazakhstan and coutries of EEU (Russian, Belarus) and to evaluate whether there are potentials for growth in trade between Kazakhstan and those countries.

Regarding this, a gravity model has been estimated with panel data and fixed effect estimation covering the period of fourteen years from 2000 to 2014. The main results indicate that the bilateral trade flows between Kazakhstan and these two coutries within the EEU are driven by economic size, market size and exchange rate volatility. Distance, however, seem to have no effect on bilateral trade between Kazakhstan and EEU (Russian, Belarus). For all two coutries - Russian Federation and Belarus trades with Kazakhstan are still under potential levels.

Bilateral trade between Kazakhstan and EEU countries (Russian Federation, Belarus) increases with economic size and market size implies that economic growth of separate individual economies will highly affect trade relationship. Therefore equalization policies and tempting business environment which contribute to bring about the high growth rate for the country are significant issues for Kazakhstan's policy makers.

Proof of a small but important negative effect of real exchange rate on bilateral trade between Kazakhstan and Belarus confirms that exchange rate volatility does have impact on trade; however, its contribution to trade is quite limited. In case of trading of Kazakhstan with Russian Federation it is little bit more and shows that these two currencies more depended with each other. National Bank should manage the exchange rate movement more effectively in order to force trade between Kazakhstan and EEU coutries (Russian Federation, Belarus).

Although Kazakhstan has trade surplus with CIS, EEU coutries for years, Kazakshatan, in general, has unrealized trade potentials with EEU coutries (Russian, Belarus). This detection is extremely important for policy-maker because of exploiting these trade potentials are prospective

to contribute to trade diversification for Kazakhstan. Bilateral trade agreement such as the case of Kazakshatn and countries of EEU is trade agreement would increase trade substantially. Moreover, besides trading with Russian Federation and Belarus increasing trade with new memvers of EEU which have trade potentials such as Armenia and Kyrgyzstan.

Kazakhstan has implemented the common external tariff with exceptions, but has made very little progress on trade facilitation or NTBs. Kazakhstan had free trade with Russia and Belarus prior to the customs union, so the only change is the implementation of the common external tariff. In particular, since the initial common external tariff was essentially the Russian Federation tariff, Kazakhstan does not get a terms-of-trade improvement in Russian Federation.

For Kazakhstan to achieve a positive outcome from participating in the EEU, it is crucial for it to work together with its partners on the reduction of trade-facilitation and border cost barriers as well as on the reduction of nontariff barriers.

Estimated results reveal that bilateral trade between Kazakhstan and EEU has entered recession last 1-1.5 years. It is not because of bilateral trade has reached its peak; it is, nevertheless, mostly due to the unattractive business environment and the tendency to trade intensively with new market. A more appealing business environment together with market reorientation from government could help Kazakhstan to overcome the slowdown in trade with this main trading partner.

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