Thesis for the Degree of Master of Arts

A Comparative Study on the International Competitiveness of Russia and Korea and the Determinants of Their Exports

러시아와 한국의 국제무역 경쟁력 비교와 수출 결정 요인에 관한 연구

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Abstract

A Russian economy had experienced hard days during the transition period from the central-planned to the market economy in the 1990s. The new government of Yeltsin was unable to carry out an adequate economic policy and it caused the GDP decline and deterioration of the social life in the country. However, from the 2000s, the Russian government adopted several measures aiming to reinforce the national economy. Increasing the export volumes of natural resources significantly enhanced Russia's GDP and the living standard of the population simultaneously. Unlike its predecessor, the Soviet Union, capitalistic Russia has chosen the integration policy with the global markets in order to strengthen its own economy. One of those global markets is South Korea. Since the 1990s, the political and economic relations between these two countries have been activated and both of them remain the top trading partners for each other. During the last two decades, Russia and Korea have largely diversified their trading commodities. Russia's oil, gas, and aluminum are still the main targets of Korean buyers, while the high quality "made in Korea" technologies and automobiles keep popularity among the Russian consumers.

To further the trade volume between countries, it is crucial to estimate that in what sectors Russia and Korea have an international competitiveness. This work uses five Revealed Comparative Advantage (RCA) indices to evaluate the international competitiveness of the observed countries. The estimations selected major products of trade between Russia and Korea over the even numbered years from 2000 to 2014 (2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014) -total 8 years. The results show that Russia has a comparative advantage in three sectors out of ten. They are HS27, HS72 and HS76 which witnesses that Russian economy is still dependent on the earnings from the exports of raw materials. Meanwhile, Korea has a sturdy comparative advantage in the sectors such as HS03, HS39, HS73, HS84, HS85, HS87 and HS89.

Another model applied in the current thesis the gravity model. The main purpose of utilizing the gravity model is to closely understand what factors affect the export flows of Russia and Korea with their major trading partners. The estimation was done for 30, 55 and 75 trading partners. Explanatory variables in the estimations of the Russian exports include GDP, distance, GDP per capita of Russia and its trading partner, real exchange rate, oil price, border and economic partnership. The Hausman test for all three countries sets demonstrates that the Random Effect regression was appropriate rather than Fixed Effect for explaining the export determinants of Russia. GDP and distance had positive and negative effects, respectively, while per capita GDP of Russia displays a significantly negative impact on Russia's export. By contrast, GDP per capita of Russia's trading countries represent positive but insignificant sign for Russia's exports. The real exchange rate was found to have a negative but insignificant effect on the Russian exports. Subsequently, oil price, border and economic partnership have a positive and significant impact on the export volume of Russia. On the other hand, the gravity model of Korea includes the variables such as GDP, distance, per capita GDP of Korea and its trading partners, real exchange rate, FDI and APEC as a dummy variable. The results of the Hausman test exhibit that Random Effect regression is acceptable for all the three countries sets. The results display that the GDP and distance have positive and negative impacts respectively, which are highly significant in all the three countries sets. Furthermore, per capita GDP of both Korea and its trading partners boosted Korea's exports, while the real exchange rate had positive and significant effect on the 55 countries set. Meanwhile, FDI and APEC were found to have a positive and significant influence on the increase of Korea's exports.

Keywords: Russia, Korea, Economy, Export, Revealed Comparative Advantage Indices, Trade, Gravity Model, Pooled OLS regression, Random Effect, Fixed Effect, Hausman test.

러시아와 한국의 국제무역 경쟁력 비교와 수출결정 요인에 관한 연구

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한글 요약

1991년 소련이 붕괴한 후 러시아가 기존의 계획경제제도에서 시장경제제도로 전환하는 데 많은 어려움을 겪었다. 옐친 대통령을 비롯한 러시아의 리더들이 경제시스템 전환 기간에 적당한 정책을 펼치지 못 한 결과, 국내총생산 (GDP) 성장률이 하락하였고 러시아 국민의 경제생활에도 크게 악영향을 미치게 되었다. 그러나 2000년대 초반부터 러시아 정부가 국내 경제 회복을 목적으로 여러 가지 조치를 취했다. 특히, 천연자원의 대량 수출 덕분에 GDP가 상당히 증가했고 러시아 국민의 생활 수준도 개선됐다. 당시 한국은 전망이 좋은 국가들 중 하나였고, 그렇기에 1990년대부터 오늘까지 러시아와 한국은 서로 밀접한 경제 및 정치 관계를 맺어오고 있다. 지난 26년 동안 러시아의 천연오일과 가스, 그리고 알루미늄이 한국의 주요 수입 품목들인 한편, 첨단기술제품과 자동차는 러시아의 주요 수입 품목들이다.

두 국가간 교역 규모를 더욱더 확장하기 위하여 각 나라의 국제 수출 경쟁력을 확인하는 것이 매우 중요하다. 따라서 본 연구는 5가지 현시비교우위지수(RCA)모형들을 응용하여 연구 대상국들의 국제수출경쟁력을 평가해 봤다. 응용하는 모형은 2000, 2002, 2004, 2006, 2008, 2010, 2012, 그리고 2014년 – 총 8년간을 포함하여 그 기간에 러시아와 한국 국가간 교역에 주요 품목들인 10종의 HS코드를 선택해서 계산해 봤다. 출산된 결과에 따르면, 러시아가 HS27, HS72 및 HS76 품목의 수출경쟁력이 한국보다 우위를 갖고 있는 것으로 나타났다. 반면에, 한국은 나머지 7종 품목- HS03, HS39, HS73, HS84, HS85, HS87, 그리고 HS89의 수출 경쟁력이 러시아보다 우위에 있는 것으로 나타났다.

그 위에 본 논문의 대상국들인 러시아와 한국 각국의 수출 과정에 어떤 요인들이 어떤 식으로 수출에 영향을 끼치는지를 확인해 보기 위하여 무역중력모형(Gravity Model)이라고 부르는 모형을 응용하였다. 본 논문은 러시아와 한국 각국의 그들의 주요 교역 국가들 수출요인들을 측정했다. 측정기간은 1999년부터 2014년까지인 16년간을 포함했다. 또한 상대 국가로서 러시아와 한국 각국의 세계 주요무역국들 중 30개국, 55개국, 그리고 75개국을 선발하여 측정을 이루었다.. 러시아의 중력모형은 다음과 같은 설명변수들을 내포했다. 러시아와 무역하는 상대국의 통합 국내총생산 규모, 거리, 러시아의 일인당 국민 소득, 상대국의 일인당 국민 소득, 실질 환율, 유가, 공동국경, 경제 파트너십입니다. 하우스만 검정을 통하여 측정결과를 해석하기 위하여 무선효과회귀 분석 (Random Effect)이 고정효과회귀분석(Fixed Effect)보다 적절한 모형인 것으로 알려졌다. 측정결과에 따르면, 러시아와 상대국의 통합 국내총생산이 긍정적인 영향을, 국가간 지리적인 거리는 부정적인 영향을 미치는 것으로 나타났다. 또한 러시아의 일인당 국민 소득이 부정적인 영향을 끼쳤다. 한편 상대국의 일인당 국내 총생산이 부정적인 영향을 미치지만 유의한 값이 나타나지 않았다. 실질 환율 변수가 부정적이었지만 유의한 값이 나타나지 않았다. 이어서 유가, 공동국경, 경제 파트너십 변수들이 각각 긍정적인 효과를 주고 유의한 값을 나타냈다.

한국의 중력모형은 한국과 상대 무역국의 통합 국내 총생산, 지리적 거리, 한국의 일인당 국민소득, 상대 무역국의 일인당 국민소득, 실질환율, 외국인직접투자(FDI), 그리고 APEC 변수들을 포함하였다. 하우스만 검정 (Hausman test) 결과에 따라서 측정 효과를 해석하기 위하여 무선효과회귀(Random effect)를 채택하였다. 한국과 상대국의 통합 국내 총생산이 한국산 제품들의 수출량을 증가시키고, 지리적 거리는 수출량을 하락시키는 것으로 나타났다. 또한 한국과 상대국의 일인당 국민소득이 각각 한국 수출에 긍정적인 영향을 미치는 것으로 알려졌다. 또한, 실질환율, 외국인직접투자 및 APEC변수들도 긍정적 영향을 미치는 것으로 나타났다.

핵심어: 러시아, 한국, 경제, 수출, 현시비교우위지수, 무역, 무역중력모형, 통합회귀, 무선효과회귀, 고정효과회귀, 하우스만 검정.

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Acronyms

APEC	Asia-Pacific Economic Cooperation
EBRD	European Bank of Reconstruction and Development
ECM	Error Components Model
EEU	Eurasian Economic Union
EIA	Energy Information Administration
EU	European Union
FE	Fixed Effect
FSSS	Federal State Statistical Service (Russian Federation)
IMF	International Monetary Fund
LSDV	Least Squares Dummy Variable
OECD	Organization for Economic Cooperation and Development
RE	Random Effect
SITC	Standard International Trade Classification
UN Comtrade	United Nations Commercial Trade
USD	United States Dollar
USSR	The Union of Soviet Socialist Republics
WB	World Bank
WITS	World Integrated Trade Solution

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Appendix

Chapter I Introduction

1. Background of Russian economy

Over the past two and a half decades, Russia has experienced unbelievable economic changes, including the burdensome reforms and catastrophic economic downturn of the 1990s, the boom period of 2000s, the economic crisis in the global markets, post-crisis recovery term and finally, the current downswing due to sanctions.

In the beginning of the 21st century, the Russian government announced several economic programs, the accomplishment of those measures was crucial to rebuild the economy and improve social life. For instance, the Gross Domestic Product (GDP) of Russia increased from $395 billion in 1993 to $2.1 trillion in 2014[1] allowing Russia to rank in 9th place among the largest economies in the world.[2]

Services are the largest sector of Russia covering 58% of its total GDP in 2014. Services included wholesale and retail trade, repair of motor vehicles, motorcycles and household goods (17%), public administration, health and education (13.6%), real estate (9%) and transport storage and communications (5.2%). While the manufacturing sector consisted of 15.6%, followed by mining (10.3%) and construction (6.5%) were also key industry segments of Russia. Agriculture only accounted for the remaining 4.2%.[3]

Although Russia is one of the hugest economies worldwide, it has been criticized by economists to be arguably dependent on natural resources. The statistical figures indicate that oil and gas still account for nearly 70% of its total exports and around a half of the federal budget, according to European Bank of Reconstruction and Development (EBRD) special report in 2012.[4] Except the thriving energy sector, the economic circumstance has always been much less propitious for the last two decades. For instance, the output of manufacturing sector

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[1] World Bank (2015), World Development Indicators. Retrieved from http://data.worldbank.org/news/release-of-world-development-indicators-2015

[2] World Bank (2015), World Development Indicators. Retrieved from http://data.worldbank.org/news/release-of-world-development-indicators-2015

[3] FSSS database (in Russian). Retrieved from http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/leading_indicators/

[4] European Bank for Reconstruction and Development (December 13, 2012), Diversifying Russia: Harnessing regional diversity, *Special Report.* Retrieved from http://voxeu.org/article/diversifying-russia

has reduced by 10% since 2003. In 2013, manufactured products made up just 17% of Russian commodity exports, compared to 83% for Germany, 86% for South Korea and 77% for Poland.[5] The productivity of the manufacturing sector of Russia, however, is only around 40% of the OECD average, with very low levels in the machinery, equipment and transport equipment sectors.[6]

The country's strong reliance on the raw materials and energy exports were repeatedly discussed by the leaders of the country. In 2009, Dmitry Medvedev, Prime-minister of Russia, in his article so called "Go Russia!" criticized the country's 'primitive economy' with its 'disgracing dependence on the raw materials'. Additionally, Medvedev argued that 'Russia's finished products were plagued by their extremely low competitiveness'.[7]

Thanks to high oil prices Russia's foreign trade skyrocketed in the last fifteen years. Russian exports increased from $72.8 billion in 1999 to $527.2 billion in 2014. Import volume also rose from $30.2 billion to $314.9 billion.[8] As a result, Russia has experienced rapid expanding trade surpluses. Russia's trade surplus was $36.0 billion in 1999 and it increased to $212.3 billion in 2013. Consequently, exports brought huge earnings to the Russian "pocket" and Russia had accumulated enormous foreign reserve from $4.5 billion in January of 1993 to $509.5 billion in December of 2013.[9]

A growth of the national economy, obviously, had a positive effect on the level of social life of the Russian people. The GDP per capita income of the population rose from $8,607 to $24,805 per person. According to the figures of Federal State Statistical Service (FSSS) of the Russian Federation, an average life expectancy of the Russian population increased from 60 in 1996 to 65 in 2014.

The Ukrainian crisis occurred in the early 2014 and the following sanctions by the EU and the USA against Russia gravely shrunk Russia's economy and its export volume. A restriction of the Russian access to the financial markets of the West walloped the Russian business, which

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[5] World Bank (2015), World Development Indicators. Retrieved from www.worldbank.org

[6] World Economic Forum (2011), The Russia Competitiveness Report.

[7] Medvedev, D. (2009, September 10), Go, Russia!, *Official Internet Resources of the President of Russian Federation*. Retrieved from http://kremlin.ru/events/president/news/5413

[8] UN Comtrade database. Retrieved from http://comtrade.un.org/data/

[9] Central Bank of Russia. Retrieved from http://www.cbr.ru/eng/

not only needed to service a corporate debt, but is important for finding more FDI sources. At the same time, restricted access to innovative extractive technology has resulted in several joint ventures (e.g. Gazprom Neft/Shell, Rosneft/ExxonMobil, Lukoil/Total) being suspended, which in the longer term will impair the capacity of the Russian oil industry to tap into non-conventional resources as current reserves run out.[10] Post-Soviet Russia approved a policy of integration with global markets thanks to that Russia was able to rebirth its own economy and has challenged to become a key state in the region. The onset of Yeltsin's administration announced to challenge western markets. As a result, Russia started enhancing the economic relationships with the West and the Netherlands, Germany, the USA and France became main trading partners of Russia and consistently boosted the Russian economy. Russia actively held bilateral negotiations with its close neighbors from Eastern Asia. Unlike its predecessor -the Soviet Union, the Russian Federation was the upholder of developing of warm relations with South Korea rather than supporting a nuclear program and isolated regime of North Korea. Consequently, Russian market became one of the primary destinations of the Korean chemical, machinery products and vehicles. Meanwhile, the Russian oil, gas, iron, aluminum and other ores play a significant role to boost the Korean industry. Russia is the 12th main trading partner of Korea,[11] while Korea possesses the 8th rank among Russia's main trading partners.[12]

Trading items between Russia and Korea are more diversified nowadays rather than the 1990s. They mainly comprise the oil and liquid gas, aluminum, plastics, ships and electronic equipment. For instance, Russia exported to Korea $10.9 billion worth of the oil products in 2012. On the other hand, Russia bought $5.3 billion worth of vehicles other than railway commodities from South Korea in the same year.[13]

Further, recently Russia has been cooperating with Seoul on the nuclear program of North Korea. For example, in the article which dedicated to Russia's foreign policy, President Vladimir Putin noticed the importance of diplomatic negotiations over the nuclear program of

[10] Russell, M. (2015), The Russian economy: Will Russia ever catch up? *European Parliamentarian Research Service*, PE 551.320.

[11] Korea International Trade Association. Retrieved from http://www.kita.org/

[12] Review of Russian Trade (2013). Retrieved from http://www.ved.gov.ru/monitoring/foreign_trade_statistics/monthly_trade_russia/

[13] UN Comtrade data base. Retrieved from http://comtrade.un.org/data/

North Korea. Moreover, he pointed out a promotion of the denuclearization of the Korean peninsula, preventing North Korea from proliferating nuclear weapons as one of the concrete foreign policy priorities for Russia.[14]

Korea considers Russia as a main player not only in the solution of North Korean issue. Also, Park Geun –hye in her so-called "Eurasian Initiative" from 2013, pointed out the importance of building a creative and peaceful continent with Eurasian countries which includes Russia and the rest CIS states. She proposed to create a single and unified system of transport, infrastructure, trade networks and oil supply. At the same time, President Park noticed that an implementation of the economic interaction, sharing the skills within the spheres of science, culture and technology between Korea and the Eurasian states would bring more benefits for all countries. She also noted the necessity of improving the relations between two Korea and the role of Eurasian Initiative in this mission.[15]

The author has chosen these two nations-Russia and Korea, in aims to compare their economies due to the several reasons. First, focused proximity in the economic size (GDP) and income level (per capita GDP) of countries[16] because, according to the international trade theory, the closer economies the higher possibility for a mutual trade. Second reason was a trade balance between nations for the years under the study. Another reason of selection of Russia and Korea for the observation was that the number of empirical comparative studies on Russia and Korea's economies was found to be small and not enough. Moreover, an availability of obtaining of the accurate data also increased the chances of selecting those two countries.

2. Objectives of the study and research question

The objective of this research is to investigate and evaluate Russia's economy, its peculiarity, the periods of its ups and downs over the last two decades from 1999 to 2015. Further, this work discusses about Russia's oil and gas sectors which remain to be the dominant source of

[14] Putin, V. (2012, February 27), Russia and the Changing World, *Moskovskiye Novosti*. Retrieved from https://www.rt.com/politics/official-word/putin-russia-changing-world-263/

[15] Asmolov, K. (2014, August 28), The Eurasian Initiative by the President of South Korea, *New Eastern Look.* Retrieved from http://journal-neo.org/2014/08/28/rus-evrazijskaya-initsiativa-prezidenta-rk/

[16] The Global Economy Data Source. Retrieved from http://www.theglobaleconomy.com/compare-countries

its export earnings. Besides, this research scrutinizes the trade relations between Russia and Korea from the 1990s up to present. Secondly, this study determines Russia's and Korea's international trade competitiveness with aim to show that what kind of commodities the pairing countries have more relative advantage to make and export. The third objective of the study is utilizing Gravity Model in order to estimate the key export determinants of Russia and Korea and analyze the findings and compare the results with expected outcomes. This econometric model is assumed to be helpful to understand the reasons of Russia's and Korea's export flows. Eventually, this research looks forward to make a contribution to the existing studies on the Russian-Korean economic relations.

This research aims to find the consistent answers the following questions:

What economic sectors represent comparative advantage and disadvantage for Russia and Korea in the exports toward global markets?

What factors are crucial for the exports of Russia and Korea and how these factors impact on their exports?

This study takes a number of hypotheses. They are the followings:

-Russia's export earnings come from the exports of factor abundant sectors such as natural resources while Korea's exports depend on the human-capital and technology intensive commodities.

-Russia's exports tend to increase when economic size of Russia and importing nation is big, distance between countries are relatively close, oil prices are high and stable, when Russia's GDP per capita and its partners are high, when Russia has co-membership in the same economic blocs with its partners. By contrast, exchange rate fluctuations force the exports to decline.

-Korea's exports grow when Korea and its partner have a comparatively huge economic size, higher GDP per capita, increased FDI inflows. Besides, the exports of Korea will be enhanced

if the partner is a member of the APEC along with Korea. On the other hand, a distance and the real exchange rate reduce Korea's export volume.

3. Methodology

This study applies two economic models in order to estimate the comparative advantage and export determinants of Russia and Korea. In the first part, the author investigates international trade competitiveness of Russia and Korea by using the Revealed Comparative Advantage (RCA) indices. The data includes the years which are even numbered years from 2000 to 2014 (2000, 2002, 2004, 2006, 2008, 2012, 2014) - total 8 – year - period. In this study, RCA indices estimate ten major trading commodities between Russia and Korea over selected years. Consistently, the second part applied the Gravity Model in aims to evaluate the export factors of both countries for the period from 1999 to 2014 (16 – year - period). Exogenous variables for each country's determinants slightly differ from each other owing to the nature of each state's economy.

4. Structure of the study

This study consists of six subsequent chapters. The Chapter I-Introduction gives a general information about Russia's economy, its relations with global markets and Korea and explains the reason why these two countries have been selected for the observations. Further, the Introduction part presents the objectives of the research, the information about utilized methodology, research questions and structure of the study.

Chapter II is dedicated to an overview of the Russian economy from 1991 up to present. Moreover, this chapter explains Russia's oil economy and the economic diversification policy of the Russian authorities. At the end of the chapter, the author analyzes a regional integration history after the Soviet Union collapse, its major export and import commodities and destinations.

Chapter III provides an outlook of Russia's and Korea's bilateral political and economic relations over the years 1991-2016. Subsequently, it moves to the trade relations between these two nations during two and a half decade.

Chapter IV conducts analyses on the international trade competitiveness of Russia and Korea. For the sake of evaluating and comparing the international competitiveness of both countries, Revealed Comparative Advantage (RCA) indices will be applied. Initially, the author presents the literature reviews related to RCA indices, previous works which utilized to analyze Russia's and Korea's international competitiveness. Consequently, five RCA indices and ten economic sectors will be introduced for the estimations. Consistently, the findings will be interpreted in details. At the end of the chapter, the findings of RCA estimations will be summarized.

Chapter V investigates the export determinants of Russia and Korea separately and compares the results. For the purpose of evaluating the results, Gravity Model will be applied. First, general information will be given about the international trade theory and Russia's trade. Subsequently, the literature review of gravity model will be revised. Then, the author moves to the models introduction applied in the study which is followed by the findings, interpretation and conclusion.

The last Chapter VI composes of the conclusion and policy recommendation parts. This chapter summarizes all findings and their shortened interpretation. On the basis of the conclusion part, policy recommendations will be given to the both countries.

Chapter II Russia's Economy

1. Economic overview of Russia

Russia, as one of the most enormous economies in the world, has been gaining its economic potential since early 2000s. High oil prices and integration with the global markets have led to the recovery of hampered Russian economy after the collapse of the Soviet Union. Although Russia was hit by the global economic crisis in 2008, the federal exchange reserves, administrative measures and rehabilitation of the increased oil prices brought about a fast restoration of the economy and social life. This growth continued until 2014 when the USA and EU countries blamed Russia in the annexation of Crimea and subsequent intervention of the military forces into the Eastern part of the Ukraine and imposed a number of economic sanctions against Russia.[17]

The 1990s remains in the history of Russia as a transition period from the Soviet planned economy to the market economy and it was tough term for the Russian government and people to adapt a new economic system. This period, by most accounts, was a term of economic clutter, if not near wreckage and fiasco.[18] It is believed that main reasons behind that fiasco were a maladaptive economy policy of Yeltsin's administration and the wrong government measures on the currency policy.

Against the background of the wrong economy policy of the government, Russia's GDP declined by almost 30% over 7 years from 1992 to 1998. Furthermore, Russia experienced soaring rates of inflation- more than 2000% in 1992 and over 800% in 1993. Though those high inflation rates noticeably reduced by 1996, lofty level of depreciation remained about 20% until the end of 1990s. Eventually, the ruble collapsed and the Russian government had to immediately devalue the ruble on January 1, 1998 and issued renewed ruble which per new ruble was equal to 1000 old rubles. Moreover, the ruble depreciation forced the disposable income (a total personal income subtracted from the personal current taxes) to decline by 25

[17] Gros, D. and Mustilli, F. (2015), The Economic Impact of Sanctions against Russia: Much ado about very little. *Centre for European Policy Studies,*

[18] William, H.C. (2009), Russia's Economic Performance and Policies and Their Implications for the United States, *CRS Report for Congress, Prepared for Members and Committees of Congress.*

percent in real terms from 1993 to 1995.[19] In other words, the 1990s remained in Russian economy as "inflationary period". Further, an employment rate fell by 8% and real wages by 33% while a household consumption remained stagnant- 7% fall between 1990 and 1997.[20]

Deterioration in the economy immediately reflected in the life of common people. For instance, life expectancy of male declined from 64 in 1991 to 59 in 1998, while women's average age reduced from 74 to 72 over the same period. [21]

Although the 1990s was one of the hardest periods for Russian economy due to the wrong economic policy and measures, starting the 2000s Russia managed to reinforce the economy. Over fifteen years Russia's economy has represented at least three surprises. The first surprise includes a period of miracle from 1999 to 2008. The GDP per capita of Russia doubled in 10 years, while the GDP amount increased from $270 billion to $1.7 billion in 2007.[22] The second surprise occurred in 2008 and 2009 years when the global economic crisis hit the national economic systems worldwide. It led to the decrease of the Russian GDP by 8% in 2009. Finally, recent Western sanctions which caused a retardation of the Russian-Western trades.

After the global economic crisis, Russia seemed to recover its economy and demonstrated 4.5% and 4.3% GDP growth in 2010 and 2011 respectively. However, in the reality, after the crisis, Russian economy started to stagnate year-by-year. Even before the sanctions imposed in 2014, Russian economy recorded only 1.3 % growth in 2013 and 0.6% in following year. The figure 2.1 gives more detailed fancy about the Russian GDP growth over two and a half decades.

A main purpose of this study is to determine the international trade competitiveness and export patterns of Russia and South Korea. Therefore, this research is limited to give general information of the Russian economy after the collapse of Soviet Union and doesn't analyze the

[19] Economist Intelligence Unit (2014), Russia Analyses. Retrieved from http://country.eiu.com/russia

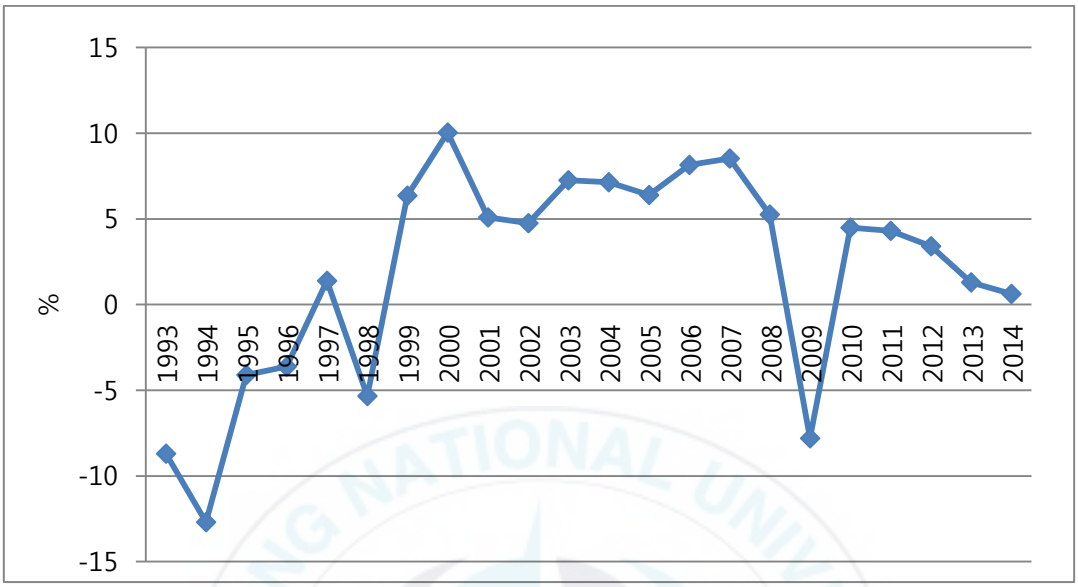
[20] Gerardo, B.C. and Julio, L.G. (2005), The Economic collapse of Russia, *Mexican Foreign Service and St. Antony's College, Oxford.*

[21] William, H.C. (2009), Russia's Economic Performance and Policies and Their Implications for the United States, *CRS Report for Congress, Prepared for Members and Committees of Congress.*

[22] International Monetary Foundation (2014), Russian Federation, *IMF Country Report*, No.14/175, Washington D.C.

reasons of ups and downs in the economy. On the other hand, the work tries to present more itemized analyses about the economic indices and sectors of Russian economy.

Figure 2.1 Annual GDP growth rate of Russia (1993-2014)



Source: World Bank National Accounts Data

Russia's economy is presented like high-income mixed economy whereas the strategic areas of the economy are controlled by the state-ownership enterprises.[23] The government provided market reforms in the 2000s and became to support more the energy and defense-related sectors rather than manufacturing industry and agriculture sectors. In a little while, energy revenues became to play driving role for the growth of the economy. Russia is an abundant country of oil, gas products and precious metals which compose of major export shares. According to statistics, only in 2012, oil and gas sectors made up 16% of the Russian GDP, 52 % of the revenues of the federal budget and 70% of the total export earnings.[24]

Russia's arms industry is also one of the large-scale and sophisticated sectors in the world with a large employee volume. Despite the sanctions over the annexation of Crimea, Russia exported

[23] World Bank Country and Lending Groups data. Retrieved from http://data.worldbank.org/about/country-and-lending-groups

[24] Economist Intelligence Unit (2014), Russia Analyses. Retrieved from http://country.eiu.com/russia

$15.2 billion worth of arms retaining the second exporter after the USA.[25] Main export items of Russian arm-manufacturers are combat aircrafts, ship and submarines, air defense systems and primary guns.[26]

Table 2.1 Main export products of Russia, billion USD (1996-2014)

Year	Oil and gas products	Iron and steel	Coal briquettes	Nuclear reactors	Wood	Cereals	Aluminum	Diamonds	Fish	Commodities not specified
1996	22.4	7.56	1.0	2.2	1.8	0.1	4.3	N/A	0.2	14
1997	22.6	7.51	0.8	2.19	2	0.2	4.4	N/A	0.28	11.5
1998	13.6	6.04	0.6	2.19	1.8	0.16	4.6	1.6	0.34	7.5
1999	18.8	5.09	0.4	2.3	2.1	0.05	4.5	N/A	0.25	10.5
2000	34.3	6.2	1.1	2.8	2.4	0.09	5.2	N/A	0.32	11.9
2001	32.7	5.5	1.2	3.3	2.4	0.2	4.4	1.1	0.39	12.3
2002	38.8	6.4	1.1	2.9	2.9	0.9	3.6	0.81	0.38	9.6
2003	50.8	8.3	1.7	3.3	3.4	1.1	4.01	0.86	0.4	11.9
2004	74.2	15.9	2.7	3.7	4.5	0.6	4.8	1.3	0.32	15.6
2005	113.4	17.8	3.7	4.2	5.6	1.3	5.4	1.6	0.45	19.9
2006	140.8	17.8	4.3	4.9	6.6	1.5	7.03	1.7	0.52	24.4
2007	166	21.1	5.3	5.8	8.8	4	8.1	1.7	0.51	28.4
2008	230	28.6	7.7	7.1	7.7	3.2	8.6	1.5	0.47	34.9
2009	140.4	14.7	7.3	5.5	5.5	3.4	5.7	1.1	1.7	26.4
2010	197.3	18.7	9.1	5.2	6	2.3	6.6	2.6	2.1	28.7
2011	263.1	21.9	11.3	5.3	6.9	4.4	7.7	3.7	2.3	41.4
2012	284.5	22.6	13.0	7.6	6.7	6.2	7.2	4.6	2.5	N/A
2013	283	20	11.8	8.8	7.3	4.7	7.1	4.9	2.81	N/A
2014	269.6	20.5	11.6	9.2	7.7	7	6.3	5.3	2.86	11.6

Source: International Trade Statistics Database, UN Comtrade

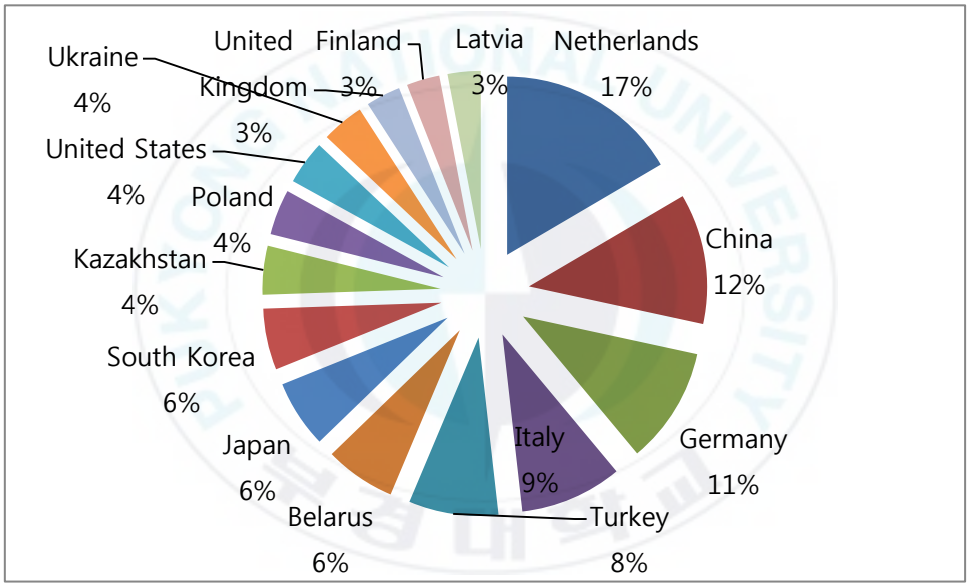
Table 2.1 shows the main export commodities of Russia. As the table demonstrates, Russia primarily exports the items of natural resources. The natural resources are followed by the nuclear reactors, wood, cereals and fish products. Meanwhile, the exports of commodities not specified comprise substantial volume in the Russian exports. The exports of oil/oil products and gas/gas products have increased very fast recently. Energy sector remains to be the largest GDP composer of Russia while the figures show how Russia's economy has become highly

[25] Ibtimes (December 30, 2015), "Russia Arms Exports Crossed $15B In 2015, Moscow Plans Similar Sales for 2016". Retrieved from http://www.ibtimes.com/russia-arms-exports-crossed-15b-2015-moscow-plans-similar-sales-2016-2243843

[26] Reuters News Agency (July 7, 2014), "Putin says Russia must boost arms exports". Retrieved from http://www.reuters.com/article/us-russia-arms-iduskbn0fc10x20140707

dependent on the imports of agricultural products. Russia's export volume peak was recorded in 2013 with $527.2 billion worth which demonstrated 1.8% share of the world's total exports. On the other hand, Russia's imports composed $314.9 billion in the same year. [27] However, the sanctions imposed by the West caused Russia's trade volume to widely drop. For instance, the exports from Russia composed only $333.5 billion in 2015 against $527.2 in 2013. Meantime, the imports declined by $194.09 billion comparing to $314.9 billion in 2013. From a continental perspective Russia exports with 57.1% share sent to EU countries following by Asia (35.6%) and North America (3.2 %) The Figure below shows major export destinations for Russia's export products.

Figure 2.2 Major export destinations of Russia's goods (2014)



Source: FSSS database.

As well as Russia is a big exporter, it is also one of the largest importing countries with its 143.4 million worth population. The major import items are machinery ($52.1), electronic

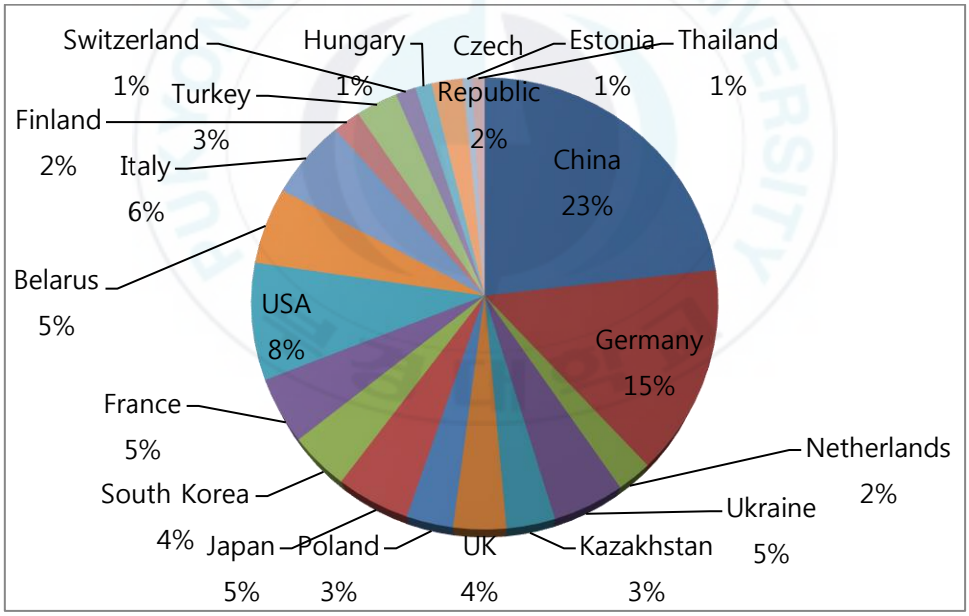
[27] World's Top Exports (February 19, 2016), Russia's Top Import Partners. Retrieved from http://www.worldstopexports.com/russias-top-import-partners/

equipment ($33.7 billion), automobiles ($31.4 billion), medicaments ($12.8 billion), agriculture products ($2.9 billion), meat ($5.5 billion) and others.[28]

Russia has common borders with 16 countries in land (14) and water (2). Common borders imply the less transport costs. If we analyze about Russia's main export and import partners, most of the major trading nations are either Russia's neighbors or comparatively close to Russian territory.

In this point, Russia's major importing items also come from the countries which have common borders with Russia. Moreover, partners' economic size is also crucial to trade with Russia. The Figure 2.3 shown below contains empirical evidences of major import origins for Russian market.

Figure 2.3 Major import origins for Russia's market (2014)



Source: FSSS database

After the EU and U.S. sanctions against Russia were imposed, the government of Russia adopted counter sanctions for the products from US, EU, Australia, Canada and Norway (in

[28] The costs of imported commodities account for 2014 year.

force, since August 7, 2014 and extended on June 24, 2015 until nowadays). European Commission estimated the overall negative effect of Russia's countersanctions for 2014 and 2015 years. It composed 0.3% and 0.4% of EU's overall GDP decrease respectively (€ 40 billion and €50 billion).[29] The sanctions also changed Russia's trading partner selection and the trade volume with China, the CIS and other Asian nations significantly increased.

2 Russia's oil economy and diversification

Russia is the eighth country of oil reserves and second largest oil producer and exporter in the world after Saudi Arabia. Meanwhile, Russia has the largest proven gas reserves (23% of all gas reserves worldwide) and 12% of oil reserves.[30] Natural recourses, especially oil, have been a main driving power of Russia's economic growth for a long time period and substantial determinant variable of economic wealth of Russia. Even during the Soviet Union oil was one of the main sources of currency inflow. Some scholars claim that a reduction in the oil revenues was the main trigger of the collapse of the Soviets (Gaidar, 2007). In more recent periods, the two stage economic boom (2000-2008 and 2010-2013) with an average annual GDP increase in excess of 5-7% also was accompanied by a significant increase in the oil price. Increased oil prices stimulated Russia to produce more oil and Russia reached 10 million barrels/day extraction in 2007.[31]

As we mentioned before, Russia's main export earnings come from the selling of natural resources, particularly, oil exports. After the collapse of communism, Russia needed a huge capital for reinforcing the national economy. Europe's oil and gas demand was prompt for oil abundant Russia. Figure 2.4 brings empirical evidences of Russia's oil and gas export share in the total export framework. Russia was steadily increasing its oil exports over the years. Its

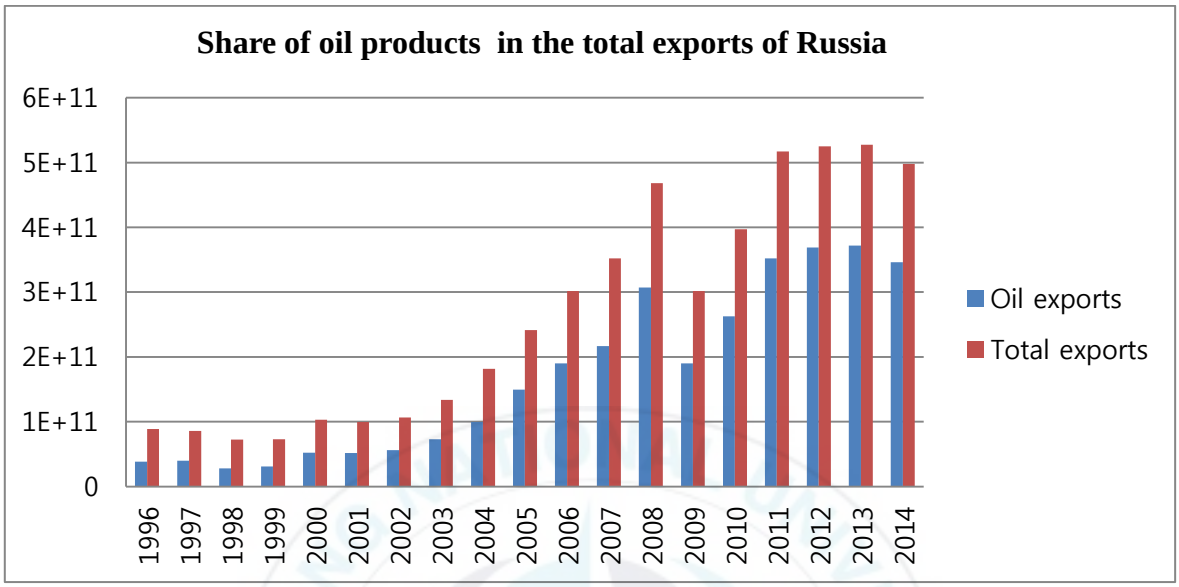
[29] European Parliament (2015), Economic Impact on the EU of Sanctions over Ukraine Conflict. *Briefing PE 569.200*, European Parliamentary Research Service.

[30] World Bank (2015), World Development Indicators. Retrieved from www.worldbank.org

[31] Benedictow et al. (2010, May), Oil dependency of the Russian economy: An econometric analysis. *Statistics Norway, Research Department*, Discussion Papers No. 617.

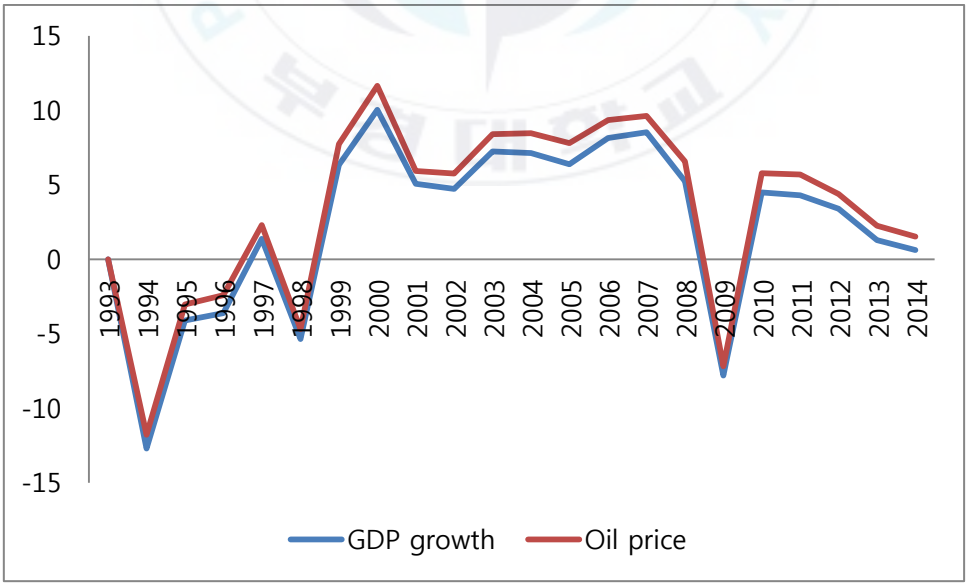
export volumes of the oil products composed 43 % of total exports in 1996, while this figure reached 70.5% in 2013.[32]

Figure 2.4 Share of oil products in the total exports of Russia (1996-2014)



Source: International Trade Statistics Database, UN Comtrade

Figure 2.5 Correlation of oil price and GDP growth of Russia, % (1993-2014)



[32] UN Comtrade database. Retrieved from http://comtrade.un.org/

Source: Russia Economic Report, World Bank[33]

Figure 2.5 describes a correlation between oil prices and the Russian GDP growth. In fact, Russia has earned most of its export earnings from the exports of the oil products. Russian GDP growth composed 5.2% positive jump with $1.6 trillion worth in 2008 when an average oil price amounted 96.94 USD/barrel. In that year, the global crisis threatened all the countries of the world and caused a decline in the oil prices. As the Figure 2.5 shows, Russia's GDP decreased following by the oil price down in 2009. There is we can be observe the same trend between oil price and Russia's GDP for the rest years also.

As the world's second largest oil maker, Russia is home to the biggest companies which are specified on oil and gas productions. Rosneft (total 1.5 billion barrels in 2014), Lukoil (total 707 million barrels in 2014), Gazprom Neft (total 482 million barrel in 2014), Surgutneftgaz (total 447 million barrel in 2014) and Tatneftgas (total 193 million barrels in 2014) are not only main enterprises in the energy sector but also in the economy of Russia.[34]

However, Russia's dependency on the natural resources may lead Russia to the Dutch disease.[35] Previous researches such as Westin (2004) and Kalcheva and Oomes (2007) already found out the symptoms of the Dutch disease in the Russian economy.

Therefore, over the years economists and researchers have been warning Russia about the pathologies of natural resource dependency. This pathology includes a corrosion of political and economic institutions, an unfavorable influence on the competitiveness of other economic sectors, weakening of the productivity growth and raised macroeconomic impermanence.[36]

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[33] World Bank Group (2016), Russia Economic Report: The Long Journey to Recovery, Report No.35. Retrieved from http://www.worldbank.org/eca/pubs/rer35_ENG.pdf

[34] FSSS database. Retrieved from http://www.gks.ru/

[35] According to Benedictow et al. (2013), the hypothesis of Dutch disease that implies that when revenue of natural resources rises it may cause a deindustrialization by increasing the real exchange rates, and thus commits a nation's manufacturing industry less competitive.

[36] Guriev, S., Plekhanov, A. and Sonin, K. (2009), Development based on Commodity Revenues. European Bank of Reconstruction and Development, *Working paper No.108.*

A need of rising of the profits from the cost-sensitive industries in tradable economic spheres (such as agriculture and manufacturing), a need of improvement of public spending efficiency and the level of quality of the public services leads natural resource dependent states to diversify their own economies. Especially, for Russia where the state possesses 40 % of total employed people and where a rate of employment in private sector is growing very slowly, an avoiding of oil dependency and diversification of the economy is crucial.[37]

Recently, the Russian authorities pay more attention on reducing the dependency on the natural resources and diversifying the economy. Putin, in one of his interviews emphasized a significant role of diversification of the Russian economy. He also noted an impossibility of achieving the global leadership by reliance on the exports of natural resources, such as oil and gas.[38] Further, former Russian President Medvedev in 2009 announced an article "Go Russia" which is popular as "Medvedev Modernization Program". The program aims to modernize the domestic economy and society of Russia, declining an oil and gas revenue dependency and establishing more diversified economic structure. Medvedev put five main priorities for the nation's technological development. They are an efficient use of energy resources, nuclear technologies, technologies in IT (information) sphere, advanced medical technologies and pharmaceuticals and space technologies.[39]

Moreover, Russian government recognized the important role of resistant economic institutions. Ongoing initiatives aimed to improve the efficiency of public administration, diminishing corruption and stimulating advanced technologies and innovation.[40]

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[37] European Bank for Reconstruction and Development (2012), Diversifying Russia: Harnessing Regional Diversity. *Special Report*, EBRD, London, UK.

[38] European Bank for Reconstruction and Development. (2012), Diversifying Russia: Harnessing Regional Diversity. *Special Report*, EBRD, London, UK.

[39] Medvedev, D. (2009, September 10), Go, Russia!, Official Internet Resources of the President of Russian Federation. Retrieved from http://kremlin.ru/events/president/news/5413

[40] OECD (2013), Russia: Modernizing the Economy, Better Policies, Paris: *OECD Publishing*. Retrieved from https://www.oecd.org/russia/russia-modernising-the-economy-en.pdf

3. Global Integration of Russian Economy

From the first days after the collapse of Soviet Union, Russia took measures for a liberalization and integration of Russia with world markets. On November, 1991, President Yeltsin signed the Decree "on liberalization of foreign trade activities in RSFSR" which revoked the monopoly of the government on foreign trade and the authorities took steps to conform the existing trade regime of Russia to international standards. Russia has substantially reduced tariff barriers and quantitative bounds on exportation and importation, progressively decreasing license issue requirements, cancelled, especially, the policy of authorized exporters, modified currency control and carried out many out measures. As a result, the share of foreign trade in GDP of Russia composed 43.8 % according to 2010 statistics.[41]

One of the first steps in the integration process was Russia's GATT (succeeded by WTO since 1994) accession launch in 1993. Russia's application was taken by WTO in 1995 and it took eighteen years for joining of Russia the WTO. After long term negotiations, WTO members approved Russia's candidate for WTO membership in the late 2011 and Russia became a WTO member-state in 2012. Economists predicted about social and economic benefits of WTO membership on the Russian economy. They mentioned annual 0.96% welfare of Russian economy in the long run, 0.4% increase in an aggregate consumption, growing of FDI inflow, raise of efficiency and productivity, increased demand for skilled labor forces and other effects. On the contrary, the economists argued a reduction of federal funds, decline of production volume (less than 1%), increase of unemployment following the production volume reduction, deterioration of less experienced labor forces in the labor market.[42]It was only second year after the accession into WTO when the Western countries imposed anti-Russian sanctions in 2014. Therefore, it is still hard to analyze the real effects of WTO membership on Russia. However, WTO participation brings more positive consequences for the Russian economy rather than negative.

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[41] Evseev, V. and Wilson R. (2012), WTO Accession: Implications for Russia. *Russian Analytical Digest,* No.199, pp. 11-16.

[42] Kirsanov, S. and Safonov, E. (2014), The Consequences of Russia's Accession to WTO: Conclusions and Recommendations. *European Scientific Journal,* Vol.10, No.16, pp. 195-210.

Russia faced towards Western countries in the early 1990s for the sake of integration with global markets and reinforcing the wrecked economy. Russia put serious plans to normalize and develop the bilateral ties with EU countries. In 1997, the Partnership and Cooperation Agreement between Russia and European Union came into the force and since the Agreement regulates all political and economic bonds between the states. In 2003, at the summit which was held in St. Petersburg, Russia and EU agreed to enhance the bilateral relations by creating four "common spaces". Those common spaces involved:

1. Common Economic Space, including issues related to the economy and environment;

2. Common Space of Freedom, Justice and Security;

3. Common Space of External Security, covering management of crisis and non-proliferation;

4. Common Space of Research and Education, involving Cultural Aspects.[43]

The 2014 sanctions by EU banned the exports of dual-use equipment, arms and innovative technologies used by Russia's energy sphere toward Russia which had little implication on the bilateral trades. But, Russia's counter-sanctions were more noticeable for European exporters. Russia stopped to import EU's agri-food products which are accounted for EU's 43% exports into Russia and 4.2% of total EU agri-food exports to the globe.[44] Although, the relations between Russia and EU are not in their good phase nowadays, the parties are holding regulars negotiations to normalize the bilateral relations.

When we talk about Russia's partners we cannot skip the states of the former-Soviet Union. On December 8, 1991, Russia, Belarus and Ukraine signed the "Agreement on Establishing the Commonwealth of Independent States" which was signed later by the rest eight former Soviet-Union states (except three Baltic countries). CIS was created to manage the collapse of the USSR and encourage post-Soviet cooperation in the economic, political and security issues.[45]

[43] European Commission (2007), the European Union and Russia: Close Neighbors, Global Players, Strategic Partners, Luxembourg, Office for Official Publications of the European Communities. Available:

[44] European Parliament (2014), at a Glance: EU-Russian trade, European Parliamentary Research Service, PE 557.023.

[45] Kubicek, P. (2009), The Commonwealth of Independent States: an example of failed regionalism?, *Review of*

Nowadays there are 9 member-states and 2 associate nations. In 1994, CIS member nations agreed to establish Free Trade Area (FTA) in the CIS territories but the agreement were not signed. In 2009, was introduced a new form of FTA for CIS states. The agreement called the CISFTA in abbreviations. Consistently, it was signed by Russia, Belarus, Armenia, Tajikistan, Moldova, Kazakhstan, Ukraine and Kyrgyzstan. As of 2013, CISFTA was ratified only by Russia, Belarus, Ukraine, Armenia and Moldova and is in effect only between those ratified states.[46] CISFTA implies an elimination of export-import duties on some specific commodities while gives some exemptions that will eventually be phased out.

On the other hand, Russia, Kazakhstan and Belarus established Eurasian Economic Union (EEU) in May of 2014. Later in 2015 Armenia and Kyrgyzstan joined the Union. The Union covers 183 million people and GDP with 4 trillion USD worth. The EEU represents the free movement of products, services, capital and people. It is assumed to provide for common transport, energy and agriculture policies, The Union plans to create a single currency and greater enlargement in the near future.[47]

In 2001, Goldman Sachs Asset Management introduced "BRIC" economic bloc which includes Brazil, Russia, India and China with their developing and new industrialized economies. The first Summit of BRIC was held in Yekaterinburg, Russia in 2009. Later in 2010, BRIC members increased by South Africa and BRIC changed to BRICS. BRICS countries share 25 % of world GDP and expected to rise until 40% by 2050.[48] Further, in 2015, the states signed an agreement of establishment of New Development Bank in Shanghai with 100 billion USD initial capital fund.[49] For Russia a membership in BRICS is valuable for its benefits including trade flow increase, stabilizing of ruble, ensuring the socio-economic sustainability in the

International Studies,35(Supplement S1), pp. 237-256.

[46] U.S. – Ukraine Business Council (USUBC) (October 18, 2012), CIS Free Trade Agreement Comes into Force. Retrieved from http://www.usubc.org/site/member-news/cis-free-trade-agreement-comes-into-force

[47] Tarr, G.D. (2015), The Eurasian Economic Union among Russia, Belarus, Kazakhstan, Armenia and the Kyrgyz Republic: Can it succeed where its predecessor failed? *Journal of Social Science Research Network.*

[48] Prasad, B.R. (2013), BRICS and the Global Economy, *FT Knowledge Management*.

[49] BBC News (July 21, 2015), BRICS Countries Launch New Development Bank in Shanghai. Retrieved from http://www.bbc.com/news/

country, reinforcing its political status in the global arena, counter-balancing the countries of West in the geopolitical and geo-economic games. [50]

Another organization where Russia participates is Asian-Pacific Economic Cooperation (APEC). Russia officially joined APEC meetings from 1998. Since, Russia has been actively trading with all 20 member- economies of APEC. In other words, APEC membership caused reorienting of trading destinations of Russia. For instance, in 2010 China overtook Germany and became leading trading partner of Russia. Only over the period 2005-2010 merchandise volume between Russia and Japan doubled, trades with South Korea raised threefold over the same period. Moreover, APEC was a tool to improve its relations with countries of Asia-Pacific, especially, South Korea, USA, China, Japan and Australia which remain biggest economies in the world. Moreover, by participating in APEC conferences Russia got opportunity to put forward its political and economic ambitions in the region.

Russia hosted annual meeting of APEC leaders in 2012 in Vladivostok which is the 'capital' of Russian Far East. Russia has been realizing "Far East development program" and directed more than 31 billion USD in aims to develop resource-rich Far East. Most of the APEC states such as Korea, China and Japan are directly participating in the implementation of "Far East program"[51].

[50] Sergunin, A. (2015), Understanding Russia's policies towards BRICS: theory and practice, *ISA Global South Caucus Conference*, Singapore, Conference paper.

[51] East Asia Forum (September 1, 2012), "Russia's APEC moment". Retrieved from http://www.eastasiaforum.org/2012/09/01/russias-apec-moment/

Chapter III Russia-South Korea Relations

1. Overview of relations between Russia and South Korea

Diplomatic and trade relations between Russia and South Korea have a relatively short history. The development of the bilateral relations between the two countries has gone through two periods. The first period is characterized as a stage of political controversy (1970-1989). During the Soviet Union era there were no direct merchandises or investment projects between two states. The reason was that the Soviet Kremlin didn't accept South Korea as an independent country. However, there were rare cases when the Korean enterprises purchased the Soviet resources via third party countries. Subsequently, the leaders of North Korea forced Moscow to cease any official relations with Seoul. Eventually, the political issues on the Korean Peninsula negatively impacted on the Soviet-South Korean bilateral relations. Beginning in the late 1980s the Soviet Union changed its policy with respect to capitalistic Korea. This stage is considered as the second wave of the bilateral cooperation between Russia and South Korea (1990 - up to present).[52]

A crucial role in the development of relations between two states played Gorbachev's new thinking Policy. Gorbachev was the first person among the all Soviet leaders who acknowledged the rapid economic mass and rising power status of South Korea in the region (Davidov, 1990). On June 4, 1990 Gorbachev and then Korean President Roh Tae Woo held an official meeting in San Francisco and after the meeting Soviet leader stated that

We could not, for obsolete ideological reasons, continue opposing the establishment of normal relations with his country, which showed an exceptional dynamism and had become a

[52] Korenevskiy, K. (2003), Russia-Korea Trade and Investment Cooperation: Current Tendencies and Perspectives. Retrieved from https://faculty.washington.edu/karyiu/confer/seoul04/papers/korenevskiy.pdf

force to be reckoned with, both in the Asia Pacific region and in the wider world.[53]

San Francisco meeting of the leaders accelerated the process and in the same 1990, Russia and South Korea officially established diplomatic relations. This historical event opened new ways and more opportunities to strengthen the bilateral trade and diplomatic ties. After the collapse of the Soviet Union, Russia under President Yeltsin's administration initiated to improve the relations with South. The same time, Russia's relations with Pyongyang deteriorated steadily due to Russia's pro Seoul foreign policy and North Korea's covert nuclear program.

In November 1992, Yeltsin visited South Korea. Main purpose of that visit was formalizing and fortifying the links between Moscow and Seoul. During the official meetings, Yeltsin supported a reunification of two Koreas through only dialogues and argued that Russia had already stopped furnishing Pyongyang with offensive arms. Moreover, in 1994 when then South Korea's President Kim Young Sam paid a visit to Moscow, President Yeltsin announced that the Soviet-North Korea Friendship and Mutual Assistance Agreement from 1961 would no longer oblige Russian Federation to take sides of Pyongyang if any conflicts occur between South and North (Harada, 1997).

Following the honeymoon decade in the bilateral relations in the 1990s, Putin and Medvedev managed to make a significant progress for boosting the relations with Seoul starting the 2000s. During this period the Korean Peninsula issue has become a superior priority issue in the foreign policy of Kremlin. Putin supported South Korea's peaceful negotiations initiative over North Korea's nuclear program and called Pyongyang to cooperate with the Six Party talks. In 2004, Sergei Lavrov, Foreign Minister of Russia, declared the official position of Russia in Six Party talks. Lavrov stated that Six Party talks should achieve the denuclearization agreement in the Korean Peninsula and provision of socio-economic aid to North Korea.[54]In 2005, Putin during the meeting with the new South Korean ambassador to Russia and various other diplomats mentioned South Korea as a top diplomatic and economic priority for the Russian

[53] Ahn, S.H. (2012), Russian-South Korean Security Relations Reconsidered: The Lost Two Decades of Promise and Perils. *The Korean Social Science Journal,* Vol. 39, No. 2, pp. 27-53.

[54] Torkunov, A. and Denisov, V. (2005), Russia – Korea: a view from the past into the present (in Russian), Journal of *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, No. 1, pp.45-54.

government in the Asia –Pacific region.[55] Some Korean researchers suggest to learn the bilateral ties of Russia and South Korea over the period 1999-2015 by dividing to the Presidential terms of Korea as following: "the period of normalization of relations" (Kim Dae-jung, 1998-2003), "the period of searching ways for economic developments" (Roh Moo-hyun, 2004-2008), "the period of strategic partnership" (Lee Myung-bak, 2008-2013)[56] and "birth of Eurasia initiative" (Park Geun-hye, 2013-nowadays).[57]

Russia also plays important role in the foreign policy of Korea. The current president of Korea, Park Geun-Hye announced "Eurasia Initiative" in 2013 and suggested establishing the Silk Road Express railway network from Busan towards the Eurasian regions. Further, President Park emphasized the importance of increasing of integration in the energy sector between Korea and Russia and other nations in the region.

Park called Russia, China and other nations in the region to facilitate a new formation of the Eurasian economic bloc which would be helpful to demolish any trade barriers between nations.

Further, positions of Korea and Russia on the nuclear program of North Korea are close to each other. During the meeting between Park Geun-Hye and Putin in Beijing in 2015, exchanged opinions on the bilateral issues and discussed North Korea. During the meeting, President Park expressed hopes that official Kremlin will help to ease tensions between and South Korea. The sides also discussed the bilateral cooperation in denuclearizing in the Korean Peninsula.[58]

Moreover, these two nations have demographic proximity to each other. For example, more than 185 thousands Koryo-saram which refer to ethnic Koreans live in the territory of Russia. Most of them are settled in Primorskiy Kray, Sakhalin Islands, Vladivostok, Siberia and other

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[55] Ahn, S.H. (2012), Russian-South Korean Security Relations Reconsidered: The Lost Two Decades of Promise and Perils. *The Korean Social Science Journal,* Vol. 39, No. 2, pp. 27-53.

[56] Shin, B.S. (2010), Political Relations between South Korea and Russia: Estimations and Suggestions (in Korean), *Sourcebook of 23rd Korean Peninsula Peace Forum*, pp. 5-30.

[57] Kwon, Y. (2014, August 20), South Korea's Eurasia Ambitions, *The Diplomat.* Retrieved from http://thediplomat.com/2014/08/south-koreas-eurasia-ambitions/

[58] Korea Times (September 9, 2015), Park, Putin discuss North Korea. Retrieved from http://www.koreatimes.co.kr/www/news/nation/2016/04/116_186185.html

regions of Russian Far East.[59]Most of these ethnic Koreans actively participate in the economic and political life of Russia. Imposing the non-visa system for both Russian and South Korean people from 2014 was helpful to increase a wave of businessmen and tourists into each other's countries.[60] According to the data by Korea Tourism Organization, only in 2015, more than 187 000 Russian citizens visited Korea with aims to have a journey, study, work and etc.,[61] while more than 100 000 South Koreans travelled to Russia in the same year. This figure increased by 13 % rather than 2014.[62]

2. Trade relations between Russia and South Korea

A collapse of the Soviet Union and transition from socialism to market economy route was decisive for Russia-Korea economic cooperation's future. After establishing the diplomatic relations both countries started to trade mutually and many joint ventures became to establish. Thanks to close distance, existing of connecting ports and abundance of natural resources (mostly fur and timber), major Korean companies settled in Russian Far East (Primorskiy kray, Sakhalin oblast and etc.).[63] However, the chaos in the post-socialistic Russian economy didn't allow increasing the trade volume between two states. In 1990s, most of the Korean companies restrained themselves to invest in Russia due to the negative predictions of international institutions on Russia's economy. Therefore, despite the annual growth in the bilateral trade, the figures increased very slowly. Most of researchers that period call as "stagnant decade" in Russian—Korean economic relations.[64]

The real trade boom between these two nations is marked from the 2000s. Trade balance of

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[59] Andrey Lankov (October 16, 2009), Koreans Left Dry. Retrieved from http://www.atimes.com/atimes/central_asia/kj16ag02.html

[60] Yonhap News (2014, January), Korea and Russia impose mutual non-vise system for the citizens (in Korean). Retrieved from http://www.yonhapnews.co.kr/international/2014/01/02/0601100100akr20140102005400080.html

[61] Korea Tourism Organization database. Retrieved from http://korean.visitkorea.or.kr/

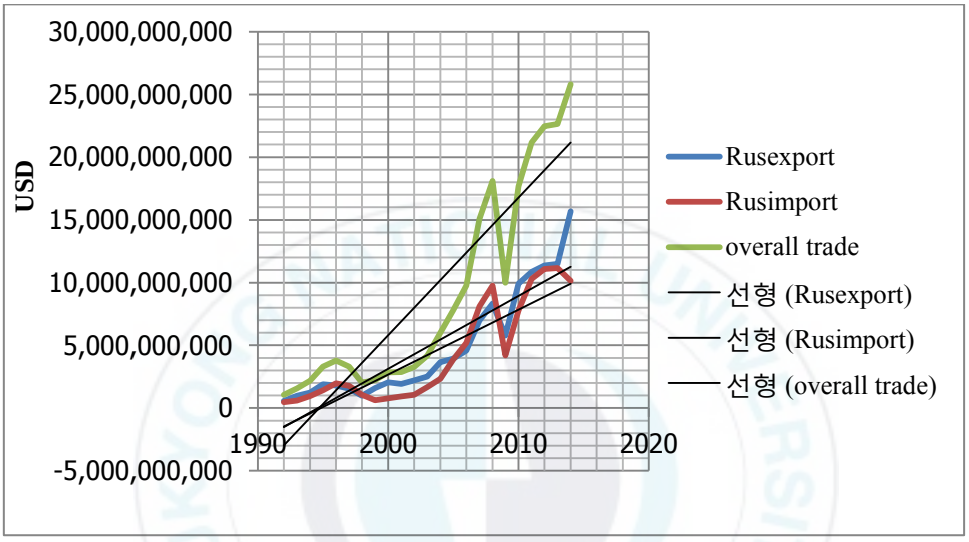
[62] National Tourism Portal of Russia (in Russian). Retrieved from http://rg.ru/2015/12/23/turizm.html

[63] Korenevskiy, K. (2003), Russia-Korea Trade and Investment Cooperation: Current Tendencies and Perspectives. Retrieved from https://faculty.washington.edu/karyiu/confer/seoul04/papers/korenevskiy.pdf

[64] Ahn, S.H. (2012), Russian-South Korean Security Relations Reconsidered: The Lost Two Decades of Promise and Perils. *The Korean Social Science Journal*, Vol. 39, No. 2, pp. 27-53.

two countries jumped 26.2 times, from$1.05 billion in 1992 to $25.8 billion in 2014.[65] (for more detailed figures see appendix A) In the trade ratio, Russia's exports exceed the imports from Korea. For instance, Russia exported $11.4 billion worth products while imported $11.1 billion worth. Korea is the 8th largest country at Russia's trades and the 3rd in the East Asian region following China and Japan. Meanwhile, Russia is the 12th largest trading partner of Korea.

Figure 3.1 Bilateral trade between Russia and Korea (1992-2014)



Source: International Trade Statistics Database, UN Comtrade

The main items of bilateral trade have remained natural resources from Russia and manufactured goods from Korea. Russia as an abundant country of natural resources is relatively close to Korea which highly reduces the transport costs. Korea's main import items from Russia are oil and oil products, heavy metals like iron and aluminum, fish products. Meanwhile, Russia's imported item list from Korea changed during two decades. If in 1990s heaters and color TVs dominated among export items from Korea toward Russia, after 2004 cars took advance in the from-Korea-to-Russia list. Consistently, from 2005 automobile cars became second main export item toward Russia.[66] Moreover, Russian market is also furnished

[65] UN Comtrade database. Retrieved from http://comtrade.un.org/

[66] Kang, I.S. and Kim, D.Y. (2015) A Significance and Implications of 25 Years of Establishment of the Diplomatic Relations between South Korea and Russia: An Importance of Strategic Cooperation for the Implementation of Eurasia Project (in Korean), VIP report, *Journal of Hyundai Economic Research*, Vol. 631, pp.

by plastics, nuclear reactors, electronic equipment and ships from South Korea.[67]

Table 3.1 Main export commodities of Russia toward South Korea (million USD)

Year	Oil and oil products	Iron	Fish products	Aluminum
1992	47.5	133.4	103.5	22.6
1993	67.8	355.6	125.9	45.4
1994	87.4	464.6	155.8	85.7
1995	88.6	614.2	185.1	142.7
1996	90.8	495.1	201.9	157.3
1997	57.8	306.3	163.9	165.8
1998	69.0	124.6	940.7	113.1
1999	135.1	283.4	200.1	227.9
2000	521.0	456.8	121.6	327.4
2001	604.0	446.4	151.8	295.4
2002	657.2	528.9	213.2	280.5
2003	565.2	625.5	296.6	332.4
2004	903.5	1057.4	274.8	489.5
2005	947.7	1028.8	275.1	609.8
2006	1574.8	621.9	345.8	908.8
2007	3718.2	1013.3	422.2	691.4
2008	3995.1	2203.2	383.4	754.3
2009	3333.4	785.2	434.8	425.3
2010	6570.7	1107.5	493.05	460
2011	7466.5	942.6	659.5	782.3
2012	8220.2	834.6	651.3	850.4
2013	8537.5	742.5	587.8	543.1
2014	12381.7	827.5	669.3	566.5

Source: International Trade Statistics Database, UN Comtrade

Russia supplied to Korea $60.6 billion oil products which composed 28.9% of overall trade volume during the period 1992-2014. Further, Russia's iron exports toward Korea reached $16

15-34.

[67] UN Comtrade database. Retrieved from http://comtrade.un.org/

billion for 1992-2014. The following Table 3.1 gives more detailed figures about Russia's exports toward the Korean market. On the other hand, Korea's export earnings from nuclear reactors and electrical equipment to Russia during observed years drawn up as $24.7 billion.

Table 3.2Main export commodities of South Korea toward Russia (million USD)

Year	Plastics	Nuclear reactors	Electronic equipment	Ships
1992	22.5	61.5	111.0	14.6
1993	11.2	82.3	210.5	35.7
1994	10.7	81.0	493.4	20.3
1995	15.0	161.1	670.8	19.5
1996	24.5	185.1	881	35.8
1997	46.7	152.2	436.4	0.6
1998	48.3	133.3	158.8	7.6
1999	94.4	37.8	91.2	0.5
2000	209.3	65.1	109.9	1.1
2001	217.3	89.2	127.6	6.4
2002	270.3	113.4	147.5	18.6
2003	370.9	153.7	260.0	102.2
2004	476.6	230.1	310.2	61.5
2005	620.6	300.1	400.0	301.8
2006	646.9	389.5	430.8	357.1
2007	724.1	558.9	1232.4	622
2008	759.8	887.0	1318.2	216.3
2009	390.9	529.9	760.7	286.1
2010	588.9	1046.1	1056.5	607.1
2011	755.0	1487.4	967.9	609.1
2012	779.7	1649.7	1110.8	43.5
2013	727.4	1603.2	1059.9	83.3
2014	631.8	1406.2	986.4	858.7

Source: International Trade Statistics Database, UN Comtrade

Foreign Direct Investments which were directed from Korea to Russia increased from $9 million in 1990 to $1.35 billion in 2014 which implies more than fifteen times shock over 25 years. The most amount of Korean FDI (95% of all FDI amount) into Russia was routed in

aims to develop the manufacturing sectors of Russia in the 1990s while this trend has changed and nowadays Russia's service sector is steadily becoming more attractive for Korean investors.[68]

Russia's FDIs into Korean market increased from $200 thousands in 1990 to $300 million worth in 2014. Over 25 years the volume of FDI increased by 147 times. If to take by sector, Russian investors prefer the manufacturing sector (54.9%) of Korea to invest rather than service sector (44.8%).[69]

Although the trade flows have been regularly increasing over the years, both of nations still remain passive to invest in each other. There are pointed out two main reasons of FDI restrictions: language and legal affairs. Both of Korean and Russian businessmen face the language problem to communicate with each other. Moreover, a jurisdiction of two countries differs from each other. Especially, without acquaintance with the Korean jurisdiction is impossible to do business in Korea.[70]

Although trade relations are increasing between the two states, some tariff and non-tariff barriers remain to restrict an improvement of bilateral trade in fast speeds. For instance, after the establishment of the Eurasian Economic Union (EEU) on January, 2015, Russia and other EEU member - states imposed limits regarding the imports of several commodities in order to protect their domestic economies. For instance, Korea cannot export to Russia the commodity HS7304- tube or hollow profile, seamless iron/steel not cast due to the EEU import limits. Therefore, customs procedures need to be improved. Further non-tariff barriers such as SPS and TBT requirements also need to be eased or removed.[71]

On the other hand, oil and gas-chemical, timber processing, producing of fish products and pulp & paper products of Russia could be more perspective projects for the Korean investors.

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[68] Export-Import Bank of Korea Database. Retrieved from https://data.exim.gov/

[69] Database of Ministry of Trade, Industry and Energy of Korea. Retrieved from http://english.motie.go.kr/

[70] Ivashentsov, G. (2013), Russia and South Korea: Perspectives of Bilateral Relations, Russia—Republic of Korea Relations: Revising the Bilateral Agenda, *Working paper 13,* pp. 4-21

[71] Lee J.Y. et al. (2015), Evaluation of Korea-Russia Economic Cooperation and its mid- to long- term Vision (in Korean), *Korea Institute for International Economic Policy.*

For instance, ‘Gazprom’ (Russia) and ‘Kogas’ (South Korea) in 2012, signed Memorandum of Understanding (MOU) on the construction of gas tube from Russia to South Korea. Although North Korean dispute and other political issues have been remaining unsolved, Russia and South Korea keep improving the bilateral economic relations. However, the economic potentials of both states are not used fully. The pairs can boost the cooperation in the new spheres such as energetics, gas-chemical, high technologies and modernization of Russian Far East.[72] Moreover, increasing trade volumes between two nations could be encouraged in high steps by establishing of FTA between Russia and Korea.[73]

[72] Denisov, V. and Zhebin, A. (2008), Korean Settlement and Russian Interests, *Journal of IDV RAN*, Russkaya Panorama, Moscow, pp. 189–220.
[73] Lee J.Y. et al. (2015), Evaluation of Korea-Russia Economic Cooperation and its mid- to long- term Vision (in Korean), *Korea Institute for International Economic Policy.*

Chapter IV Analysis of International Competitiveness Using Revealed Comparative Advantage Indices

1. Introduction

Nowadays RCA indices are widely utilized to estimate any nation's or country-groups' international competitiveness in the global trade. This study has also applied RCA indices. This Chapter analyzes an international competitiveness of Russia and Korea. Before moving to the analysis part the author stops by the literature reviews of RCA indices. Afterwards five RCA indices applied in this study will be introduced. Following RCA indices introduction, data source and the results of estimations for each five index and their interpretations will be given. At the end, conclusion will be reported.

2. Literature review of RCA indices

Numerous researches dedicated to structural alignment problems and trading policy, both of economics scholars and government economists apply revealed comparative advantage index for the sake of estimating a competitiveness of a country or particular region.[74]

Revealed Comparative Advantage context implies the competitiveness of observing economy to manufacture a good relatively effectively rather than other nations. Subsequently, the international trade data of selected country is used to estimate its comparative advantage in a specific industry.[75]

[74] Yeats, A.J. (1985), On the appropriate interpretation of the revealed comparative advantage index: Implications of a methodology based on industry sector analysis, *Weltwirtschaftliches Archiv,* Vol.121, pp. 61-73.

[75] Karaalp, S. and Yilmaz, D. (2013), Comparative Advantage of Textiles and Clothing: Evidence for

Comparative advantage is an essential concept in economic theory. Empirical estimations of total comparative advantage are helpful to make decisions on overall economic direction of a country for future and give hints what measures the authorities should adopt in order to operate international differences in goods and factor supply and demand.[76]

Adam Smith, John Stuart Mill and David Ricardo first expressed and explained the concept of comparative advantage (CA). Smith and Mill in their notion of absolute advantage explained that a country will export more that item which requires the lowest producing cost. Ricardo improved the CA concept by identifying that a country is prone to destine its resources to its most efficient use. On the other hand, a nation may import a product even when that product requires the lowest costs for produce.[77]

More lately, Eli Heckscher and Bertil Ohlin restructured the trade theory by laying stress on international differences of obtained resources. The Hechscher-Ohlin model or so-called "factor abundance theory" claimed that a nation will export overseas those specific commodities that are comparatively rigorous in the factor with which the nation is comparatively well endowed. Later Wassily Leontief, Paul Samuelson Jaroslav Vanek and other scholars developed the Heckscher-Ohlin model through their empirical researches.[78]

Ideally, determinants of CA should reflect the regional and cross-country distinction in the hypothetical pre-trade conditions, so-called Autarky. Autarky implies the environment where the prices don't get any influence from external factors to economy. (Hook, J.P, 1992.) However, in a reality, all states participate in the international trades in some levels. Therefore, it was impossible to directly observe the Comparative Advantage. Bela Balassa, in 1965, introduced the concept of "Revealed Comparative Advantage" (RCA) in order to anticipate CA in Autarky

Bangladesh, China, Germany and Turkey, *Journal of Fibres & Textiles in Eastern Europe*, Issue 97, pp. 14-17.

[76] Vollrath, L. (1991, June), A Theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage. *Weltwirtschaftliches Archiv*, Volume 127, Issue 2, pp. 265-280.

[77] Leishman, D. and Menhaus, D.J. (1999, July), Revealed Comparative Advantage and the Measurement of International Competitiveness for Agricultural Commodities: An Empirical Analysis of Wool Exporters. *Selected Paper of the 1999 Annual Meeting*, Fargo, North Dakota.

[78] Bakhshinejad, M. and Zadeh A.H. (2012), Comparative Advantage of Selected Agriculture Products in Iran: A Revealed Comparative Advantage Assessment. *World Applied Sciences Journal*, Vol.19, Issue 10, pp.1449-1452.

and index to estimate it.[79] Balassa states that the concept of RCA refers to the comparative merchandise performances of a nation in specific commodities. On the hypothesis that the commodity patterns of trade represent inter-economy differences in relative cost factors as well as non-cost factors, this is expected to reveal a comparative advantage between economies.[80]

Since Balassa proposed a notion of Revealed Comparative Advantage Model, many researchers have applied this model to determine relative advantage of particular economies and regions. One of those empirical determinants was carried out by Suthathip et al. (2012) to evaluate a revealed comparative advantage of Thailand's exports to the construction sector of India. Suthatip et al. investigates an international competitiveness of the construction industry of Thailand. The paper analyzed the relevant industry performance for the period before FTA signing between Thailand and India (from 1999 to 2003) and after FTA imposing (2007-2011). The authors found out that Thailand obtains a robust comparative advantage in the term of supply of constructing materials toward Indian market. Particularly, the commodities under the HS Code-4410 (Particle board and similar board of wood or other ligneous materials) and the product under HS Code -6809 (Articles of plaster or of compositions based on plaster) showed highest privilege among overall exports of construction materials from Thailand to India.[81]

Along with various countries, economies of Russia and Korea have also been targeted for the estimations on the basis of RCA. They include different economic sectors and different time periods for each country. Most of the papers represent that energy and raw material sectors of Russia have been obtaining a comparative advantage over all times. Those kind of conclusions allude to the highly dependence of Russian economy on the earnings from oil and raw materials exports. Meanwhile, prior works on Korea's comparative advantage demonstrate a diversified framework of Korean economy while Korea reflects a comparative disadvantage on the energy and raw materials sectors.

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[79] Balassa, B. (1965), rade Liberalization and 'Revealed' Comparative Advantage, *The Manchester School*, Vol.33, pp.99-123.

[80] Balassa, B. (1977), A Stage Approach to Comparative Advantage, Washington D.C.: *Staff Working Paper 256, World Bank.*

[81] Suthathip et al. (2012), The Export Growth and Revealed Comparative Advantage of Thailand to India's Construction Industry. Retrieved from http://www.wbiconpro.com

Tabata (2006) investigated Russia's Revealed Comparative Advantage (RCA), Revealed Comparative Disadvantage (RCD) and Trade Specialization Index (TSI). He considered on the major export and import commodities of Russia for the period from 1994 to 2005. The empirical estimations of Shinichiro proved that Russia's increased competitiveness in the export (RCA) of oil and gas, armaments, fertilizers, timber and selected base metals must compensate for shrinking competitiveness and increased imports (RCD) of meat, automobile commodities, plastics and thereof and machinery sectors for 1994-2005period.

Ishchukova and Smutka (2013) carried out a comprehensive analysis on revealed comparative advantage of Russia's agricultural products and foodstuffs in the global market. The authors generated their determinants over the period 1998-2010. Measurements applied using three indexes- the classical Balassa's index, Lafay index and Vollrath's index. Balassa's index found out a group of products to be relatively competitive over the observed period. Cereals (wheat, barley etc.), cereal byproducts (bran, wheat), products of their processing (cereal preparations and etc.), oilseeds, chocolate and vegetable oils performed comparative advantage in terms of agricultural exports. Moreover, Vollrath's index represented that the above mentioned commodities steadily enhanced a comparative advantage from year to year. Lafay index calculations were utilized by regions. In accordance with the results, Russia performed a comparative advantage in relation to Asian and CIS countries thanks to its convenient geographical location and comprehensive bilateral ties. In terms of primary products Russia had relatively advantage rather than EU and Asian states. With respect to the world, Russia had advantage on byproducts (e.g. bran of wheat, etc.) from 1998 to 2001 while demonstrated relative advantage on primary products (wheat, cow milk, sunflower seed, barley etc.) for the period 2002-2010.

Kim, S.J. and Kim, G.S. (2015) analyzed the changes in exports of Korea and its major trading partners-China, Japan and USA by utilizing RCA model over the period 1999-2009. He applied SITC data base for his observations. He concluded that Korea's export patterns experienced changes faster relatively to USA and China during the observation period. According to the study, Korea became to export more R&D intensive products rather than skilled human capital intensive good for this period. Korea displayed comparative advantage on the commodities such as textile yarn, fabrics and related products (SITC 65), electrical machinery, apparatus and appliances, not elsewhere specified (n.e.s.) (SITC 77), iron and steel (SITC 67), transport

equipment (SITC 79), office machines and ADP equipment (SITC 75), metal working machinery (SITC 73), road vehicles (SITC 78) and scientific instruments, n.e.s. (SITC 87). By contrast, the estimations showed that Korea has comparative disadvantage in comparison with its major trading partners in regard to the exports of labor intensive products, such as SITC 85, SITC 81, SITC 82, SITC 83, SITC 89 and SITC 84, and capital/technology intensive goods, such as SITC 76 and SITC 75.[82]

3. Introduction of applied RCA indices

The Revealed Comparative Advantage (RCA) index is used for measuring the level of comparative advantage (CA) or comparative disadvantage (CD) of a specific nation in a particular commodity or service. It is composed on the basis of the concept of Ricardian Comparative Advantage. There are many options to evaluate the RCA indices, but the most spread index is the RCA index of Balassa. Balassa introduced his RCA concept in relevance to CA in Autarky and an index to determine it.[83]

Many researchers discuss the advantages and disadvantages of the RCA indices. For instance, Wu and Lin (2008), Kuldilok et al. (2013) and Nicolić et al. (2011) argued that RCA model has following advantages: "easy for calculating, widest utilized method by researchers, is applied to emphasize an economic efficiency of industrial sectors, reveals both strong and weak economic sectors of a nation, provides arguments and recommendations for establishing of public policies." By contrast, Kilduff & Chi (2007), Nicolić et al. (2011) and Kuldilok et al. (2013) discussed about disadvantages of RCA arguing that the RCA indices are so asymmetric and don't represent particular explanations of the reasons for level changes of competitiveness.[84]

Regardless of critics by many researchers of the accuracy and preciseness of Revealed Comparative Advantage index, Balassa's index still performs us respectable figures respect to

[82] Kim, S.J. and Kim, G.S. (2015), Changes in Comparative Advantage of South Korea and Her Major Trading Countries, *Seoul Journal of Economics*.

[83] Vollrath, T.L. (1991, June), A Theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage. *Weltwirtschaftliches Archiv,* Volume 127, Issue 2, pp. 265-280.

[84] Startienėa, G. and Remeikienėa, R. (2014), Evaluation of revealed comparative advantage of Lithuanian industry in global markets, *Journal of Procedia - Social and Behavioral Sciences,* Vol. 110, pp. 428 – 438.

CA.[85] However, each numerical index implies different outcomes; the indices don't argue which determinant shows better empirical value.

This study has chosen five following RCA indices.

RCA_1 index

A reason of the application of RCA_1 index for the analysis of comparative advantage of Russia and Korea is to evaluate the export shares of the pairing countries on each of the ten economic sectors regarding to the world's exports on that specific item. This index was proposed by Leisner in 1958 before Balassa explored his RCA index. The higher the figure the bigger the export shares in respect to the worldwide exports is (the bigger comparative advantage):

$$RCA_1 = X_{ij}/X_{nj} \quad (3.1)$$

In the above mentioned formula, X describes exports, *i* for exporting countries, *j* is for specific commodity or economic sector, *n* stands for a set of countries (in this study it implies the world) The numerical value is between 0 and 1. If the figure shows 0 then a nation has comparative disadvantage in the exportation of a specific product or sector while 1 means the comparative advantage.

RCA_2 index

This index is a comprehensive and advanced gauge of RCA index. It was introduced by Balassa in 1965. Additionally to the Liesner's index RCA2 involves the data of aggregated exports both by a single states and a set of countries[86] (world-in this paper).Some researchers mention RCA2 as Relative Export Advantage (RXA) index while some others prefer to use the expression Comparative Export Performance Index (CEPI):

$$RCA_2 = RXA = CEPI = (X_{ij}/X_{it})/X_{nj}/X_{nt}) = (X_{ij}/X_{nj})/(X_{it}/X_{nt}) \quad (3.2)$$

where X denotes the exports, *i* exporting nation, *j* is a specific commodity or sector, *t* is the total export, n stands for trading partners of country *i* (in this paper-world). The current formula evaluates *i* country's share of exports on a specific commodity in comparison with a set of its trading partners *n* to their overall trade. Though the results are always positive, the country *i*

[85] Sanidas, E. and Shin, Y. (2011), Convergence towards the Revealed Comparative Advantage Neutral Point for East Asia: Similarities and Differences between the Three Countries, *Seoul Journal of Economics* Vol. 24, No. 1.

[86] RCA1 and RCA2 are measured on the level of globe.

obtains a comparative advantage if the empirical value shows more than a unity and vice versa. In other words, RCA2<1 means a comparative disadvantage while RCA2>1 implies comparative advantage. This index omits the imports data due to it is argued to obtain some bias.[87]

RCA_3 index

RCA3 is applied to determine an exporting nation's share of trade balance in relation to its overall trade. This formula is based on a nation's own trade:

$$RCA_3 = (X_{ij} - M_{ij})/(X_{ij} + M_{ij}) \quad (3.3)$$

where *X* represents export value, *M* is imports, *i* stands for a trading country and *j* refers to a particular commodity or an economic sector. In this formula the results lie between +1 and -1. Positive figures imply an advantage and the values the closer to +1, the higher the advantage is. On the other hand, a negative outcome means a disadvantage. Zero values represent no worth.[88]

RCA_4 index

RCA_4 index finds the ratio of exports and imports on a peculiar commodity or sector in comparison to the total volume of exports and imports of a country *i*. The formula is below:

$$RCA_4 = (X_{ij}/X_{it})/(M_{ij}/M_{it}) = (X_{ij}/M_{ij})/(X_{it})/M_{it}) \quad (3.4)$$

According to the formula, X and M refer to the exports and imports whereas *i* stands for a single country, *j* implies a specific commodity or sector, while *t* is total commodities or sectors. Results are confirmed as comparative advantage if they are positive bigger than 1 while the results below 1 represent a comparative disadvantage. In other words, RCA4>1 means that exports are greater than imports of a specific commodity or sector whereas RCA4<1 implies that imports of a commodity is higher than exports.

RCA_5 index

The last equation measures the overall revealed trade competitiveness. This is generated by subtracting Relative Import Advantage (RMA) from Relative Export Advantage (RXA) or so

[87] Greenaway, D. and Milner, C. (1993), Trade and Industrial Policy in Developing Countries: A Manual of Policy Analysis. *Macmillan Press,* pp.181-192.

[88] Greenaway, D. and Milner, C. (1993), (See footnote 88).

called Comparative Export Performance Index (CEPI).[89] In most cases, RCA5 is called as Revealed Trade Advantage (RTA):

$$RCA_5 = RTA = RXA - RMA = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) - (M_{ij}/M_{it})/(M_{nj}/M_{nt}) \quad (3.5)$$

$$\text{Here: RXA} = \text{CEPI} = (X_{ij}/X_{it})/(X_{nj})/X_{nt})$$

$$RMA = CIPI = (M_{ij}/M_{it})/(M_{nj}/M_{nt})$$

Where *X* means the exports, *M* is imports, *i* is exporting country, *j* refers to a particular commodity or economic sector, *n* stands for a trading partners (in this paper –world) and *t* is for overall trade. Positive (+) findings refer to a comparative advantage and vice versa.

4. Data

Data for RCA model estimations is derived from the World Integrated Trade Solution (WITS) software undertaken by World Bank. The data is selected under the Harmonized System (HS) 1996 classification of 2 digits. The study investigates Revealed Comparative Advantage of Russia and Korea, for the period of even numbered years from 2000 to 2014 (total 8 year term). The below listed commodities are major trading products between Russia and Korea for the selected time period which contains more than 62% of total trade volume between the pairs. They are:

1. HS03 –Fish, crustaceans, mollusks, aquatic invertebrates
2. HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes
3. HS39 -Plastics and articles thereof
4. HS72 - Iron and steel
5. HS73 -Articles of iron or steel
6. HS76 -Aluminum and articles thereof
7. HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof

[89] Utku, U. and Seyman, D. (2004), Applied abbreviations RTA for Revealed Trade Advantage, RXA for Revealed Export Advantage, and RMA for Revealed Import Advantage, European Trade Study Group, *6th Annual Conference, ETSG* , Nottingham. Available at: http://www.etsg.org/

8. HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles

9. HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof

10. HS89 -Ships, boats and floating structures

5. Empirical findings of RCA indices

This part of the study will introduce the empirical results of the calculations. Implemented calculations on all five RCA indices supplied us similar results.

Table 4.1 Beneficial sectors for Russia and Korea

Advantageous sectors for Russia	**Advantageous sectors for Korea**
HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	HS03-Fish, crustaceans, mollusks, aquatic invertebrates
HS72 - Iron and steel	HS39 -Plastics and articles thereof
HS76 -Aluminum and articles thereof	HS73 -Articles of iron or steel
	HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
	HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
	HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof
	HS89 -Ships, boats and floating structures

Source: Author's own calculations.

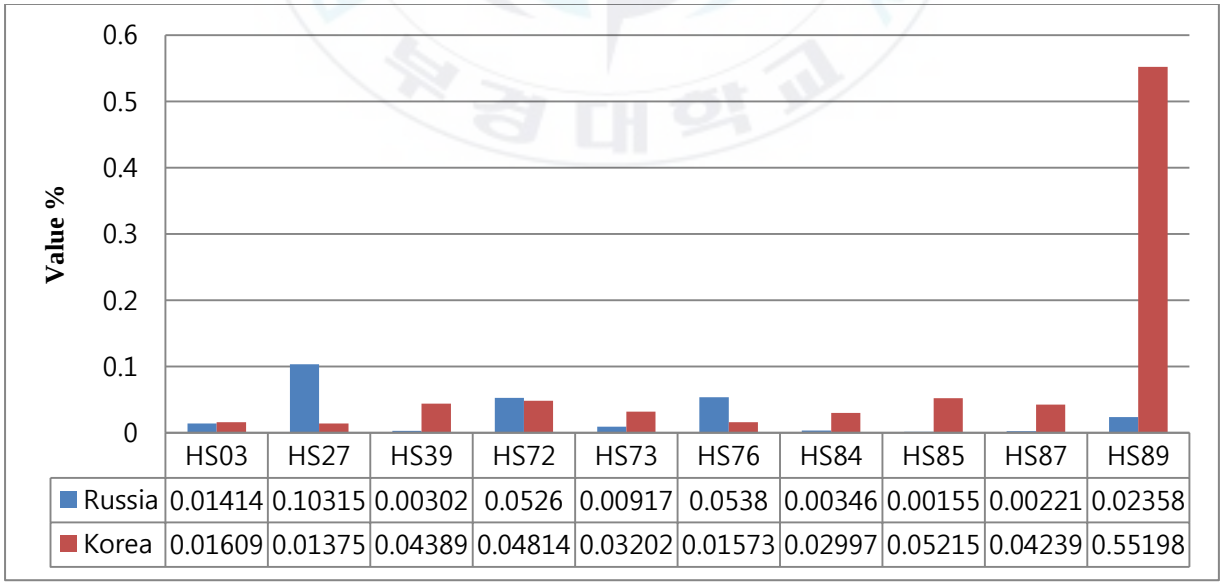
In accordance with the estimation outcomes Russia has revealed comparative advantage on the

economic sectors as HS27- Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS72 - Iron and steel and HS76 -Aluminum and articles thereof. On the other hand, Korea handles more revealed comparative advantage in comparison with Russia like HS03 –Fish, crustaceans, mollusks, aquatic invertebrates, HS39 -Plastics and articles thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures. The commodities under HS 27, HS 72 and HS 76 are defined as raw materials. The outcomes prove that Russia has been still remaining for 14 years to gain its trade inflow from the exportation of the natural resources. On the other hand, the results show that South Korea is more prone to export manufactured commodities.

5.1 Empirical results of RCA 1 (2000-2014)

The purpose of RCA 1 is to find a share of export size for the selected economic sectors in respect with the world exports of the same sectors by both pairs.

Figure 4.1 Overall mean of RCA 1 (2000-2014)



	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
Russia	0.01414	0.10315	0.00302	0.0526	0.00917	0.0538	0.00346	0.00155	0.00221	0.02358
Korea	0.01609	0.01375	0.04389	0.04814	0.03202	0.01573	0.02997	0.05215	0.04239	0.55198

Source: Author's own calculations

The above Figure 4.1 performs that Russia has revealed comparative advantage on the

economic sectors such as HS 27- Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS72 - Iron and steel, HS76 -Aluminum and articles thereof. It implies that Russia has displayed the advantage for the sectors of natural resources. Meanwhile, Korea has superior position in comparison with Russia for the sectors such as HS 03- Fish, crustaceans, mollusks, aquatic invertebrates, HS39 -Plastics and articles thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures. These results show that Korea's exporting goods are specified for skilled human-capital intensive and high-technology intensive.

Table 4.2 Results of Russia for RCA 1, 2000-2014

Russia	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.0069	0.0804	0.0034	0.0477	0.0067	0.07996	0.0031	0.0012	0.0019	0.0555
2002	0.008	0.0918	0.0024	0.0495	0.0079	0.05607	0.0032	0.0013	0.0024	0.0218
2004	0.0057	0.0957	0.0024	0.0613	0.0104	0.05246	0.003	0.0013	0.0023	0.0146
2006	0.0075	0.1069	0.0022	0.0533	0.0107	0.0516	0.0032	0.0015	0.0024	0.0214
2008	0.0058	0.1092	0.0029	0.0537	0.0103	0.05528	0.0038	0.0017	0.0027	0.0191
2010	0.0257	0.1121	0.0025	0.0488	0.0057	0.04774	0.003	0.0012	0.0012	0.0209
2012	0.0265	0.1127	0.0038	0.0547	0.0108	0.04796	0.0038	0.0021	0.0024	0.0195
2014	0.0271	0.1164	0.0045	0.0518	0.0108	0.03931	0.0046	0.0021	0.0025	0.016

Source: Author's own calculations

Table 4.3 Results of Korea RCA 1, 2000-2014

Korea	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.0226	0.0144	0.0379	0.0453	0.0283	0.01355	0.0321	0.0464	0.0272	0.4566
2002	0.0167	0.0107	0.0359	0.0391	0.0255	0.01407	0.0307	0.0482	0.028	0.5196
2004	0.0159	0.0101	0.0407	0.0406	0.0238	0.01635	0.0319	0.0567	0.0383	0.4637
2006	0.0109	0.0118	0.04	0.0418	0.0288	0.01461	0.0276	0.0518	0.0425	0.4334
2008	0.0138	0.0137	0.0423	0.0401	0.0303	0.01556	0.0261	0.0489	0.04	0.5898
2010	0.0166	0.014	0.0492	0.0566	0.0317	0.01688	0.0304	0.0534	0.0509	0.6279

2012	0.0187	0.0176	0.052	0.0613	0.0442	0.01692	0.03	0.0538	0.0569	0.5796
2014	0.0135	0.0177	0.0532	0.0603	0.0435	0.0179	0.0309	0.0581	0.0554	0.7453

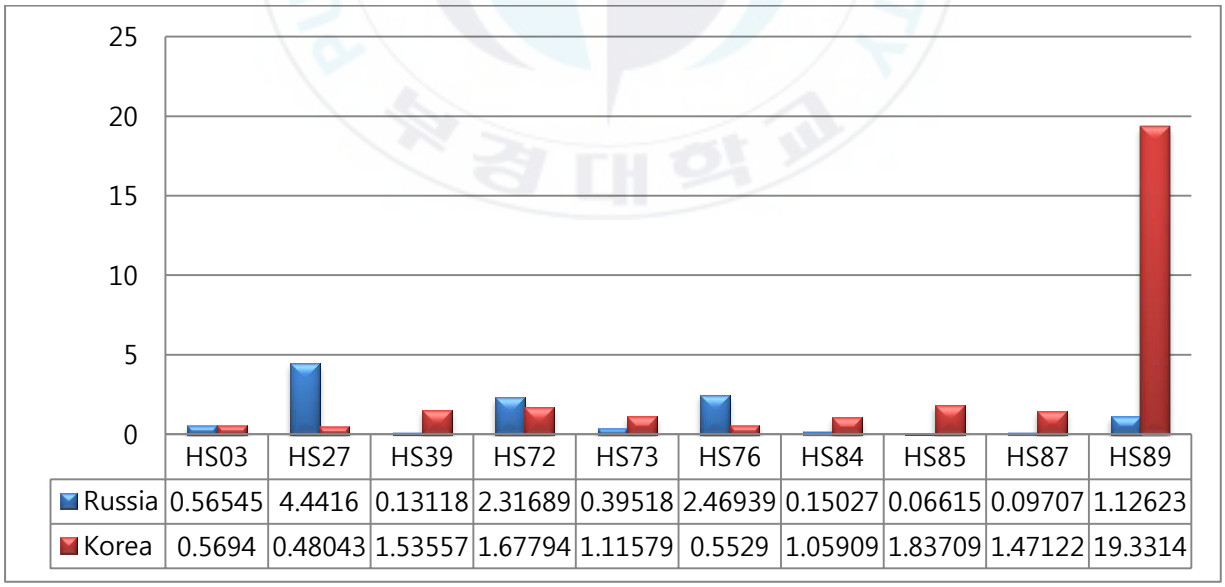
Source: Author's own calculations

For the sake of strong evidence, there above are presented the detailed results of RCA 1 estimations for each country separately. Though Russia's RCA1 results for HS 03- Fish, crustaceans, mollusks, aquatic invertebrates concede to Korea, there is very little difference in overall mean for HS 03 commodity. If to look at the Table 4.2 and 4.3, Russia's fish export shares respect to the world's fish products exports have been increasing year by year. Eventually, for the years 2010, 2012 and 2014 Russia's HS 03 export shares exceeded Korea's.

5.2 Empirical results of RCA 2

RCA_2 index performs the shares of the exports of the observed sectors of each of the country pairs (Russia and Korea) and the world export in relations to their total exports. The values, less than one unit reveal comparative disadvantage, whereas higher than one mean comparative advantage. Consistently, Russia has remained to be dominant on three economic sectors what is similar with the results of RCA1.

Figure 4.2 Overall mean of RCA 2 (2000-2014)



	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
Russia	0.56545	4.4416	0.13118	2.31689	0.39518	2.46939	0.15027	0.06615	0.09707	1.12623
Korea	0.5694	0.48043	1.53557	1.67794	1.11579	0.5529	1.05909	1.83709	1.47122	19.3314

Source: Author's own calculations.

Russia's comparative advantage was found for the commodities such as HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS72 -

Iron and steel and HS76 -Aluminum and articles thereof. Meanwhile, Korea has represented an advantage relatively to Russia on the sectors such as HS 03- Fish, crustaceans, mollusks, aquatic invertebrates, HS39 -Plastics and articles thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 - Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures.

By contrast, in the accordance with the general idea of RCA2 model, it is found to be advantageous when the indices exceed unit. If to take HS03 results of each country separately, both countries reveal comparative disadvantage in terms of export shares. Alongside with the graph of overall mean for RCA 2, there are in Table 4.4 and 4.5 given detailed figures for each country for each year under the study.

Table 4.4 Results of Russia RCA 2 (2000-2014)

Russia	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.4285	4.9857	0.2112	2.9604	0.4126	4.9577	0.1928	0.0737	0.1158	3.443
2002	0.4851	5.5482	0.1458	2.9893	0.4788	3.3889	0.1955	0.0807	0.14397	1.3151
2004	0.2873	4.8398	0.119	3.1023	0.5245	2.654	0.1527	0.0655	0.11677	0.7366
2006	0.2996	4.2539	0.0871	2.1207	0.4242	2.0528	0.1281	0.0584	0.09623	0.8502
2008	0.1982	3.7274	0.1007	1.8339	0.3523	1.8869	0.1284	0.0581	0.09058	0.6524
2010	0.9647	4.2138	0.0957	1.8359	0.2161	1.7951	0.1111	0.0469	0.04456	0.7846
2012	0.8838	3.7619	0.1282	1.8251	0.362	1.6015	0.1281	0.0699	0.08008	0.6498
2014	0.9764	4.202	0.1617	1.8675	0.3908	1.4183	0.1654	0.076	0.08855	0.5781

Source: Author's own calculations.

Table 4.5 Results of Korea RCA 2 (2000-2014)

Korea	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.8396	0.5345	1.4064	1.6799	1.0511	0.5028	1.1927	1.7212	1.00871	16.943
2002	0.6636	0.4253	1.4267	1.5519	1.0135	0.5585	1.2166	1.9127	1.11217	20.624
2004	0.5751	0.3661	1.4716	1.4698	0.8611	0.5918	1.1553	2.0523	1.38493	16.783
2006	0.4025	0.4348	1.4743	1.5393	1.0623	0.5385	1.0191	1.9081	1.56488	15.974

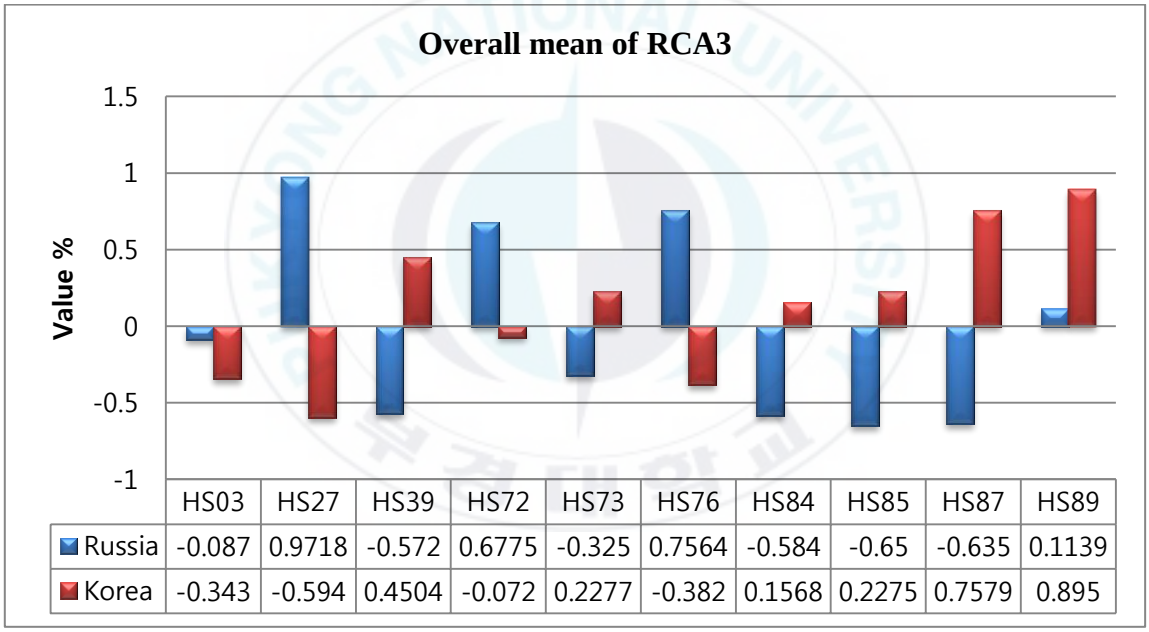
2008	0.521	0.5172	1.5999	1.517	1.1459	0.5891	0.9877	1.8521	1.51234	22.324
2010	0.5316	0.4484	1.5736	1.8126	1.0155	0.5403	0.9717	1.7089	1.62888	20.101
2012	0.5979	0.5617	1.6631	1.9622	1.4136	0.5411	0.9595	1.7205	1.82011	18.539
2014	0.424	0.5555	1.669	1.8909	1.3633	0.561	0.9702	1.8209	1.73775	23.364

Source: Author's own calculations.

5.3 Empirical results of RCA 3 (2000-2014)

RCA_3 has clear-cut results. The unique character of this model is that it is based on a country's own trades. It includes import of country on a specific sector. Values fluctuate between -1 and +1 where -1 refers to the comparative disadvantage and +1 is advantageous result.

Figure 4.3 Overall mean of RCA 3 (2000-2014)



	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
Russia	-0.087	0.9718	-0.572	0.6775	-0.325	0.7564	-0.584	-0.65	-0.635	0.1139
Korea	-0.343	-0.594	0.4504	-0.072	0.2277	-0.382	0.1568	0.2275	0.7579	0.895

Source: Author's own calculations.

The empirical outcomes witness Russia's advantage on the sectors such as HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS72 -Iron and steel and HS76 -Aluminum and articles thereof and HS89 -Ships, boats and floating structures. The rest sectors like HS03, HS39, HS 73, HS84, HS 85 and HS 87 are found to be comparative disadvantage for Russia.

Meanwhile, Korea's results are also interesting. Sectors such as HS39 -Plastics and articles

thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures demonstrate advantage of Korea's export on the above mentioned specific sectors. By contrast, disadvantageous economic sectors composed by HS03, HS27, HS72 and HS76.

If to take the results for the sake of comparison of two countries, Russia remains to dominate for the sectors such as HS27, HS72 and HS 76. Korea is superior rather than Russia on the sectors like HS39, HS73, HS84, HS85, HS87 and HS89.

On the other hand, HS03 shows negative slope for both nation which implies an advantage for both countries under study. However, if to look over the more detailed results of HS 03- Fish, crustaceans, mollusks, aquatic invertebrates designated in Tables 4.6 and 4.7 Russia demonstrates positive trend in years 2000, 2002, 2010, 2012 and 2014. Meanwhile Korea shows only negative trends for the relevant sector.

Table 4.6 Results of Russia RCA 3 (2000-2014)

Russia	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.42877	0.9485	-0.0868	0.7697	-0.2216	0.8664	-0.1963	-0.235	-0.0278	0.617
2002	0.1019	0.9649	-0.4853	0.8137	-0.2001	0.8482	-0.4031	-0.5112	-0.2316	0.197
2004	-0.3263	0.9721	-0.5452	0.7918	-0.1566	0.8301	-0.5003	-0.5975	-0.589	0.512
2006	-0.3914	0.9809	-0.7093	0.6656	-0.2662	0.8271	-0.6291	-0.7231	-0.7699	-0.058
2008	-0.6229	0.9738	-0.715	0.6356	-0.3354	0.7314	-0.733	-0.788	-0.8748	-0.159
2010	0.03456	0.979	-0.7354	0.6193	-0.6181	0.7299	-0.7498	-0.8219	-0.8959	0.193
2012	0.02639	0.9783	-0.6924	0.5586	-0.4274	0.6143	-0.7652	-0.7755	-0.8758	-0.046
2014	0.05562	0.9769	-0.6095	0.5657	-0.3731	0.6037	-0.6954	-0.746	-0.8127	-0.344

Source: Author's own calculations.

Table 4.7 Results of Korea RCA 3 (2000-2014)

Korea	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	-0.0759	-0.6048	0.4571	-0.003	0.33081	-0.408	0.1751	0.13257	0.80691	0.954
2002	-0.3541	-0.6639	0.4337	-0.0897	0.28761	-0.381	0.2183	0.15632	0.73438	0.923
2004	-0.3637	-0.6539	0.4602	-0.1421	0.27014	-0.356	0.2275	0.23304	0.79911	0.874
2006	-0.5115	-0.6113	0.4331	-0.0941	0.28207	-0.42	0.1357	0.23791	0.78089	0.908

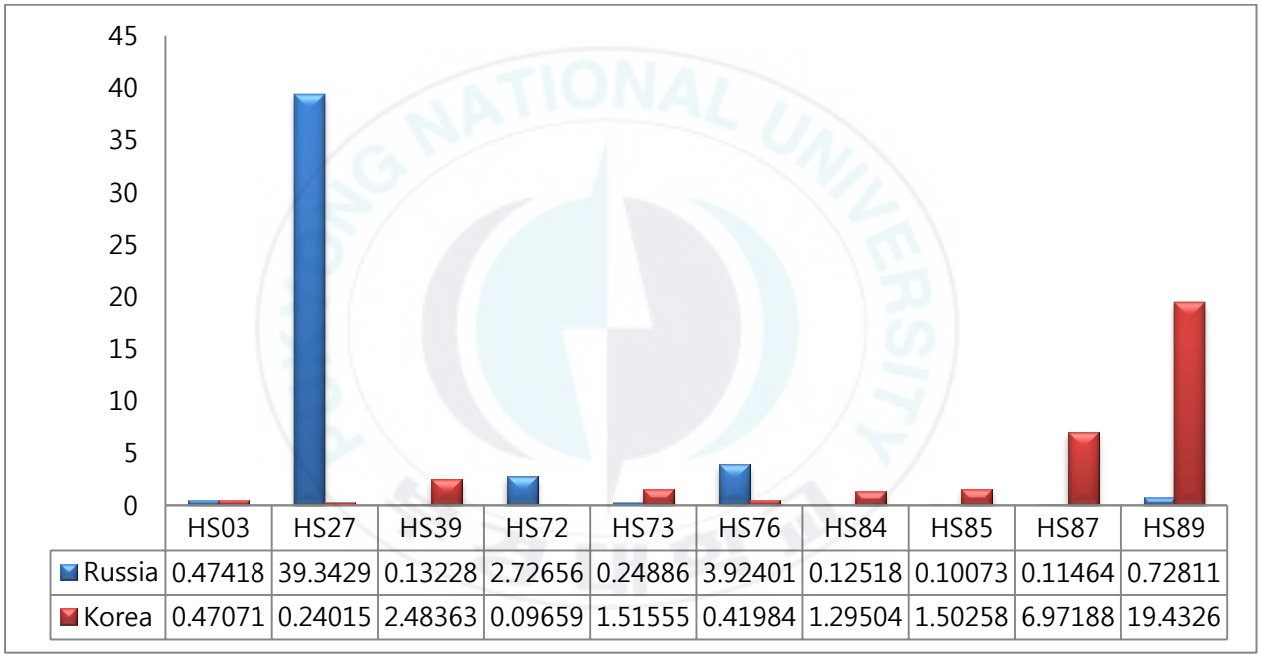
2008	-0.3873	-0.575	0.4602	-0.253	0.17791	-0.382	0.0872	0.20776	0.7413	0.848
2010	-0.3307	-0.5801	0.4169	-0.0669	0.06859	-0.373	0.0544	0.27242	0.74338	0.866
2012	-0.2888	-0.5281	0.4456	0.0316	0.23014	-0.368	0.1819	0.28183	0.76462	0.874
2014	-0.4344	-0.5388	0.4964	0.0436	0.1741	-0.368	0.1744	0.298	0.69272	0.912

Source: Author's own calculations.

5.4 Empirical results of RCA 4

RCA_4 index calculates a quantitative relation of a country's export volume of a specific product with respect to a country's import of the same product. If the values are ranged above unit then country's export volume on the specific commodity surpasses its import volume or vice versa.

Figure 4.4 Overall mean of RCA 4 (2000-2014)



	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
Russia	0.47418	39.3429	0.13228	2.72656	0.24886	3.92401	0.12518	0.10073	0.11464	0.72811
Korea	0.47071	0.24015	2.48363	0.09659	1.51555	0.41984	1.29504	1.50258	6.97188	19.4326

Source: Author's own calculations.

Generated results demonstrate that Russia's exports have been superior rather than its imports for commodities such us HS 27- Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes. Further Russia exported more the commodities of HS 72- Iron and steel and HS76 -Aluminum and articles thereof over the years under observation. Among Russia's advantageous commodities HS 27 has showed the highest difference between export and imports while the absolute disadvantage represents the sector HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles

Meanwhile, Korea's advantages have been emphasized for the sectors like HS39 -Plastics and articles thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures

The results of HS 03- Fish, crustaceans, mollusks, aquatic invertebrates have performed that imports exceed exports for both Russia and Korea.

Table 4.8 Results of Russia RCA 4 (2000-2014)

Russia	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.82199	12.4217	0.2761	2.5254	0.2094	4.59083	0.2208	0.20359	0.31087	1.3861
2002	0.53102	24.2202	0.15	4.2123	0.2885	5.26954	0.1841	0.13998	0.27005	0.6447
2004	0.21135	29.3791	0.1225	3.5815	0.3034	4.48171	0.1386	0.10484	0.10764	1.2907
2006	0.19991	47.3897	0.0777	2.2764	0.2649	4.82788	0.1041	0.07344	0.05941	0.4067
2008	0.1326	42.9851	0.0948	2.5614	0.284	3.6776	0.0879	0.06767	0.03811	0.4138
2010	0.61778	54.2111	0.0879	2.452	0.1361	3.69307	0.0824	0.05635	0.03165	0.8524
2012	0.63521	54.8222	0.1095	2.1276	0.2417	2.52157	0.0801	0.07621	0.0399	0.5494
2014	0.64361	49.3143	0.1397	2.0757	0.2629	2.32986	0.1034	0.08377	0.05948	0.2811

Source: Author's own calculations..

Table 4.9 Results of Korea RCA 4 (2000-2014)

Korea	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	0.80007	0.22937	2.5004	0.0917	1.8526	0.3914	1.327	1.21632	8.71774	39.818
2002	0.44663	0.18914	2.3705	0.0798	1.6924	0.41943	1.4594	1.28333	6.11384	23.456
2004	0.41262	0.18503	2.3918	0.0774	1.5388	0.42	1.4051	1.42161	7.91917	13.174
2006	0.30725	0.22933	2.4029	0.0954	1.6976	0.38819	1.2491	1.54411	7.72616	19.825
2008	0.45554	0.27831	2.79	0.0998	1.4779	0.46158	1.2285	1.57241	6.9426	12.576
2010	0.45853	0.24229	2.2153	0.1094	1.046	0.41652	1.0165	1.59443	6.19376	12.686
2012	0.52336	0.29284	2.473	0.1184	1.5154	0.43764	1.3702	1.69273	7.1098	14.109
2014	0.36163	0.27489	2.7252	0.1009	1.3037	0.42401	1.3046	1.69571	5.05194	19.817

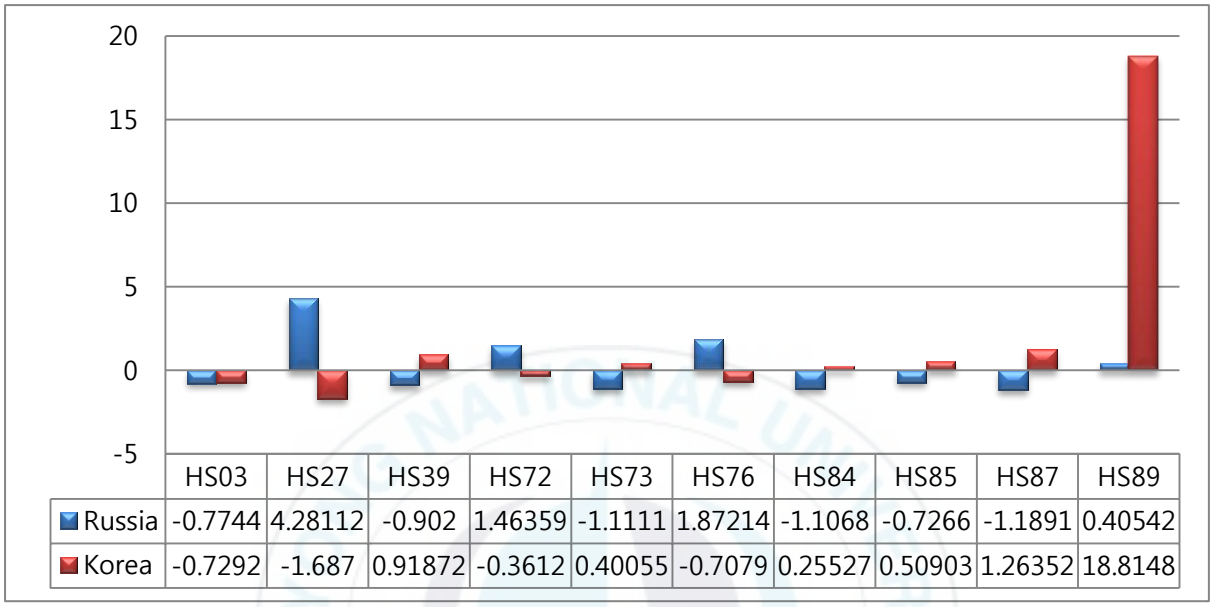
Source: Author's own calculations.

5.5 Empirical results of RCA 5

The last index is used to reveal the trade advantage or disadvantage of the pairing countries. In

the case the values are positive then the country has comparative advantage in the trade of specific sector. If the value is negative then the country's trade on that commodity is disadvantageous.

Figure 4.5 Overall mean of RCA 5 (2000-2014)



	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
Russia	-0.7744	4.28112	-0.902	1.46359	-1.1111	1.87214	-1.1068	-0.7266	-1.1891	0.40542
Korea	-0.7292	-1.687	0.91872	-0.3612	0.40055	-0.7079	0.25527	0.50903	1.26352	18.8148

Source: Author's own calculations.

Similarly to the previous RCA models, Russia remains to have advantage for the sectors HS 27- Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes (4.281123), HS 72- Iron and steel (1.463594) and HS76 -Aluminum and articles thereof (1.872137) while it has composed disadvantage for the rest sectors such as HS03, HS39, HS73, HS84, HS85, HS87 and HS89. However, the results of HS89 -Ships, boats and floating structures (0.40542) shows positive slope but comparing with Korea, the sector HS 89 is found to be disadvantageous.

On the other hand, Korea has trade advantage on 6 commodities among 10. They are HS 39 - Plastics and articles thereof (0.918723), HS73 -Articles of iron or steel(0.40055), HS84 - Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof (0.255266), HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles (0.509034), HS87 -Vehicles other than railway or tramway rolling-stock, and parts and

accessories thereof (1.263516) and HS89 -Ships, boats and floating structures (18.81479).

By contrast, the results display disadvantages of Korea's trade for the commodities such as HS 03-Fish, crustaceans, mollusks, aquatic invertebrates (-0.72917), HS 27- Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes (-1.68698), HS 72- Iron and steel (-0.36121) and HS76 -Aluminum and articles thereof (-0.70787).

According to the empirical results, Russia's highest overall trade competitiveness was noted for the commodity HS27 over the all years under study while HS89 was found to be the highest overall trade competitive sector of Korea.

Table 4.10 Results of Russia RCA 5 (2000-2014)

Russia	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	-0.15738	4.5686	-0.53648	1.74046	-1.47301	3.90055	-0.6519	-0.2958	-0.2356	2.38893
2002	-0.50616	5.306	-0.83339	2.278	-1.10868	2.7734	-0.844	-0.5259	-0.3639	0.45279
2004	-1.13991	4.6577	-0.83566	2.23844	-1.08254	2.08479	-0.9143	-0.5987	-0.9123	0.44968
2006	-1.33212	4.1601	-1.02594	1.20599	-1.08772	1.64135	-1.071	-0.789	-1.453	-0.312
2008	-1.43953	3.6362	-0.94442	1.12977	-0.81382	1.41602	-1.2724	-0.8801	-2.1449	-0.0811
2010	-0.61902	4.1331	-1.00892	1.10587	-1.33569	1.33316	-1.2461	-0.905	-1.2885	0.39746
2012	-0.50789	3.6898	-1.0191	1.0126	-1.00283	0.99522	-1.468	-0.9632	-1.7834	0.15583
2014	-0.49335	4.0974	-1.01213	0.99762	-0.98486	0.8326	-1.3864	-0.8554	-1.3309	-0.2082

Source: Author's own calculations.

Table 4.11 Results of Korea RCA 5 (2000-2014)

Korea	HS03	HS27	HS39	HS72	HS73	HS76	HS84	HS85	HS87	HS89
2000	-0.3398	-1.8872	0.856566	-0.208	0.508173	-0.7548	0.32347	0.27739	0.89955	16.7622
2002	-0.94851	-1.9527	0.820384	-0.4365	0.440735	-0.7159	0.40045	0.34432	0.93889	20.2519
2004	-0.8884	-1.8211	0.866967	-0.7373	0.340881	-0.7626	0.35898	0.51695	1.21903	16.1424
2006	-1.0237	-1.5452	0.865134	-0.381	0.471534	-0.804	0.22451	0.5915	1.37115	15.5262
2008	-0.73213	-1.4381	1.035403	-0.9092	0.416971	-0.5821	0.21649	0.56562	1.30744	21.4986
2010	-0.64416	-1.4732	0.853358	-0.4038	0.067042	-0.6924	0.00932	0.48218	1.37987	19.4344
2012	-0.54479	-1.4535	1.004063	0.12244	0.563387	-0.6392	0.26043	0.5753	1.58245	17.9897
2014	-0.71186	-1.9248	1.047911	0.06377	0.395681	-0.7121	0.24848	0.71901	1.40975	22.9129

Source: Author's own calculations.

6. Conclusion

The objective of the calculations of RCA indices was to analyze the international competitiveness of Russia and Korea. The observations included 2-digit commodities under Harmonized System (HS). Ten economic sectors which have been major trade sectors between Russia and Korea during the estimation period were selected for the measurements. The years from 2000 to 2014 (8 years) in two-year intervals were chosen as a time period. All the indices for RCA estimations are positive which means all five RCA figures are consistent.

The empirical results across all five RCA models show that Russia has comparative advantage on three commodities out of ten. They are HS 27- Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS 72- Iron and steel, HS76 - Aluminum and articles thereof in comparison with Korean exports. On the contrary, Korea has revealed comparative advantage on the products such as HS 39 -Plastics and articles thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 -Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures.

The commodity HS03- Fish, crustaceans, mollusks, aquatic invertebrates has been discovered to be disadvantageous sector for both pairing states in most cases (RCA2, RCA3, RCA4, RCA5).

Investigations of the reasons lead us to nature of economies of pairs. As everyone knows Russia is the largest country in the world with a huge amount of natural resources. Despite the governmental programs on reinforcement of manufacturing sectors which collapsed along with a disruption of Soviet Union, Russia still remains to be strongly dependent on the exportation of natural minerals like oil, iron, gas and etc. Our estimations also prove this trend that Russia hands superior to export of HS 27, HS 72 and HS 76 commodities which are involved to the group of natural resources.

Meanwhile, Korea is a country without any natural resource benefits and so Korea’s main currency inflows come from the exporting of technology-intensive products and human capital-

intensive goods. Our estimations brought empirical evidences for this. So, Korea's RCA estimations represented the advantage of Korea on manufactured sectors such as HS39, HS73, HS84, HS85, HS87 and HS89. At the end, RCA model was helpful to make particular conclusions on what sectors advantage Russia and Korea have.

Chapter V Analysis of Determinants of Exports Using Gravity Model

1. Introduction

Chapter V is dedicated to the gravity analysis of Russia and Korea's export determinants. Before evaluating the relevant estimations the author revises the compositions of Russia and Korea's international trade. Furthermore, the international trade section presents major 30, 55 and 75 export destination-countries of both Russia and Korea's exports separately during the period 1999-2014. Literature reviews of gravity model of trade discusses about origin of Gravity model of trade, its development history, previous works which applied gravity model, the sample researches which utilized gravity model to explain Russia and Korea's exports for different time period with different explanatory factors. Subsequently, the chapter acquaints us with methodology part which is followed by models applied in this research. Afterwards, data source is presented while it is followed by the estimation findings section. Estimations findings are given separately for Russia and Korea which includes findings of 30, 55 and 75 country set analysis for each country and summaries of findings. At the end, aggregated conclusion is represented.

2. International Trade

In our modern life, there is a strong mutual interdependence of the different national economic regimes. To find a closed economy in the new millennium is impossible and to carry out a locked economy policy hampers any country. All world economies have become open. But the level of openness differs from one country to another. Thus, there is no any state who confidently can announce that its economy is self-sufficient. Self-sufficiency, in the proper sense of the word used here, denotes the share of the products and services expended to their total output manufactures with in a country. But the scale of self-sufficiency also varies from one state to another.

Countries support the bilateral trade with its neighbors, economic partners in order to increase export earnings which cause currency inflow and lead to the growth of GDP. Nowadays

countries carry out more trade with each other than ever before. Because an international trade rises welfare and performance through increased competition, specialization and scale benefits (Wang, Wei, Liu, 2010). Therefore, from the view of economic mark, entire states of the world are in the interest in it to further an international trade.

The increase of foreign (international) trade, according to Ricardo "will very powerfully influence to growth the mass of commodities, and therefore, the quantum of enjoyments". It can be interpreted as following. International trading allows the countries use effectively their resources like technology, capital and labor. As many of the countries possesses natural resources and various assets (labor, technology, capital and land) they are capable to produce various products more efficiently and then sell their goods at cheaper prices comparing with other countries. On the other hand, if that country has no ability effectively produce within national boundaries an item which has a high demand among the population, then the country can obtain that specific commodity from another country. This is the distinctive feature of international trade. Global trading lets the countries to play an active role in global economy promoting the foreign direct investors. Hence, the countries who are trading internationally can become competitive participants of the global market.

Unlike Soviet Union, modern Russia has approved integration policy and became one the active players of the world market. Countries tend to trade with their neighbors or comparatively close countries. Another key point in trading partner selection is the economy size of trading pairs. Russia as the 10th largest economy has been following all three conditions of partner selection. Russia's main trade partners are Netherlands, China, Belarus, Kazakhstan, USA, Japan, South Korea and Germany[90] which are explained by the factors such as their close geographical location to Russia, comparative advantage, economic size and etc. Among Russia's exports towards its major trading partner-countries, oil, gas, timber and fertilizer keep dominating. In order to assure the competitive advantages, to make support and protect the interests of Russian producer-exporters at foreign markets, the Russian government has been

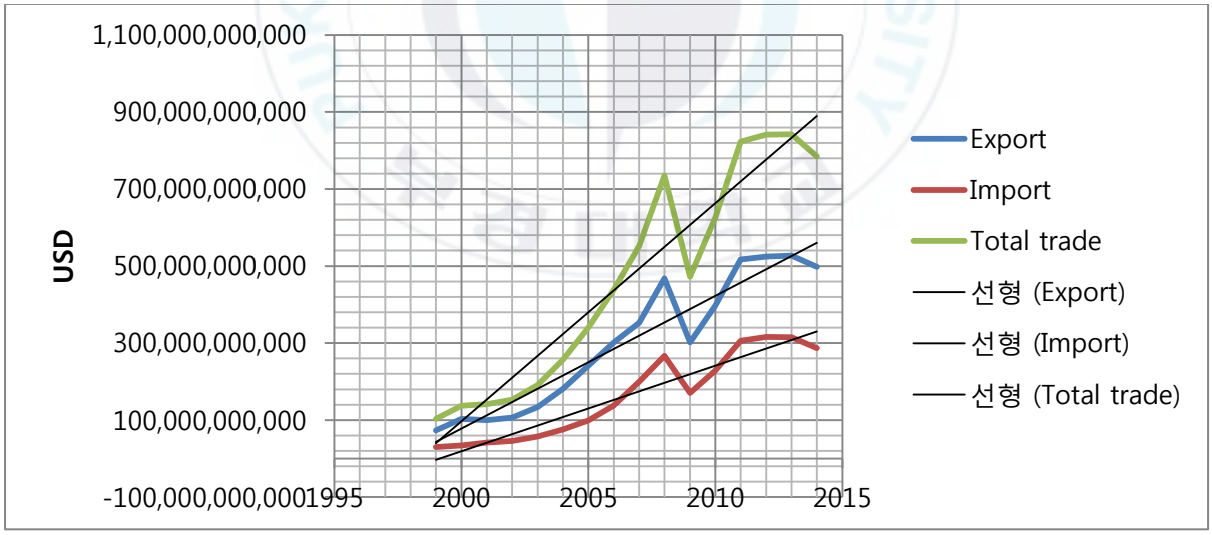
[90] Russia Insider. Retrieved from http://russia-insider.com/en/politics_business/2014/11/04/02-12 09pm/ russias_10

realizing the measures to enhance the export of industrial goods, postulating application of trade, economic, finance, information and consultative means.

Russia's WTO accession in 2012 has significantly impacted on the merchandise volume between Russia and its partners. Reduction of export-import duties, regulation of customs procedures have brought prognosticated profits for both Russia and its trading partners.

This chapter determines Russia's and Korea's export factors in the global market. Consistently, these determinants will be applied using Gravity model of trade. Empirical estimations of the exports of pairing countries will be implemented using the data for the period from 1999 to 2014. The reason of this kind of time period selection is following. The Russian economy became to recover and stably develop from 1999. Although the country experienced downs after 2008 crisis, thanks to high oil prices around the globe Russian economy managed to recuperate again in short terms. Regarding the last year of the observations , the author selected 2014th year due to the data availability.

Figure 5.1 Composition of Russia's trade (exports and imports, 1999-2014)



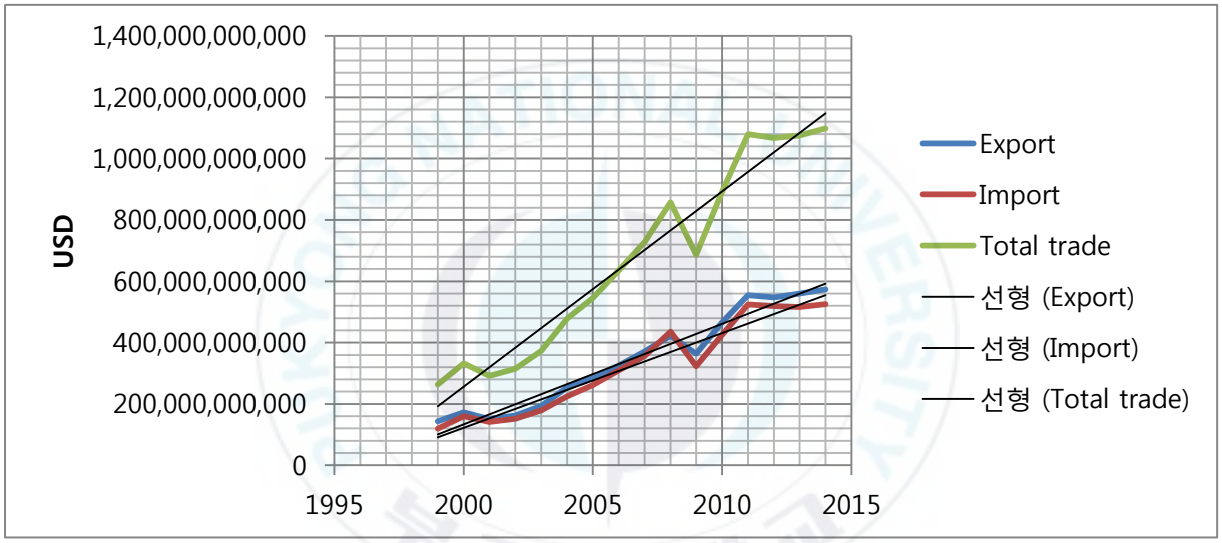
Source: Calculations carried out on the basis of the UN Comtrade data.

Note: The top line denotes total trade of Russia, middle is for the exports and lower line for imports.

The above Figure 5.1 describes the exports and imports share to the general trade of Russia from 1999 to 2014. The lines drawn in the figure witnesses that Russia's exports exceeds its

imports for the period under study. A difference between exports and imports tripled from $76.3 billion in 2003 to $211.1 billion in 2014.This is linked to the high oil-prices, augmented prices for raw materials and indeed the reinforcement of Russia's integration with the World.[91] Notwithstanding the Global Crisis hit overall economies worldwide including Russia. Consequently, trades shrunk by $472.6 billion in 2009 comparing with $735 billion in 2008. Interestingly, the changes in the imports of Russia follow the export changes. If the exports rise then imports also consequently rise or vice versa. Therefore, the composed trade surplus during the period under study allowed to Russia to augment its foreign exchange reserves.

Figure 5.2 Composition of Korea's trade (exports and imports, 1999-2014)



Source: UN Comtrade.

Note: The top line denotes total trade of Russia, middle is for the exports and lower line for imports.

Figure 5.2 represents the top-downs in the export and import of Korea from 1999 to 2014. Alike the trends of Russia, exports of Korea surpass the import volumes through sixteen years under the observation. But the gap between export and import of Korea is very small. For instance, Korea exported the goods with worth $371.4 billion in 2007 and imported size accounted $356.8 billion. Although the gap of exports and imports of Korea have been kept in

[91] Russell, M. (2015), The Russian economy: Will Russia ever catch up? *European Parliamentarian Research Service*, PE 551.320.

low intervals for the whole period under study, Korea have been enjoying a trade surplus for each year. Further, we can observe a similar trend like Russia has. Global Crisis forced Korea's trade to vastly shrink. Another correspondence is that consistent move of exports and imports of Korea. Both export and import traverse in the same direction and increases and decreases occur in the same time.

Both of Russia and Korea carry out merchandises with almost all countries around the world. The below tables represent main 75 expert destinations of each country during the period of observation.

Table 5.1 Main export destinations of Russia's goods (1999-2014)

	Top 1-20	**Top 21-40**	**Top 41-60**	**Top 61-75**
1	Netherlands	Slovakia	Algeria	Malaysia
2	Italy	Czech Republic	Malta	Saudi Arabia
3	China	Spain	Croatia	Tunisia
4	Germany	Lithuania	Kyrgyzstan	Georgia
5	Belarus	Sweden	Mongolia	Gibraltar
6	Ukraine	Cyprus	Syria	Mexico
7	Turkey	Greece	Thailand	Argentina
8	Poland	Bulgaria	UAE	Lebanon
9	Kazakhstan	Estonia	Vietnam	Bosnia
10	USA	Iran	Hong Kong	Peru
11	United Kingdom	Romania	Norway	Iraq
12	Japan	Br. Virgin	Venezuela	Bangladesh
13	Finland	Israel	Turkmenistan	Jordan
14	Swiss	Egypt	Portugal	Cuba
15	Korea	Uzbekistan	Moldova	Kenya
16	France	Austria	Philippines	
17	Hungary	Azerbaijan	Ireland	
18	Latvia	Brazil	Tajikistan	
19	India	Denmark	Indonesia	
20	Belgium	Singapore	Canada	

Source: UN Comtrade

Table 5.1 introduces Russia's main 75 trading partners. Russia's trading partners extend along the world. If we interpret this table top 30 covers those countries whose economy is

comparatively larger than majority countries of the world and who share common borders with Russia or locate comparably close to Russia. Russia has common borders with 16 countries, involving two states with maritime boundaries (Japan, USA). Korea is the 15th destination of Russian goods. Russia exported more than $102 billion worth of products toward Korea for the years under the study.

Despite Netherlands is not shares borders with Russia, it imports the largest volume of Russian products. Russian-Dutch producers have been improving 'tulips-for-oil' policy. Russia's oil and various raw materials are welcomed in Netherlands. Consistently, Dutch people sell their agricultural equipment, machinery, meat and indeed flowers.[92]

Further, Russia also keeps strong bilateral ties with former Soviet Union countries .Common Russian language is one of the sustainable factors for the trade among them. For instance, Belarus, Ukraine and Kazakhstan are included to the 10 major export destinations for Russian goods. Uzbekistan, Latvia and Lithuania and other relative states are involved in top dozens of export addressees for Russia's products.

On the other hand, Table 5.2 introduces Korea's major export destinations. Due to its specific geographical location Korea only has common borders in land with North Korea with whom South Korea has very cold relations. Six from ten major destinations are located in the East and Southeast Asia area. Korean ships loaded with national products can reach those Eastern and Southeastern Asian harbors comparably faster and burden less transport costs. Russian market is 11th big goal of Korean exporters. Netherlands which is the 1st largest destination for Russian products possesses only 18th rank among the countries of Korean products.

Korea has been boosting the trade with CIS countries also. Uzbekistan, Ukraine and Kazakhstan are covered in the above table.

[92] Reuters News Agency (January 16, 2015), Dutch-Russian 'Tulips-For-Oil' Trade Suffers under Crisis, Sanctions. Retrieved from http://www.reuters.com/article/us-netherlands-russia-trade-iduskbn0kp1lo20150116

Table 5.2 Main export destinations of Korea's goods (1999-2014)

	Top 1-20	Top 21-40	Top 41-60	Top 61-75
1	China	Canada	Malta	Libya
2	USA	Italy	Israel	Iraq
3	Japan	Iran	Bangladesh	Ireland
4	Hong Kong	Marshall Islands	Uzbekistan	Venezuela
5	Singapore	France	Bermuda	Syria
6	Germany	Liberia	Colombia	Argentina
7	Vietnam	Turkey	New Zealand	Denmark
8	Indonesia	Panama	Czech Republic	Slovenia
9	India	Poland	Kuwait	Oman
10	Mexico	Spain	Sweden	Ecuador
11	Russia	Slovakia	Ukraine	Portugal
12	United Kingdom	Greece	Cyprus	Kazakhstan
13	Malaysia	Chile	Jordan	Romania
14	Australia	South Africa	Switzerland	Cambodia
15	Philippines	Hungary	Algeria	Tunisia
16	Brazil	Bahamas	Qatar	
17	Thailand	Egypt	Pakistan	
18	Netherlands	Nigeria	Angola	
19	UAE	Finland	Peru	
20	Saudi Arabia	Norway	Austria	

Source: UN Comtrade

3. Literature review of gravity model

A Gravity Model became popular among the researchers and scholars thanks to its reliability, predictability of the future of nation's trade direction. This model has been widely applied to determine the flows across borders and landmasses. In 1915 Albert Einstein published an article on geometric theory of gravitation which was the superior to Newton's Law of gravity. Einstein's article is consistent with special relativity and explaining several effects which not accounted for by the Newtonian theory.

Gravity theory of trade is an analogy of Newton's Law of Gravity. It signifies that a mass of

labor or goods supplied from a source is attracted to a mass of labor and goods in destination.[93] If the distance between two masses increases it is expected to be a negative impact on the trade flows of two masses. On the other hand, size of the trading countries is considered to impact positively on their trades with each other. In the science, the economic size is assessed by GDP and per capita GDP of merchandising pairs. It can be concluded like if the masses are bigger (economic size) and closer (distance), the trade is more real to be realized between them. It means that aggregate goods or labor or the production factors at source is attracted by a huge demand for goods or labor or production factors at destination, however the possible flow is diminished by the distance between source and the destination.[94]

It is same as Newton's law

$$F_{ij} = G\frac{M_i M_j}{D_{ij}} \qquad (5.1)$$

where F_{ij} signifies a trade flow from region *i* to a region *j*, M_i and M_j denotes a labor or product of the economic mass of region *i* and region *j*, while D_{ij} refers to a distance between the regions *i* and *j* and *G* is a constant. Usually the traditional model is rewritten in most empirical researches applying natural logarithms *"ln"* for each variable included in the estimation. The purpose is for better interpretation of the results. The new formula with added logarithms is overwritten as following (Eq. 5.2):

$$ln\, F_{ij} = \alpha + \beta_1 ln\, M_{ij} + \beta_2 ln\ M_{ij} - \beta_3 ln\, D_{ij} + \varepsilon_{ij}$$

where F_{ij} signifies a bilateral trade flow between country *i* and *j*, α denotes a constant value, $M_{ij}$and M_{ij} refer to economic size of merchandising nations. Here an economic size may be demonstrated by GDP, per capita GDP and population of a trading country. Moreover, D_{ij} stands for an distance between trading countries *i* and *j*. ε_{ij} is a residual.

In the 19th century, German-English scholar Revenstein is remarked as a person who applied a gravity to carry out researches on migration flow in United Kingdom.[95] Later, in the 1960s, Jan

[93] Anderson J. E. (2011), The Gravity Model, *Annual Review of Economics*, Vol. 3, pp.133-160.

[94] Salvatici, L. (2013), The Gravity Model in International Trade. *African Growth and Development Policy modeling Consortium (IFRI), Technical Note TN-04*, Version 2.

[95] Revenstein E. G. (1889), The Laws of Migration, *Journal of the Statistical Society of London*. Vol. 48. No.2,

Tinbergen (1962)[96] and Poyhonen (1973) first used gravity of model.[97] Poyhonen used post trade data set and applied log-linear relationship. Meanwhile, Tinbergen was interested in international trade flow and Free Trade Agreement that would predominate if no trade barriers were being used. He insisted that in most cases a free trade would lead to the world's wellbeing-maximizing solution. He also aimed to compare the trade volumes that were actually taking place with the theoretical non-trade barrier volumes. According to Tinbergen, GNP size impacts on the trade in two ways: firstly, it refers to the general amount of demand that country has at the moment under the observation. Secondly, it's a good proxy to diversify an economy in that country. A country with more diversified industry will need to import proportionally less in comparison with a country with less diversified economy. Consistently, a country whose economy is more diversified obtains a capability to export a wide range of goods in the global markets. On the other hand, a distance between nations is obviously expected to impact negatively correlated with the merchandise, since longer distance should imply higher transport costs.[98]

Tinbergan suggested 3 main factors to be concentrated in the gravity model:

1) overall capacity supply (or exports) of a region (country) to the global markets;

2) overall capacity demand (or imports) of a region (country)to the global market;

3) factors that can make a resistance to trade flow and thus affect the level of merchandise intensity

After Tinbergan, many researchers have come up with a large size of studies which imposed more theoretical evidences to the Gravity Trade Theory than Tinbergen's claims. Along with the increase of geographical factors in the theory of international trade, the gravity model applications reawakened in the 1980s. For instance, the empirical investigation carried out by Krugman and Helpman (1985), Evenet and Keller (1998) and Deardorff (1995) did huge

pp. 167-235.

[96] Tinbergen, J. (1962). *Shaping the World Economy; Suggestions for an International Economic Policy*, *Books (Jan Tinbergen)*. Twentieth Century Fund, New York. Retrieved from http://hdl.handle.net/1765/16826

[97] Poyhonen, P. (1973), A Tentative Model for the Volume of Trade Between Countries, *Weltwirtschaftliches Archiv*, Vol. 90, pp. 99-100.

[98] Weckström, A. (2013), Gravity Model of Trade and Russian Exports (Master's thesis). Retrieved from http://epub.lib.aalto.fi/

contributions to the determination of theoretical fundamentals for the gravity model. The above mentioned researchers in their works proved that gravity equation can be retrieved from a number of various international trade models. One of these models is Differentiated Products Model and another is Heckscher-Ohlin Model. A connection between bilateral trade flows and two countries' GDP volume was identified by using the Differentiated Products Model was in-depth analyzed in the works of Anderson (1979) and later by Krugman and Helpman (1985) argues that if the economic size (or the population) of any nation doubles, consumption rate will increase, not in the shape of greater quantity, but of higher variety.[99] Existing of international trade also can present the same reaction by increasing of consumer's chances for even bigger variety. The authors conclude that when two trading nations have same preferences and technologies, they will tend to trade with each other in order to enlarge the number of selections accessible for consumption.[100] Evenett and Keller (2002) argued that the theoretical foundations of Gravity Model of Trade can be retrieved from models such as so called Ricardian models, Heckscher-Ohlin models and increasing returns to scale models. These three models are different in the way the economies have specialized. Ricardian model hypothesizes that the technologies are not similar for all countries in the world. Consequently, each country specializes in manufacturing goods and it has more comparative advantage relatively with others. Heckscher-Ohlin model claims that countries have variable factor proportions, so that developed countries have a huge ratio of capital to labor force in relation to developing countries and vice versa.

Now there are plenty of empirical analyses and theoretical foundations for the gravity model. We now have lots of gravity analyses are applied to evaluate such issues related to trade policy. For instance, Wall (1999) used gravity model to generate an effect of protection, Harrigan (1996) for openness, Saxonhouse (1993) for the analysis of regionalization trends, Walkasugi and Itoh (2003) for an effect on non-member countries, Brenton et al. (1999) for a FDI inflows. So the gravity model of trade remains as one of the main tools to measure an international trade. Krugman and Helpman (1985) and Helpman (1987) predicted that a product of GDP of trading

[99] Sohn C.H. (2001), Does the Gravity Model Explain South Koreas's Trade Flows?, *Japanese Economic Review,* Vol. 56, Issue 4, pp. 417-430.

[100] Helpman, E. and Krugman, P. (1985), Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy, *MIT Press,* Cambridge, Massachusetts, London.

nations significantly increases bilateral trade between them. Another comprehensive work carried out by Bussière and Schnatz (2006) proved that an economic size (GDP) had a positive and significant on Chinese exports over the period 1980-2003 across its 61 main trade partners. Goran (2005) determined the effect of FDI on exports of Croatia. He utilized panel data model for 21 Croatian manufacturing sectors for the period from 1996 to 2002. Goran found out a statistically significant and positive impact of FDI on export volume. However his results represented relatively low FDI impacts. He emphasized a positive effect of FDI to boost Croatian manufacturing sectors and eventually export competitiveness. Furthermore, he gives the suggestion to the policy maker to implements necessary measures to raise the potential effects of FDI inflows.[101]

Jiménez-Rodríguez and Sánchez (2004) focus on the correlation between oil price shocks and GDP growth of OECD countries. They take UK and Norway's case as oil exporting nations. Regarding positive movement in the oil prices, impact of oil price on UK's economy shows negative effect while Norway's GDP gets positive benefits from oil price hikes.

Khalid and Azrai (2014) investigated the impact of oil price and oil revenue on GDP of Sudan from 2000 to 2012. The results proved that oil price and oil revenue positively effects of GDP growth of Sudan. Furthermore, they concluded that a unit increase in oil price or oil revenue will generate .02 % raise in GDP while it causes 78.8% overall GDP increase for the period 2000-2012.

Benedictow et al. (2013) analyzed Russia's oil dependency economy using macro econometric model. The research finds that Russian economy is assailable to large oscillations in the oil price. A higher oil price not only causes economic growth soaring and population wealth, but also may call a crisis in the Russian economy. The authors give the authorities suggestions on alternative using of oil export earnings in the way of economic growth.

Furthermore, there are various studies quantitatively assessed how augmented oil prices impact on the exports and economic size of Russia. The assessment indicators were relatively proxy to each other among most of them: oil prices will shift GDP growth by 0.15% (Kuboniwa, 2012), 0.2% (Rautava, 2004). Further, high oil prices make the export volume to increase by 0.24 – 0.25% (Ito, 2008), (Korhonen and Ledyaeva, 2010). Empirical evidences of Suni (2007)

[101] Goran, V. MSc. (2005), Impact of Foreign Direct Investment on Croatian Manufacturing Exports, *Journal of Financial Theory and Practice,* Vol. 29, pp. 131-158.

presented that an increase in the oil price from 2001 to 2006 encouraged per annum GDP of Russia by about 2.5 %, which refers to the elasticity ratio of 0.2.[102]

Exchange rate is assumed to be negative impact by theoretical framework and it was proved by most of the researches. Hooper and Ethier (1973), Clark (1973), Baron (1976), Cushman (1986), Peree and Steinherr (1989) and many others argued that exchange rate declines the export and trade flows between nations. In the contrast, we can see also insignificant or positive effects of exchange rate volatility on exports. For instance, Cüneyt and Taylan (2016) cannot find any significant relationships between exchange rate and exports of Turkey toward its most prominent export destinations like Germany, UK, France, USA and Italy in both short- and long-run estimations. Further, Hooper and Kohlhagen (1978), Gotur (1985), Bailey et al. (1986, 1987), Aristotelous (2001), Bailey and Tavlas (1988), Bahmani et al. (1993), Gagnon (1993) also did not find any connections between exchange rate and trades. On the other hand, Franke (1991), McKenzie and Brooks (1997), Giovannini (1988), Brada and Mendez (1988), Sercu and Vanhulle (1992), Asseery and Peel (1991), Kasman and Kasman (2005), Doyle (2001) and Bredin et al. (2003) presented positive effect of exchange rate on the export and trade flows.[103]

Per capita GDP denotes the level of economic development of a nation. Therefore per capita GDP is assumed to be positive and significant. Paas and Tafenau (2005), de Groot et al. (2004) and other several works found significant and positive effect of per capita GDP on the export and trades. By contrast, Karamuriro and Karukuza (2015) concluded that per capita GDP negatively and simultaneously significantly impacts on Uganda's exports. Furthermore, Foroutan and Pritchett (1993) and Kitetua and Ko (2015) found similar negative and statistically significant influence of per capita GDP on the exports.

Fixed effect PPML (Poisson pseudo maximum likelihood) method was applied to determine Korea-Chile FTA for trade diversion by Uprasen (2014). The results showed that after the Korea-Chile FTA came to effect in 2004, percentage of imports of Korea from its 15 major trading partners noticeably reduced. The author found out that free trade agreement of Korea with Chile generated a diversion in several industries across a number of trade partners of

[102] Kudrin, A. and Gurvich, E. (2015), A New Growth Model for the Russian Economy. *Russian Journal of Economy,* Vol.1, Issue 1, pp. 30-54.

[103] Ozturk, I. (2006), Exchange Rate Volatility and Trade: A Literature Survey, *International Journal of Applied Econometrics and Quantitative Studies,* Vol.3, Issue 1, pp. 85-102.

Korea. According to the empirical results, diversion occurred in twenty five industries out of eighty four. The author linked this diversion to the enforcement of Korea-Chile FTA.

Moreover, the author found out plenty of applied researches dedicated to the export determinants of Russia and Korea. Iwasaki and Suganuma (2013) estimated a trade between Russia and 23 OECD member states. They determined the role of FDI and socio-cultural similarity in the trade volume between Russia and these twenty three developed economies. The work finds out that Random Effect is appropriate for all estimation. The results concluded that FDI from 23 OECD countries to Russia is estimated to be not significant and irrespective, while social similarity in terms of civil liberties and political rights effected positively on trades. On the other hand, FDI from Russia to OECD 23 member-states promotes merchandise between nations. However, similarity has turned out to have a negative impact on the export volume from Russia.

Another comprehensive research on Russian trade using gravity approach was carried out by Weckström (2013). He analyzed Russian export flows for the period 1996-2010. Weckström concludes that increased raw materials (including oil, heavy metals, wood and etc.) boosted the economy of Russia despite the ruble appreciation and population shrinking. The author calls Russian exports "not similar with the exports of most advanced economies". He predicts that suchlike results of estimations could be linked to the raw material intensive pattern of Russian economy. He added that raw materials dependent specificity of Russian economy increased export volume despite the ruble appreciation.

Sohn (2005) carried out in-depth analysis on Korea's bilateral trade flows and South-North Korean trade. He used trade conformity index and APEC membership in his estimations to identify the specificity of Korea's trade structure. His results performed that Korea's trade structure tends to follow Heckscher-Ohlin model. Korea's merchandise with its partners rely more on the inter-industry, rather than intra-industry. In accordance with the results, the author explains that the trade patterns of Korea strongly depend on the points like comparative advantage, different stages of development and income level dissimilarity rather than product variety or economies of scales. Sohn's analysis represented that per capita GDP variable was found to be insignificant factor to explain Korea's trade flows. He explains it as that Korea's trade factors depend on GDP pattern, concentrating on producing and export of quantity-based goods and relying on GDP rather than per capita GDP implies that Korea's high quality products are very sensitive to the fluctuation of income of nation.

However, APEC variable applied by Sohn demonstrated highly significant result with strong coefficient of 1.1, which undermines that Korea's merchandise volume with APEC-membership country increases more than 3 times in comparison with non-APEC state.

Lee (2013) evaluated the determinants on the Korea's bilateral trade with 23 states from ASEAN and TPP. Lee puts a purpose to estimate the trades of Korea with the member states of ASEAN and TPP separately. The results show that having common language is one of the important factors to boost the trades between nations. Furthermore, he concludes that Korea will obtain more benefits if it improves bilateral trades with the member-states of ASEAN rather than TPP.

4. Methodology

This study applied panel data for the determinants of Russia and Korea exports toward their major merchandising partners around the globe for the period from 1999 to 2014. The study affirmed the panel data as a tool for determinations. Because the panel data has more advantages rather than conventional cross-sectional and time-series data analysis (e.g. Hsiao, (1985a, 1995 and 2000). Panel data commonly gives a researcher to obtain a big volume of data, raising the degree of freedom and diminishing the co-linearity among the exogenous variables- hence boosting the efficiency level of econometric estimations. Moreover, panel, or longitudinal data gives a research an opportunity to analyze the various economic questions, which is not possible with an application of cross-sectional or time-series data model.[104]

The study utilizes balanced panel data to provide empirical analysis of export factors of Russia and Korea in relation to the major trading partners of them. Baltagi (1995) argues that the use of panel data has numerous advantages. According to Baltagi, balanced panel data controls an individual heterogeneity of every section and represents more and reliable information. Moreover, balanced panel data comprises higher degree of freedom and greater rate of efficiency. Further, the results of estimations can be identified and effects can be measured which are not simply detected in ordinary data sets.[105] The same time, Baltagi counts the limitations of panel data. Organization of the required data, in terms of collecting and

[104] Cheng, H. (2007), Analysis of Panel Data. 2nd Ed.. *Cambridge University Press, UK*

[105] Baltagi, B. H. (1995), Econometric Analysis of Panel Data, New York: *JohnWiley & Sons.*

composing the data, misrepresentation of the residuals are main disadvantages of panel data.[106]

Gravity models in the current study consist of three scenarios. They are Pooled regression, Fixed Effects regression (FE) and Random Effect (RE) regression models. Pooled data is characterized by containing repeated observations on fixed units. This implies that pooled arrays of collected data are one that conjoins the cross-sectional data on N dimensional units and T time period to make up data set of N*T determinants[107]. Pooled data is useful to use due to its ability of analyzing several explanatory variables in single equation run.

Fixed effect or Least Squares Dummy Variable (LSDV) regression model is one of the mostly used models in the analysis of econometrics. Fixed Effect is assumed to have an intercept for every observing variable but a similar slope which implies that each variable is unique. The fixed-effects model put under control for all of the time-invariant differences between the variables, which causes that the estimated coefficients of the fixed-effects models don't contain any bias due to its omitted time-invariant characteristics.[108] Moreover, by its nature, FE regression model cannot estimate binary variables. On the other hand, many scholars argue that fixed effect estimations comprise stronger results rather than Pooled OLS and random effect.

Random Effect (RE) or so called Error Components Model (ECM) obtains a mean value for all variables intercepts under estimation to be the proxy intercept. This model has individual residuals (error terms) which are not auto-correlated with other variables. Moreover there is no any correlation between the exogenous variables. Additionally, Random Effect has ability to estimate invariant variables like distance, border, economic partnership, dummy APEC which are estimated in the study. Using RE allows us to exclude heteroscedasticity, a main problem bounded with cross-sectional data.

In the analysis of panel data, it is very important to find out which of fixed effect and random effect regressions is suitable to explain the results. Therefore, *Hausman* test is applied. The

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[106] Baltagi, B. H. (1995), Econometric Analysis of Panel Data, New York: *JohnWiley & Sons.*

[107] Podestà, F. (2000), Recent Developments in Quantitative Comparative Methodology: The Case of Pooled Time Series Cross-Section Analysis Universität Brescia, *Discussion Paper*, Vol. 3, Issue 2.

[108] Torres-Reyna, O. (2007), Panel Data Analysis, Fixed & Random Effects using Stata 10.x (ver. 4.1), Princeton University. Retrieved from http://dss.princeton.edu/training/Panel101.pdf

Hausman test is the standard procedure utilized in empirical analysis of the panel data which aims to distinguish between fixed and random effect models.[109]

The *Hausman* test hypothesis implies that, if p-value of *Hausman* test for *Chi.Sq* is significant at 1% or 5% levels then we reject the null hypothesis and accept Fixed Effect as an appropriate option to explain the results. The null hypothesis refers no correlation between explanatory variables and random effects. We accept the null hypothesis when the p-value *Hausman* test is insignificant. Accepting the null hypothesis implies that Random Effect regression is more appropriate to explain the results of our estimations. If the null hypothesis cannot be rejected and RE is accepted, it allows us to interpret the results for invariant variables which are distance, border, economic partnership and APEC in the study.

The results of Russia's and Korea's export determinants in the 30, 55 and 75 countries set have represented that the *Hausman* test cannot reject the null hypothesis and the Random effect (or Error Components Model) was selected to explain the estimation findings.

5. Applied models

This study has applied two different models for Russia's and Korea's export determinants. The components of the models are different from each other in some points. Despite both Russia and Korea are major trading partners and their economic sizes are close to each other, they have different geographical location, economic framework and allies. Further, initially the author planned to adjust the variables of two equations. For instance, FDI variable was applied for Russia. However, FDI has showed positive but insignificant p-value for all three country sets. Moreover, FDI made other variables' results to change and consequently, most of the variables displayed insignificant value. Therefore, the author was forced to exclude FDI variable from Russia's estimations.

Meanwhile, several other variables such as common language dummy, labor productivity, population were included in the equations. But, when above mentioned variables were inclusive, most of the results represented insignificant and contradictory findings. Therefore,

[109] This approach was also applied by Durbin (1954) and Wu (1973). For this reason tests based on the comparison of two sets of parameter estimates are also called Durbin-Wu- *Hausman* tests, or DWH. For simplicity of exposition we will refer to the *Hausman* (1978) set up.

those variables were omitted from the estimations.

The first model denotes Russia's exports ($EXPijt$) presented in three parts; 30 country set analysis, 55 country set analysis and 75 country set analysis in that order:

$$Ln(EXPORT)_{ijt} = \beta_0 + \beta_1 \; Ln(GDP)_{ijt} + \beta_2 \; Ln(DISTANCE)_{ijt} + \beta_3 Ln(GDPPC)_{it} + \beta_4 Ln(GDPPC)_{jt} + \beta_5 Ln(EXR)_{ijt} + \beta_6 Ln(OILPRICE)_{it} + \beta_7 Border_{ijt} + \beta_8 Partnership_{ijt} + \varepsilon_t \quad (5.3)$$

Dependent Variable:

$Ln(EXPORT)_{ijt}$ logarithm of exports from country *i* to its trade partner *j* in a year *t*

Independent or explanatory variables:

$Ln(GDP)_{ijt}$ logarithm of product of GDP for exporter *i* and its export destination country *j* in year *t*

$Ln(DISTANCE)_{ijt}$ logarithm of distance from the capital-city of country *i* to the capital of country *j*

$Ln(GDPPC)_{it}$ logarithm GDP per capita of exporting country *i* in year *t*

$Ln(GDPPC)_{jt}$ logarithm of GDP per capita of exporting country *i* in year *t*

$Ln(EXR)_{ijt}$ logarithm of real exchange rate between exporter *i's* and importer *j's* currency

$Ln(OILPRICE)_{it}$ logarithm of average price for Urals oil brand in the global market in year *t*

$Border_{ijt}$ common border shared by exporter *i* and its importer *j* (a binary variable)

$Partnership_{ijt}$ regional economic trading bloc (CIS and APEC) (a binary

variable)

ε_t residuals.

In the equation 5.3 an dependent variable is Russia's exports $Ln(EXPORT)_{ijt}$ whereas explanatory variables involve a product of GDP for trading pairs (GDP_{ijt}), $DISTANCE_{ijt}$ between Moscow and the capital city of trading country, a value of outputs of Russia and its trading partner ($GDPijt$), income of Russian population GDP per capita($GDPPCit$) trading partner's ($GDPPCjt$), currency exchange rate of Russia against the trading partners($EXRijt$), annual average price for Brent blend oil ($OILPRICE_{it}$) in the global market during the time *t*, while common borders between Russia and her export destination ($Border_{ijt}$) and economic bloc ($PARTNERSHIP_{ijt}$) are binary variables.

Subsequently, we move to the model of Korea's export determinants. Selected model for estimation of Korea's export differs from the model of Russian assessments. Variables for Korea's exports were drawn up on the basis of previous researches on Korea's export determinants and the economic specificity of "country of morning freshness" As far as Korea is one of the largest oil consumer in the world and doesn't own oil resources. Therefore, *Oil price* variable is omitted from the model of Korean export. Korea doesn't share land- borders with any country except North Korea. But North Korea is not included in 75 country list under the study. Therefore, *Border* variable is also omitted from the empirical estimations. The selected model for Korea's export determinants looks like below:

$$Ln(EXPORT)_{ijt} = \beta_0 + \beta_1 Ln(GDP)_{ijt} + \beta_2 Ln(DISTANCE)_{ijt} + \beta_3 Ln(GDPPC)_{it} + \beta_4 Ln(GDPPC)_{jt} + \beta_5 Ln(EXR)_{ijt} + \beta_6 Ln(FDI)_{it} + \beta_7 APEC_{ijt} + \varepsilon_t \quad (5.4)$$

Dependent Variable:

$Ln(EXPORT)_{ijt}$ logarithm of exports from country *i* to its trade partner *j*

Independent or explanatory variables:

$Ln(GDP)_{ijt}$ logarithm of product of GDP for exporter *i* and its export destination country *j* in year *t*

$Ln(DISTANCE)_{ijt}$ logarithm of distance from the capital of country *i* to the capital

of country j

$Ln(GDPPC)_{it}$	logarithm of GDP per capita of exporting country *i* in year *t*
$Ln(GDPPC)_{jt}$	logarithm of GDP per capita of exporting country *i* in year *t*
$Ln(EXR)_{ijt}$	logarithm of real exchange rate between exporter *i's* and importer *j's* currency
$Ln(FDI)_{it}$	logarithm of foreign Direct Investment inflow into country *i* in year *t* per annum.
$APEC_{ijt}$	membership at the forum of Pacific Rim economies (a binary variable)
ε_t	residuals

Korea's export determinants model contains dependent variable $EXPORT_{ijt}$ and explanatory variable such as *GDPijt* which is a product for country *i* and *j* (GDPijt), distance between the capitals of trading countries (*DISTANCEijt*), per capita GDP of country *i* (*GDPPCit*) and *j* (GDPPCjt), real exchange rate between the currencies of trading pairs (*EXRijt*). FDI inflow into Korean economy (*FDIit*) and binary variable for APEC membership (*APECijt*). The estimations were evaluated in three country set frameworks: 30, 55 and 75. .

6. Data

The study applied exports of Russia and Korea as a dependent variable where the export volume is counted in US dollars. The data related to exports of pairs was derived from World Bank.. GDP and per capita were in US dollar market prices which were retrieved from the World Development Indicators database of World Bank and Index Mundi data portal. Meanwhile, a distance data was taken from www.distancefromto.net. Oil price data was deducted from the Trading Economics database. Figures of real exchange rate was obtained from the World Bank and www.usforex.com website. The data on border binary variable was retrieved from www.thematicmapping.org. Korea's FDI inflow data was drawn from Korean International Trade Agency database.

The author separately calculated a trade volume of Russia and Korea with each country of the world from 1999 to 2014. Panel data model was utilized to estimate export factors of Russia and Korea. During the estimation process, the author used Pooled OLS, Fixed Effect regression

and Random Effect regression. So the results of all three regressions are presented whereas Random Effect results are used to report while Pooled OLS and Fixed Effect are for the reference. The analyses are carried out in three sets of countries- 30, 55 and 75 country set in order to compare the results. The calculations were evaluated by using *Eviews 8* software.

Before presenting the findings of estimations, the Table 5.3 introduces expected signs of the variables under estimations:

Table 5.3 Assumed signs of variables and their rationales.

Variables	Assumed signs	Rationale
Exports		Exports represent the value of all goods and services that are provided to the rest of the world (World Bank, 2013).
GDP of Exporter	+	A high rate of GDP implies a high level of production capability in the export-origin state which encourages the availability of exports[110]
GDP of Importer	+	An increase of GDP size in the importing state may boost the exportation volume of exporting country.[111]
Distance	-	Proxy of transport costs[112]
Per capita GDP, Exporter	+	Higher income implies increased productivity which leads to higher capacity for the augmented export
	-	Higher income causes an increase of demand in domestic market which can make the exporters to reorient their supply destination
Per capita GDP, Importer	+	an increase in the income level of the population of importing country leads to the improvement of imports[113]
	-	Higher income increases the demand for the goods with high quality. Demand for low quality imported products can be declined.

[110] Eita, J.H. and Jordaan, A.C. (2007), South Africa Exports of Metal and Articles of Base Metal: A Gravity Model Approach, *Journal for Studies in Economics and Econometrics*, Vol. 31, Issue 3, pp.81-96.

[111] Tho, H.T. (2013), Determinants of Vietnam's Exports: A Gravity Model Approach (Master's thesis). Retrieved from http://www.msfe.au.edu/

[112] Fratianni, M. and Kang, H.J. (2005), Heterogeneous Distance–Elasticities in Trade Gravity Models, *Economics Letters*, Vol. 90, pp.68 – 71.

[113] Eita, J.H. and Jordaan, A.C. (2007), South Africa Exports of Metal and Articles of Base Metal: A Gravity Model Approach, *Journal for Studies in Economics and Econometrics*, Vol. 31, Issue 3, pp.81-96.

Real Exchange Rate	+	A depreciation of exchange rate of exporting nation may encourage export volume and contract imports and vice versa[114]
	-	Exporting firms avoid to risk and may reduce their export due to the exchange rate volatility[115]
Oil price	+	High oil prices encourage the oil abundant oil exporters[116]
FDI	+	Increasing capital stock and high technologies (or innovation) promotes exports
	-	"Tariff jumping due to FDI" can reduce exports
Border	+	Less transport costs
Partnership	+	Participation in the regional economic blocs can evaluate substantial increase in merchandises.[117]
APEC	+	Membership in APEC presents a positive energy to its member-states to promote further trade.[118]

7. Findings of Russia's export determinants

Estimation results of Russia's exports are provided in ascending order starting from 30 country set and following by 55 and 77 country sets.

Table 5.7.1 Results of Russia's exports toward its 30 major export destinations (1999-2014)[119]

[114] Coric, B., and Pugh, G. (2006), The Effects of Exchange Rate Variability on International Trade: A Meta-Regression Analysis, *Working Paper 1*, Centre for Research on Emerging Economies, IESR.

[115] Dell'-Ariccia, G. (1998), Exchange Rate Fluctuations and Trade Flows; Evidence From the European Union, *IMF Working Papers* , Vol.107, International Monetary Fund.

[116] Kudrin, A. and Gurvich, E. (2015), A New Growth Model for the Russian Economy. *Russian Journal of Economy,* Vol.1, Issue 1, pp. 30-54.

[117] Carrere, C. (2006), Revisiting the Effects of Regional Trade Agreements on Trade Flows with Proper Specification of the Gravity Model,*European Economic Review, Elsevier*, Vol. 50, Issue 2, pp.223-247.

[118] Tang, D. (2001), The potential of the APEC Grouping to Promote Intra-Regional Trade in the Asia-Pacific Region, *The Journal of Applied Business Research,* Vol.17,Issue 4, pp. 63-68.

[119] Note: The asterisks marks (***, ** and *) which are given just after the coefficient figures denote statistical significance at 1%, 5% and 10% levels respectively in a 2 tailed t-test. Meanwhile, the figures presented in brackets under the intercepts imply standard errors.

Variables	Pooled OLS	FE	RE
C	11.90583*** (3.459489)	17.07172*** (3.019142)	13.54209*** (2.406786)
LnGDPij	0.408672*** (0.024876)	-0.090842 (0.119345)	0.221354*** (070169)
LnDISTANCEij	-0.67882*** (0.067801)	--	-0.307422 (0.21617)
LnGDPPCi	-1.033752** (0.450049)	0.255811 (0.362163)	-0.402533 (0.307841)
LnGDPPCj	0.073822 (0.062788)	0.428773* (0.228046)	-0.001262 (0.139859)
LnEXRij	-0.006115 (0.011957)	-0.019526 (0.027219)	-0.001368 (0.022902)
LnOILPRICEi	0.67472*** (0.233666)	0.873776*** (0.14336)	0.748754*** (0.137284)
BORDERij	0.361141*** (0.06464)	--	0.379835* (0.236252)
PARTNERSHIPij	0.447327*** (0.083414)	--	0.178906 (0.154966)
Number of observations	480	480	480
R-squared	0.620611	0.883344	0.726213
Adjusted R-squared	0.614167	0.874431	0.721563
S.E. of regression	0.637723	0.36381	0.367523
F-statistic	96.30885	99.10653	156.1646
Prob(F-statistic)	0.000000	0.000000	0.000000

Source: Author's own calculations.

Table 5.7.2 *Hausman* test for Russia's exports analysis towards its 30 major export destinations:

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	6	1.0000

Hausman test for the results of 30 countries set analysis demonstrates that null hypothesis cannot be rejected which means Random effect regression is more appropriate rather than Fixed Effect. *Hausman* test results advocate that Chi-Sq. Statistic is 0.000000, Chi-Sq. d.f. is 6 and Probability is 1.0000. Krishnankutty and Kiran (2014) find that the outcomes of *Hausman* test don't give any significant message.[120] On the contrary, Aval (2015) and Mohd Isa (2014) conclude similarly relying on their empirical researches that there is not any interdependence

[120] Krishnankutty, R. and Kiran, S.C. (2014, March), The Determinants of Corporate debt maturity: a study on listed companies of Bombay Stock Exchange 500 index. *Romanian Economic Journal*, Year XVII, No. 51.

between the random effects and the independent variables. So, on the basis of the previous works we can conclude that the result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero.[121] Furthermore, Kitetu's (2015) estimations also give the similar results and concludes that the *Hausman* test evaluated the alternative hypothesis which means LSDV model is the most applicable and appropriate rather than the null hypothesis. Therefore, he preferred to apply Error Correction Model as a capable one for his analysis.[122] This work also presents all three results of Pooled OLS, Fixed Effect and Random Effect regressions. Random Effect is for reporting while Pooled OLS and Fixed Effect results are represented for the reference.

Table 5.7.1 represents empirical results. The coefficient of the constant is 13.54209 and highly significant. A product of GDP of Russia and its trading partner positively impacts the export volume of Russia. If the product of GDP of Russia and its trading country increases by 1%, then the exports of Russia will increase by 0.22%. If the distance between Russia and its partner increases by 1%, the exports of Russia will decrease by 0.30%. But the p-value is insignificant. On the other hand, the GDP per capita of Russian population negatively impacts the exports, but it is not significant. The sign of the GDP per capita of Russia's trading partners has also negative impact on Russia's exports. However, it gives an insignificant p-value. Moreover, the real exchange rate has a negative impact on exports of Russia, but the p-value is insignificant. As before mentioned, the Russian economy strictly depends on the oil exports. 1% increase of the oil price in the global market, makes the exports of Russia to increase by 0.74%. If the common borders between Russia and its trading partner increases by one unit, then Russia's exports will increase by 0.37unit. Border's p-value is significant at 10% level. Economic partnership dummy variable positively impacts the exports of Russia. But the p-

[121] Mohd, I.M. Y. (2014), Basel III Accord: Different Bank Characteristics (Insolvency Risk) Due to unobserved Heterogeneity Effects, *Australian Journal of Basic and Applied Sciences,* Vol. 8, Issue7, pp.377-385.

[122] Kitetua, G.M. and Ko, J.H. (2015), A Comparative Study on the International Trade Competitiveness of Kenya and Korea: A Gravity Approach, *Journal of International Trade and Commerce,* Vol. 11, No.6, pp.137-152.

value is insignificant.

Moreover, the R-squared of RE shows 0.7262 which implies that 72.62% variation in export variable of Russia can be explained by the explanatory variables in the equation jointly within the sample. The estimation is good fit, because the R-squared is more than 60%. Further, F-statistics represents 156.16% which is quite high. Meanwhile F-statistics p-value is 0.000000 which means that the explanatory variables can significantly impact on the exports of Russia toward its 30 partner countries.

Results of Russia's export exports toward its 55 major trading partner countries.

Empirical results of the Russian export towards its main 55 partner countries demonstrate nearly similar outcomes with 30 country set analysis. The *Hausman* test concludes that Random Effect is more acceptable model for the data analysis of Russian export into its 55 export destinations. Below are the results of all three models where Random Effect results are for reporting while Pooled OLS and FE given for the reference.

Table 5.7.3 Results of Russia's exports toward its 55 major export destinations (1999-

2014)[123]

Variables	Pooled OLS	FE	RE
C	9.287011** (4.078312)	0.492908 (3.12827)	8.355652*** (2.828865)
LnGDPij	0.395937*** (0.01968)	0.480878*** (0.11277)	0.422749 *** (0.059689)
LnDISTANCEij	-0.741926*** (0.054342)	--	-0.795505*** (0.18686)
LnGDPPCi	-0.677779 (0.525784)	-0.997292*** (0.394996)	-0.783676*** (0.332071)
LnGDPPCj	0.094315 (0.059117)	0.310785 (0.199075)	0.210583* (0.126546)
LnEXRij	0.015177 (0.014304)	-0.019645 (0.017679)	-0.011904 (0.016767)
LnOILPRICEi	0.568963** (0.275064)	0.50734*** (0.163193)	0.5422*** (0.157477)
BORDERij	0.586256*** (0.083461)	--	0.589162** (0.294901)
PARTNERSHIPij	0.480338*** (0.097494)	--	0.301244* (0.175035)
Number of observations	880	880	880
R-squared	0.568154	0.871124	0.625668
Adjusted R-squared	0.564187	0.861851	0.611863
S.E. of regression	1.01722	0.572715	0.57294
F-statistic	143.2401	93.94394	153.8977
Prob(F-statistic)	0.000000	0.000000	0.000000

Source: Author's own calculations.

Table 5.7.4 *Hausman* test for Russia's exports analysis into its 55 major export destinations:

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.

[123] Note: The asterisks marks (***, ** and *) which are given just after the coefficient figures denote statistical significance at 1%, 5% and 10% levels respectively in a 2 tailed t-test. Meanwhile, the figures presented in brackets under the intercepts imply standard errors.

Cross-section random	0.000000	6	1.0000

The Hausman test outcomes represent that p-value is 1.000 which means null hypothesis cannot be rejected and Random Effect is appropriate rather than Fixed Effect. Meanwhile, Chi-Sq. Statistic shows 0.000000 while Chi-Sq. d.f is 6. Krishnakutty and Kiran (2014) didn't find any empirical evidences and argued that these numbers are not enough to conclude that Random Effect is appropriate. On the other hand, Mohd Isa (2014) and Aval (2015) found out similar results and made conclusion that there was no correlation between the independent variables and random effects. Moreover, Kitetu (2015) evaluated the same results in this empirical work. Therefore, below we interpret the results of Random Effect estimations. . So, on the basis of the previous works we can conclude that the result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero.

The coefficient for the constant is 8.355652 and it is statistically significant at 1% level. If a product of GDP of Russia and its trading partner increases by 1%, then the export volume of Russia will increase by 0.42%. Meantime, the p-value is significant at 1% level. If the distance between Russia and its partner increases by 1%, the exports of Russia will decrease by 0.79%. The p-value of the distance is strongly significant at the 1% level. 1% increase in the GDP per capita of a country *i* (Russia) causes a decline of the export volume of Russia by 0.78%. It implies that an increase in the per capita GDP of Russia causes an absorption capacity growth of the national/domestic market. It may lead to the lowering of export volumes toward Russia's 55 major export-destinations and reorientation of national product destinations from abroad to domestic markets.[124] This result and conclusion is consistent with the researches which carried out by Foroutan and Lant (1993) and Karamuriro and Karukuza (2015).In the contrast, the GDP per capita of Russia's trading country shows positive and statistically significant impact on the exports of Russia. .

The real exchange rate has negative effect as expected in the hypothesis part but the p-value

[124] Karamuriro, H.T. and Karukuza, W.N. (2015), Determinants of Uganda's Export Performance: A Gravity Model Approach, *International Journal of Economics and Business Research*, Vol. 4(2), pp. 45-54.

represents insignificant result. 1% increase of the prices of the oil and oil products causes 0.54% increase of the exports. Sharing common borders improves the exports of Russia and it is significant at the 5% level. A co-membership of Russia and its partner in the SIC or APEC reduces various tariff and non-tariff barriers to trade and increases the volume of the Russian exports by 30 unit. The p-value of the partnership binary variable is significant at the 10% level.

Moreover, the R-squared of RE shows that the export factors of Russia can be jointly explained by the explanatory variables under the estimations at the 62% level. The estimation is good fit, because the R-squared is more than 60%. Further, F-statistics represents the overall value of the regression with 153.89% level which is quite high. Meanwhile, F-statistics p-value is 0.000000 which means the explanatory variables can significantly impact on the exports of Russia toward its 55 partner countries.

Results of Russia's exports toward its 75 major export countries.

The *Hausman* test has selected Random effect regression to explain the results. Therefore, the author presents all three models where Random Effect estimation results are for reporting and the results of Pooled OLS and Fixed Effect are given for the reference.

Table 5.7.5 Results of Russia's exports toward its 75 major export destinations (1999-2014)[125]

[125] Note: The asterisks marks (***, ** and *) which are given just after the coefficient figures denote

Variables	Pooled OLS	FE	RE
C	8.413092** (3.804134)	-5.084349** (2.625639)	7.898163*** (2.542395)
LnGDPij	0.386715*** (0.018727)	0.744849*** (0.082169)	0.526107 *** (0.051291)
LnDISTANCEij	-0.878017*** (0.051018)	--	-1.077023*** (0.171474)
LnGDPPCi	-0.73246 (0.490365)	-1.488043*** (0.345012)	-0.93799*** (0.29812)
LnGDPPCj	0.373344*** (0.046409)	-0.064649 (0.100847)	0.066802 (0.082894)
LnEXRij	-0.012801 (0.012411)	-0.009939 (0.016511)	0.000191 (0.015365)
LnOILPRICEi	0.54091** (0.256596)	0.38049*** (0.141385)	0.482465*** (0.138607)
BORDERij	0.667812*** (0.087299)	--	0.686717** (0.307135)
PARTNERSHIPij	0.894562*** (0.09385)	--	0.328591* (0.177478)
Number of observations	1200	1200	1200
R-squared	0.605413	0.894894	0.632551
Adjusted R-squared	0.602762	0.88748	0.629747
S.E. of regression	1.108168	0.589787	0.592998
F-statistic	228.418	120.7075	207.7553
Prob(F-statistic)	0.000000	0.000000	0.000000

Source: Author's own calculations.

Table 5.7.6 *Hausman* test for Russia's exports analysis into its 75 major export destinations.

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	6	1.0000

The coefficient of the constant is 7.898163 and it is significant. If the product of GDP of Russia and its trading partner increases by 1%, then the export volume of Russia will increase by

statistical significance at 1%, 5% and 10% levels respectively in a 2 tailed t-test. Meanwhile, the figures presented in brackets under the intercepts imply standard errors.

0.52%. If the distance between Russia and its trading partner increases by 1%, the exports will decrease by 1.07%. On the other hand, 1% growth of the GDP per capita of Russia causes a decrease of exports by 0.93%. It implies that an increase in the GDP per capita of Russia causes an absorption capacity growth of the national/domestic market. It may lead to the lowering of export volumes toward Russia's 75 major export-destinations and reorientation of national product destinations from abroad to domestic markets.[126] This outcome is consistent with Foroutan and Lant (1993) and Karamuriro and Karukuza (2015). An increase of the GDP per capita of Russia's trading partner positively impacts the Russian exports but it is statistically insignificant. Meanwhile, an impact of real exchange rate is positive but it is insignificant. If the oil prices increases by 1%, it makes the size of the exports to grow by 0.68%. Moreover, the co-membership of Russia and its trading partner in the economic allies such as the SIC or APEC increases by one unit, then Russia's exports will increase by 32 unit. Both of Border and Partnership binary variables are significant at the 5 and 10% levels respectively.

The R-squared of RE is 0.632551. This number implies that all explanatory variables of 75 countries set can jointly explain the exports of Russia in 63%. The estimation is good fit, because the R-squared is more than 60%. Further, F-statistics represents the overall value of the regression with 207.75% worth which is quite high. Meanwhile, F-statistics p-value is 0.000000 which means the explanatory variables can significantly impact the exports of Russia toward its 75 partner countries.

The *Hausman* test results demonstrate that Random Effect was more appropriate rather than Fixed Effect regression to explain the crucial factors for Russian export in the all 30, 55 and 75 country sets. The *Hausman* test results advocate that Chi-Sq. Statistic is 0.000000, Chi-Sq. d.f. is 6 and Probability is 1.0000. Krishnankutty and Kiran (2014) find that the outcomes of *Hausman* test don't give any significant message. On the contrary, Aval (2015) and Mohd Isa (2014) conclude similarly relying on their empirical researches that there is not any interdependence between the random effects and the independent variables. So, on the basis of

[126] Karamuriro, H.T. and Karukuza, W.N. (2015), Determinants of Uganda's Export Performance; A Gravity Model Approach, *International Journal of Economics and Business Research*, Vol. 4. Issue 2, pp. 45-54.

the previous works we can conclude that the result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero.

Estimations presented us almost the results which are assumed to be by theories and previous researches. But there were also observed some unexpected results. Below we summarize the results and try to give explanations.

GDP of Russia and its trading partner had a positive and significant effect in all country set evaluations. It implies that the bigger the country's GDP volume the higher opportunity for Russia's exports. Distance represented a negative sign for each country set and high significance which was expected (only the p-value of the distance in 30 countries set was insignificant.) It implies that the distance cause higher transport costs and, eventually, it will lead to the decline of Russian exports. On the other hand, the GDP per capita of Russia had negative impact on Russia's export volume and showed statistical significance in the 55 and 75 countries set. It implies that an increase in the GDP per capita of Russia may cause an absorption capacity growth of the national/domestic market. It may lead to the lowering of export volumes toward Russia's 55 and 75 major export-destinations and reorientation of the destinations of the national product from abroad to the domestic markets. This result is consistent with Foroutan and Lant (1993) and Karamuriro and Karukuza (2015).

Although the real exchange rate has demonstrated different effects on Russia's export volume, none of them was statistically significant. The real exchange rate exerts a negative and

significant impact on the international trade.[127] But there are several previous works which couldn't find any significant effect of an exchange rate on export and trade. For instance, Hondroyiannis et al. (2008) carried out empirical researches applying the sample of twelve industrialized countries over the period from 1977 to 2003. But they failed to find any significant effect of exchange rate volatility on 12 countries' trades. Boug and Fagereng (2010), Tenreyro (2007) also founded no significant impact on the exports.[128]

The oil price variable has presented positive and significant impacts on the exports in all three country sets. These results are consistent with the conclusion of As Benedictow et al. (2013). Benedictow et al. (2013) noted that Russia's GDP and export volume keep to increase if only the oil price is high and stable.

Border binary variable has showed a positive effect and significant probability in each country set. It infers that Russia gets more profit from the merchandising with its neighbor nations. Because shared borders implies a short distance, comparatively close culture and language. Short distance reduces transport costs and close culture makes easy the trade between nations.

An economic partnership which implies the CIS and APEC in this study has represented positive and significant (except 30 country set) impacts on Russia's exports. Membership in the CIS or APEC reduces or removes tariff or non-tariff barriers between nations and may encourage the exports from Russia.

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[127] Coric and Pugh (2006), The effects of exchange rate variability on international trade: a meta-regression analysis. Centre for Research on Emerging Economies, IESR, *Working Paper 1*.

[128] Auboin, M. & Ruta, M. (2013), The Relationship between Exchange Rates and International Trade: A Literature Review, *World Trade Review*, Cambridge University Press, Vol. 12, Issue 3, pp. 577-605.

R-squared percentages have represented more than 60% percent for each country set regression which means that each country set analysis can be accepted to be a good fit.

8. Findings of Korea's export determinants

This part of the study represents the findings and interpretations of Korea's export determinants. The period under the estimations is from 1999 to 2014. The estimations were evaluated in 30, 55 and 75 country sets.

Table 5.8.1 Results of Korea's exports toward its 30 major export destinations (1999-2014)[129]

Variables	Pooled OLS	FE	RE
C	-1.634932 (2.747516)	-16.64852*** (2.038061)	-3.95239* (2.332677)
LnGDPij	0.162979*** (0.01616)	0.659909*** (0.075983)	0.297608*** (0.046488)
LnDISTANCEij	-0.585727*** (0.051103)	--	-0.569104*** (0.184201)
LnGDPPCi	1.567903*** (0.116168)	-0.252145 (0.186308)	0.910119*** (0.117304)
LnGDPPCj	-0.100839*** (0.038579)	0.457536*** (0.135074)	0.230173*** (0.094703)
LnEXRij	0.069108*** (0.012636)	-0.014291 (0.028126)	-0.0306 (0.02362)
LnFDIi	0.207298*** (0.118841)	0.061664 (0.061391)	0.161948*** (0.059736)
APECij	0.58584* (0.068856)	--	0.277753 (0.249509)
Number of observations	480	480	480
R-squared	0.666347	0.922833	0.736606
Adjusted R-squared	0.661399	0.916937	0.7327
S.E. of regression	0.617954	0.306066	0.328552
F-statistic	134.6632	156.5216	188.5706
Prob(F-statistic)	0.000000	0.000000	0.000000

Source: Author's own calculations.

[129] Note: The asterisks marks (***, ** and *) which are given just after the coefficient figures denote statistical significance at 1%, 5% and 10% levels respectively in a 2 tailed t-test. Meanwhile, the figures presented in brackets under the intercepts imply standard errors.

Table 5.8.2 *Hausman* test results of Korea's 30 major export destinations analysis

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

The *Hausman* test shows that null hypothesis cannot be rejected which means Random Effect model is appropriate rather than Fixed Effect to analyze. Chi-Sq. Statistics to be 0.000000, Chi-Sq. d.f is 5 and Probability shows 1.0000. Hausman test results reject the disjunctive hypothesis since p-value figure for Chi-sq. Statistics is highly insignificant at 99 percent confidence interval (Mohd, 2014 and Aval, 2015). Therefore, on the basis of the previous works we can conclude that the result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero and report the first warning message that researcher encountered.Below the result interpretation is given.

Constant coefficient is negative 3.952390 and significant at the 10% level. If the product of GDP of Korea and its trading partner increases by 1%, the exports of Korea will increase by 0.29%. The p-value of GDP is significant at the 1% level. 1% increase of the distance between Korea and its trading partner will cause 0.56% decrease of the exports from Korea to 30 major trading partners. The GDP per capita of Korea has positive and significant effect. It can be interpreted like if the nation of Korea get richer they become to produce more the high-quality export-oriented products and "made in Korea" goods become more competitive in the global market. On the other hand, 1% increase of the GDP per capita of a trading country will make the Korean exports to grow by 0.23%. The reason is,if the people of an importing country get richer they become to purchase more and high quality goods which can be supplied by the Korean producers. The real exchange rate has negative effect but it is insignificant. Meanwhile, 1% increase of the FDI inflows into Korean economy, causes the exports to grow by 16%. Moreover, the p-value of the FDI inflow is significant at the 1% level. The dummy APEC has showed positive impact but it has insignificant value.

The R-squared of RE is 0.736606. It implies that all explanatory variables of the 30 country set jointly explain the exports of Korea in 73%. The estimation is good fit, because the R-squared

is more than 60%. Further, F-statistics represents 188.57% overall value of the regression which is assumed to be. Meanwhile, F-statistics p-value is 0.000000 which means the explanatory variables can significantly impact on the exports of Korea toward its 30 partner countries.

Table 5.8.3 Results of Korea's exports toward its 55 major export destinations (1999-2014)[130]

Variables	Pooled OLS	FE	RE
C	-5.972552** (2.880185)	-20.06379*** (2.310377)	-7.673588*** (2.654315)
LnGDPij	0.270375*** (0.016757)	0.640532*** (0.09182)	0.397741*** (0.0485)
LnDISTANCEij	-0.587355*** (0.061273)	-	-0.708291*** (0.207637)
LnGDPPCi	1.553995*** (0.122807)	-0.490261** (0.218332)	0.871655*** (0.134216)
LnGDPPCj	-0.273797*** (0.03833)	1.08018*** (0.186852)	0.161958* (0.10002)
LnEXRij	0.109916*** (0.013294)	0.133489*** (0.030066)	0.078924*** (0.024791)
LnFDIi	0.186797 (0.123921)	0.045867 (0.072279)	0.137273** (0.069901)
APECij	1.05436*** (0.077476)	-	0.750164*** (0.259584)
Number of observations	880	880	880
R-squared	0.617090	0.888583	0.616717
Adjusted R-squared	0.613926	0.880566	0.603399
S.E. of regression	0.872352	0.485199	0.511451
F-statistic	200.6807	110.8429	176.8474
Prob(F-statistic)	0.000000	0.000000	0.000000

Source: Author's own calculations.

Table 5.8.4 *Hausman* test results of Korea's 55 major export destinations analysis

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

[130] Note: The asterisks marks (***, ** and *) which are given just after the coefficient figures denote statistical significance at 1%, 5% and 10% levels respectively in a 2 tailed t-test. Meanwhile, the figures presented in brackets under the intercepts imply standard errors.

The above *Hausman* test demonstrates that the Random Effect model is appropriate for analyzing the Korean exports toward its 55 trading countries. Along with the results of Random effect regression, the author has presented the results of Pooled OLS and Fixed effect regressions for the reference.

The coefficient of the constant is negative 7.673588 and statistically significant. If the product of the GDP of Korea and its trading partner increases by 1%, then the exports of Korea toward 55 major trading nations will increase by 0.39%. The p-value of GDP is significant at 1% level. If the distance between Korea and its trading nation increases by 1%, the exports of Korea will decrease by 0.70%.

The GDP per capita of Korea positively impacts the Korean exports and it is highly significant. On the other hand, if the GDP per capita of a trading nation increases by 1%, the exports from Korea will increase by 16%. Meanwhile, the exports will increase by 0.07% if the real exchange rate increases by 1%. De Grauwe (1988) stressed that the dominance of income effects over substitution effects can lead to a positive relationship between trade and exchange-rate volatility. This is because, if the exporters are sufficiently risk averse, an increase in exchange-rate volatility raises the expected marginal utility of export revenue and therefore induces them to increase exports.

Further, FDI has a positive and statistically significant impact on the exports. If the APEC co-membership of Korea and its trading country increases by one unit, then Korea's exports will increase by 0.75unit.

The R-squared of RE is 0.616717. This implies that all explanatory variables of the 55 country set jointly explain the exports of Korea in 0.61%. The estimation is good fit, because the R-squared is more than 60%. Further, F-statistics represents 176.84% overall value of the regression which is assumed to be. Meanwhile, F-statistics p-value is 0.000000 which means the explanatory variables can significantly impact on the exports of Korea toward its 55 partner countries.

Table 5.8.5 Results of Korea's exports toward its 75 major export destinations (1999-2014)[131]

Variables	Pooled OLS	FE	RE
C	-6.85156*** (2.769805)	-16.00077*** (2.004215)	-8.280822*** (2.529761)
LnGDPij	0.292616*** (0.017678)	0.425698*** (0.079497)	0.385392*** (0.04778)
LnDISTANCEij	-0.666236*** (0.060158)	--	-0.699516*** (0.2030309)
LnGDPPCi	1.382478*** (0.119614)	0.05103 (0.188616)	0.773304*** (0.131781)
LnGDPPCj	-0.186012*** (0.036409)	1.089622*** (0.168974)	0.293427*** (0.092524)
LnEXRij	0.098152*** (0.012255)	0.017972 (0.015089)	0.015005 (0.01425)
LnFDIi	0.230071** (0.119181)	0.137773** (0.067491)	0.1759*** (0.06579)
APECij	1.221655*** (0.077466)	--	0.97879*** (0.261503)
Number of observations	1200	1200	1200
R-squared	0.577533	0.883053	0.656787
Adjusted R-squared	0.575052	0.874804	0.654184
S.E. of regression	0.979462	0.531636	0.546128
F-statistic	232.7885	107.0506	213.9216
Prob(F-statistic)	0.000000	0.000000	0.000000

Source: Author's own calculations.

Table 5.8.6 *Hausman* test results of Korea's 75 major export destinations analysis

Test summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

The *Hausman* test for 75 main trading nations shows that the Random Effect is appropriate rather than Fixed effect. *Hausman* test results advocate that Chi-Sq. Statistic is 0.000000, Chi-Sq. d.f. is 5 and probability is 1.0000. Krishnankutty and Kiran (2014) find that the outcomes

[131] Note: The asterisks marks (***, ** and *) which are given just after the coefficient figures denote statistical significance at 1%, 5% and 10% levels respectively in a 2 tailed t-test. Meanwhile, the figures presented in brackets under the intercepts imply standard errors.

of *Hausman* test don't give any significant message. On the contrary, Aval (2015) and Mohd Isa (2014) conclude similarly relying on their empirical researches that there is not any interdependence between the random effects and the independent variables. So, on the basis of the previous works we can conclude that the result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero. Traditionally, this 75 country set analysis has also presented the results of all estimations for three models whereas Pooled OLS and Fixed Effect given for the reference while Random Effect regression is for reporting purposes.

The coefficient of the constant is negative 8.280822 which is significant. If the product of GDP of Korea and its trading nation increases by 1% it causes an increase of the exports of Korea by 0.38% toward 75 trading nations. The exports of Korea will decrease by 0.69% if the distance between Korea and its trading nation increases by 1%. 1% increasing of the GDP per capita of Korea causes the export increase by 0.77%. The GDP per capita of trading partner has a positive effect and statistically significant at the 1% level. The real exchange rate impacts positively but it is insignificant. FDI inflow causes the growth in the exports of Korea by 0.17% if the FDI inflow increases by 1%. The APEC membership implies reducing or removing the tariff and non-tariff barriers in the trade. Therefore, if the co-membership of Korea and its partner in the APEC increases by one unit, then Korea's exports will increase by 0.97unit.

The R-squared of RE is 0.656787. It implies that all explanatory variables of the 75 country set jointly explain the exports of Korea in 65% toward Korea's 75 major trading partners. The estimation is good fit, because the R-squared is more than 60%. Further, F-statistics represents 213.92% overall value of the regression which is assumed to be. Meanwhile, F-statistics p-value is 0.000000 which means the explanatory variables can significantly impact on the exports of Korea toward its 75 partner countries.

The *Hausman* test has presented empirical evidences that Random Effect is appropriate in data analysis of Korea's export factors rather than Fixed effect regression. The result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of

individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero .

The estimations of the exports of Korea gave us almost expected results. GDP had positive and significant impacts on the exports in all three country sets. The distance variable of all three country set estimations has showed that it had negative on the exports. The GDP per capita of Korea represented a positive and significant impact on the exports of Korea. On the other hand, the GDP per capita had positive and significant impact on the export in all country sets. The real exchange rate demonstrated a negative - insignificant (30), positive - significant (55) and positive – insignificant (75) impacts. The FDI variable had positive effect in all country sets and all results were statistically significant. APEC binary variable showed positive in each estimation and significant impact except 30 country set.

At the end, R-squared rate has represented more than 60% for each country set regression which means that the explanatory variables of each country set explains exports of Korea for more than 60% which can be accepted as a good fit. Moreover, F-statistics have emerged high figures (which are above zero and not negative) which imply overall value of the regressions while all of them have presented 0.000000 which means that the explanatory variables in all three regressions significantly impact on the Korean exports.

9. Conclusion

This study applied the gravity model of trade to determine the exports of Russia and Korea. The estimations were provided in three sets: 30, 55 and 75 country set for the period from 1999 to 2014 (16 years). The *Hausman* test simulation for both Russia and Korea showed that null hypothesis cannot be rejected which explains that Random Effect model is more appropriate rather than Fixed Effect in the case of each country pair. The Chi-Sq Statistics to be 0.000000, Chi-sq.d.f for Russia was 6 and 5 for Korea while all are statistical significant at 1.0000 level. Krishnankutty and Kiran (2014) conclude that the results of *Hausman* test don't give any expressive information of which model is more suitable for confirmation-FE or RE. Notwithstanding, Mohd Isa (2014) and Aval (2015) carried out individual researches and found

out the same *Hausman* test results. Both authors argue that there is no correlation between independent variables and random effects. So, on the basis of the previous works we can conclude that the result shows the Random Effects estimate of cross-section variance is zero, so that there is no evidence of individual effects. Moreover, Glenn (2011) explains that the *Hausman* test statistic estimator for the variance of the coefficient difference is not guaranteed to be positive definite. In cases where one cannot compute the statistic, the Eviews software sets the value equal to zero. Moreover, Kitetu (2015) got the similar Hausman test results and concluded that the results have not confirmed the alternative hypothesis. Therefore, FE (or LSDV) model is most confirmative rather than null hypothesis. Eventually he used RE (or Error Correction Model) in his researches. He applied both of Pooled OLS and LSDV models in order to present them as reference while RE application was used for reporting.

In this work, the author has presented all regression results whereas the results of Pooled OLS and LSDV models have been presented for the references while the results of the ECM for the explanation.

GDP of Russia and Korea and their trading partners represent high significant positive effect on Russia and Korea's exports. A positive and higher GDP refers to higher production capability which leads to the ability of the country to export more products.[132] Meanwhile, the distance had a negative impact. The results of GDP and distance are consistent with the trade theories and the hypotheses of the study. On the other hand, the GDP per capita of Russia showed negative and significant impact on the exports of Russia toward its 55 and 75 major trading partners. It implies that an increase in the GDP per capita of Russia causes an absorption capacity growth of the national/domestic market. It may lead to the lowering of export volumes toward Russia's 55 and 75 major export-destinations and reorientation of national product destinations from abroad to domestic markets. This outcome is consistent with Foroutan and Lant (1993) and Karamuriro and Karukuza (2015). Further, it can be interpreted like if the

[132] Karamuriro, H.T. and Karukuza, W.N. (2015), Determinants of Uganda's Export Performance; A Gravity Model Approach, *International Journal of Economics and Business Research*, Vol. 4,Issue 2, pp. 45-54.

income of Russian people increases, they will become to buy more commodities. Eventually, it causes a demand increase in the domestic market and substantially, this trend makes the producers to revise their trade policy and re-orient their export destinations from the global to the domestic market. In the contrast, the GDP per capita of Korea has showed robust positive and statistically significant impact on Korea's export volume.

The GDP per capita of Russia's partners has represented insignificant effect on Russia's exports in all country sets. In the case of Korea's trading partner, the GDP per capita increase displayed strong positive and significant impact on Korea's exports.

The real exchange rate of Russia was found to have an insignificant negative (30 and 55) and insignificant positive (75) effect on the export of Russia. The results imply that the real exchange rate cannot explain Russia's exports. On the other hand, the real exchange rate of Korea shows insignificant negative (30), significant positive (55) and insignificant positive (75) impact on Korea's exports. This positive sign of exchange rate of Korea implies that Korea's exports rely on its currency devaluation. Karamuro and Karakuza (2015) also found out same significant positive effect of the real exchange rate on Uganda's export volume. Furthermore, De Grauwe (1988) and Sereu and Vanhulle (1992) highlighted various theoretical models to prove that the exchange rate volatility can increase the trades by raising the prices and size of exports of the nations.[133] He also added that, since 1973, the real exchange rate variability is not key point to explain a slowdown in the international trade.[134]

Oil prices performed strong significant effect on Russia's exports. Especially, the highest impact was found in 30 county set estimations. In the reality too, Russia's main export item to its 30 major trading partners is oil and oil products. The author skipped Ln (OILPRICE) variable in Korea's determinants as far as Korea is poor in terms of natural resources. The economic partnership binary variable had significant positive impact on Russia's exports. If any nation has a membership status in the CIS or APEC along with Russia, the chances to export from Russia will increase. Meanwhile, there is a similar trend in the case of Korea. Co-

[133] Jiranyakul, K. (2010), The Effects of Real Exchange Rate Volatility on Thailand's Exports to the United States and Japan under the Recent Float. *NIDA Development Journal,* Vol. 50, No. 2 pp. 1-18.

[134] De Grauwe, P. (1988), Exchange Rate Variability and the Slowdown in Growth of International Trade, *IMF Staff Papers 35*, pp. 63-84.

membership in the APEC shows quite statistically significant and positive impacts on Korea's exports. Sohn (2005) also found out the positive effect of the APEC on Korea's trades, Besides, Tang (2001), Sharma and Chua (2000) also examined a potential of APEC for merchandise improvement between the member-states and came up with the positive and significant impacts of APEC.

Furthermore, the estimations demonstrate a positive impact of FDI on Korea's exports. FDI as one of the driving tools for the export growth, performed robust significance at 1 % level (30 and 75 country set) and 5% level (55 country set). The FDI coefficients are consistent with existing trade theories and priors studies. FDI presents new organizational arrangements and practices of management. In addition, FDI provides labor training in the production facilities of Korea (host country). Furthermore, FDI stimulates the new input and technology incorporation in Korea's manufacturing which eventually leads to the magnification of the export outflow from Korea. Most of the prior works on FDI's impact constituted that FDI plays encouraging role for economy of a host country. For instance, Makki and Somwaru (2004) discussed the impact of FDI on the trade and economic growth through 66 developing countries and found out a positive contribution of FDI on both trade and economic growth.[135]

A common border coefficient of Russia performed statistically significant and positive effect and statistically significance at 10% (30 country set) and 5% (55 and 75 country set) levels. The results of common border satisfy theoretical expectations which imply that Russia can boost its export volume if Russia's trading nation shares common borders with Russia.

On the other hand, R-squared for all country set regressions of both countries showed that more than 60% fluctuation in exports can be explained by the explanatory variables jointly in the equations of all country sets. Further, the F-statistics p-value for all six regressions showed 0.000000 which intends that all selected explanatory variables of Russia and Korea can significantly impact on the exports of Russia and Korea.

[135] Makki, S.S. and Somwaru, A. (2004), Impact of Foreign Direct Investment and Trade on Economic Growth. Retrieved from https://jgea.org/resources/download/2595.pdf

Chapter VI Conclusion and Policy Recommendations

1. Conclusion

This study accentuates the international trade competitiveness of Russia's and Korea's economy explored in-depth analysis of the determinants of their exports. International competitiveness was determined by applying five Revealed Comparative Advantage (RCA) indices. The evaluations of the exports of Russia and Korea were estimated by utilizing Gravity Model. The findings have provided significant economic insights.

Applied five RCA indices analyzed and determined the international competitiveness of Russia and Korea. Conducted analyses utilized ten 2-digit commodities (HS1996) as major trading products between Russia and Korea for the even numbered years from 2000 to 2014 (total 8-year-period). The data for the estimations was retrieved from World Bank's software so called World Integrated Trade Solution (WITS). The sectors are the following: HS03 –Fish, crustaceans, mollusks, aquatic invertebrates, HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS39 -Plastics and articles thereof, HS72 - Iron and steel, HS73 -Articles of iron or steel, HS76 -Aluminum and articles thereof, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 - Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures. Empirical results of all five models indicate that Russia has a comparative advantage in only three sectors out of ten. They are HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes, HS72 - Iron and steel and HS76 -Aluminum and articles thereof. Meanwhile Korea has more comparative advantage in the sectors HS03 –Fish, crustaceans, mollusks, aquatic invertebrates, HS39 -Plastics and articles thereof, HS73 -Articles of iron or steel, HS84 -Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof, HS85 - Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles, HS87 -Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof and HS89 -Ships, boats and floating structures.

Among the economic sectors Russia has held comparative advantage in HS27 -Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes have demonstrated an 'absolute' comparative advantage in comparison with Korea. Meanwhile, Korea has demonstrated an 'absolute' comparative advantage on HS89 -Ships, boats and floating structures in a comparative analysis with Russia.

Gravity model was utilized to empirically determine the export patterns of Russia and Korea. The factors which will boost or impede the exports of two nations were estimated by applying the Panel data analysis (Pooled OLS regression, Fixed Effect (LSDV) regression and Random Effects (ECM) regression) model using Eviews8 software. The years from 1999 to 2014 (total 16-year-period) have been selected as the observation period. Each country's estimation composed of 30, 55 and 75 country sets. The *Hausman* test results of all country sets couldn't reject the null hypothesis which implies that Random effect (ECM) was an appropriate model for explaining the export determinants of Russia and Korea. Consequently, the author applied the results of Random Effects (ECM) along with the results of Pooled OLS and Fixed Effect (LSDV). The results of Random Effect were reported while Pooled OLS and Fixed Effect results were given for the sake of reference.

The explanatory variables for the estimations were selected on the basis of the previous gravity model researches and the export specificity of Russia and Korea. Russia's estimations composed of GDP, distance, GDP per capita of Russia and per capita GDP of its trading partner, the real exchange rate, oil price, common border and economic partnership. On the other hand, Korea's export determinants comprised the GDP, distance, GDP per capita of Korea, GDP per capita of Korea's trading partner, the real exchange rate, FDI and the APEC membership binary variable.

GDP and distance have showed significant positive and negative impacts respectively on both countries' exports. However, the p-value of distance was found to have negative but insignificant impact in Russia's 30 country set estimations.

The GDP per capita has presented different results for the pairs. In the case of Russia, the GDP per capita showed negative – insignificant (30 country set) and negative –significant impact (55 and 75 country sets) on Russia's exports. In the contrast, the GDP of Korea showed positive and significant effects in all country sets.

The GDP per capita of Russia's trading partner represented insignificant results in all country sets. Meanwhile, the GDP per capita of Korea's trading partner demonstrated a positive and significant impact at 1% (30 and 75 country sets) and 10% (55 country set) levels.

The real exchange rate was found to have an insignificant - negative (30 and 55) and an insignificant - positive (75) impact on Russia's exports. It infers that exchange rate cannot explain Russia's exports. In the meantime, a real exchange rate shows insignificant negative (30), significant positive (55) and insignificant positive (75) impact on Korea's exports. This positive sign of exchange rate of Korea implies that Korea's exports rely on its currency devaluation. Oil prices performed strong significant effect on Russia's exports. The results were assumed to be consistent with hypothesis that Russia's 70 % of export earnings has outcome from the sales of oil and oil products. Furthermore, obtaining mutual political and economic partnership in the same organizations such as CIS and APEC gives Russia more opportunity to extend its export volume. Korea also has the same tendency. If the importing nation is a member of APEC, Korea's exports will increase towards that country.

FDI factor has showed significant positive effects on Korea's exports which is assumed according to the classic FDI theories and prior researches. FDI as one of the driving tools for encouraging of the exports has performed robust significance at 1% (30 and 75 country set) and 5% levels (55 country set)

Sharing common borders represented positive and significant impact on Russia's export in all country sets. However, border binary variable was skipped in Korea's estimations due to its geographical location. The coefficients of Russia have performed statistically significant effect at 10 % (30 country set) and 5% (55 and 75 country set) level.

On the other hand, R-squared for all country set regressions of both countries showed that more than 60 % of fluctuations in exports can be explained by the variables jointly in the equations of all country set analyses. Further, the F-statistics p-value for all six regressions emerged 0.000000 which intends that all of taken explanatory variables can significantly impact on the exports of Russia and Korea jointly.

2. Policy recommendations

The results of RCA and gravity model demonstrated that Russia's international competitiveness

displays only in the sectors of natural resources including mineral fuels (oil and gas), iron and aluminum. In fact, Russia's exports mainly are composed of the sales of natural resources such as oil, gas, wood, copper, iron, metals, coal briquettes. The exports of these natural resources caused GDP growth of the country with $2.07 trillion worth in 2013. However, a strong reliance of Russia on the natural resources may cause the Dutch disease which leads to the less-diversified economic framework and increasing of unemployed population. Moreover, natural resources are dependent on the global market prices. Therefore, now, the Russian economy is experiencing a economic shortage due to the sharp decrease of oil price in the world since 2014 Therefore, Russia needs to reduce its reliance on the natural recourse earnings and diversify the economy. In 2009, the Russian President Dmitri Medvedev published an article so called "Go Russia". Medvedev emphasized an importance of decreasing a dependence on the economy based on the natural resources and diversify the economic sectors of the country. As Medvedev stated in the article, Russia has to start an efficient use of energy resources, and increase producing the nuclear technologies, technologies in the information and advanced medical technologies, pharmaceuticals and space technologies. The authorities should take all possible measures to avoid the converging Dutch disease.

Gravity model estimations show that bigger GDP size of Russia and its trading partner encourages the export of Russia and Korea. Therefore, Russia needs to enhance political and economic ties with higher GDP economies.

As border implies less transport costs in terms of the trade, Russia should improve the bilateral relations with its sixteen neighboring countries.

Further, Russia should strengthen the relations with the co-member states of the CIS or APEC. Having a membership in the economic allies implies reducing or removing the tariff and non-tariff barriers. Therefore, Russia should improve its bilateral relations with the member-states of above mentioned organizations in aims to boost its trades. Further, Russia also ought to actively participate in the other global economic organizations. It could be very helpful for Russia's economy growth.

RCA indices estimations have concluded that Korea's exports are based on the human-capital and high-technology intensive products. The indices represented Korea's advantage in the sectors such as fish products, plastics, articles of iron and steel, nuclear reactors and machinery,

electronic equipment, vehicles and ships. Therefore, Korea should keep investing in the manufacturing industry. Moreover, gravity model estimations revealed that a product GDP of Korea and its trading partner positively impacted on Korea's exports. As GDP has a positive effect, Korea should consider on improving the economic relations with large GDP partners and seek new markets in aims to boost domestic economic growth.

Hence, Korean government should to present more preferences for the foreign investors. Because, FDI can stimulate Korea's economic development and the facilities and equipment provided by foreign investors can increase Korea's export competitiveness.

Furthermore, the APEC membership broadens Korea's export opportunities due to the removal or reduction of the tariff and non-tariff barriers. Therefore, Korea has to improve its relations with the APEC member-states.

The empirical results of this research are significant for a trade policy and bilateral trade engagement so as to ensure Russia exploits its economic potential by employing the profits of globalization for the welfare of its population. Moreover, this study will contribute to the existing literature on the RCA and gravity model of Russia and Korea. In addition, this study will be a significant literature for the researchers who investigate the trade relations between Russia and Korea.

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Appendix

Table A: Russia-Korea trade relations (billion USD)

Year	Russia's export to Korea	Russia's import from Korea	Overall trade volume of Russia with Korea	Growth rate (%)
1992	0.56	0.48	1.04	-
1993	0.92	0.67	1.59	34.59
1994	1.22	0.96	2.18	27.06
1995	1.81	1.45	3.26	33.12
1996	1.86	1.93	3.79	13.98
1997	1.57	1.76	3.33	-13.81
1998	0.98	1.05	2.03	-64.03
1999	1.55	0.63	2.18	6.88
2000	2.05	0.78	2.83	22.96
2001	1.98	0.93	2.91	2.74
2002	2.21	1.06	3.27	11.00
2003	2.58	1.61	4.19	21.95
2004	3.66	2.37	6.03	30.51
2005	3.91	3.86	7.77	22.39
2006	4.50	5.12	9.62	19.23
2007	6.92	8.08	15.00	35.86
2008	8.30	9.76	18.06	16.94
2009	5.77	4.12	9.89	-82.60
2010	9.81	7.74	17.55	43.64
2011	10.83	10.33	21.16	17.06
2012	11.33	11.09	22.42	5.61
2013	11.49	11.12	22.61	0.84
2014	15.67	10.12	25.79	12.33
Total	111.48	97.02	208.50	--