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# Common Obstacles in Conducting Foreign Trade in Mongolia: Suggestions and Solutions

OTGONSAIKHAN Nyamdaa\*

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DOLJIN Mandshir\*\*\*

## Abstract

*In order to form an attractive business environment, it is crucial to take courses of action immediately after carefully observing the business environment and conducting a solid analysis. The main purpose of this research study is to indicate the key obstacles and their causes in conducting foreign trade in Mongolia, as well as to determine the courses of action in order to develop the sector. Within the framework of the goal of this research, the survey results have been grouped and analyzed in three groups: 1) within the territory of Mongolia; 2) within the territory of trade partner countries; and 3) difficulties that occur in the operation of international trading companies.*

Key words: foreign trade, customs duties, export/import documents, border wait-time, transportation

JEL classification code: F10, F13, F14

## 1. Background

### Research background

Although foreign trade has taken up an important position in the social and economic development of Mongolia, on the other hand the dependency solely on exports of mining products is greatly increasing the level of risk. Therefore, the Government of Mongolia has paid special attention to supporting the export of non-mining products, such as varying the economic structure by promoting non-mining sectors, establishing partnerships in foreign markets, as well as creating a flow of exports.

However, there is still an urgency for supporting business owners through developing and implementing a proper set of policies which are based on solid research by the government in order to form an attractive environment for conducting business. This research study is aimed at determining the common obstacles for international trade for companies in the non-mining sector, evaluating the implementation of the legal and policy documents of the government, and identifying the courses of action to be taken in the future.

### Research methodology and data processing

A questionnaire method was applied in conducting a survey throughout the nation, including the 21 provinces (*aimags*) of Mongolia and the 9 districts (*duuregs*) of the city of Ulaanbaatar. Survey sampling consisted of 2,100 entities in total, of which there were 75 entities each from the 5 provinces in the Western region, 70 entities each from the 9 provinces in the Eastern and Khangai regions, and 65 entities each from the 9 districts in the city of Ulaanbaatar. Data collected from 1,573 entities which met the requirements were processed through Stata.

1,349 entities responded on investment type, of which 96.4% were domestically invested entities.

70% of entities were established prior to the year 2010, with the other 30% after that year; 80% of entities were small and medium-sized enterprises (SMEs). As for annual sales revenue, 43% of the participants had lower than 100 million togrogs, 34% had 101–400 million togrogs, 16% had 401 million to 1 billion togrogs, and the remaining 7% of the participants had more than 1 billion togrogs.

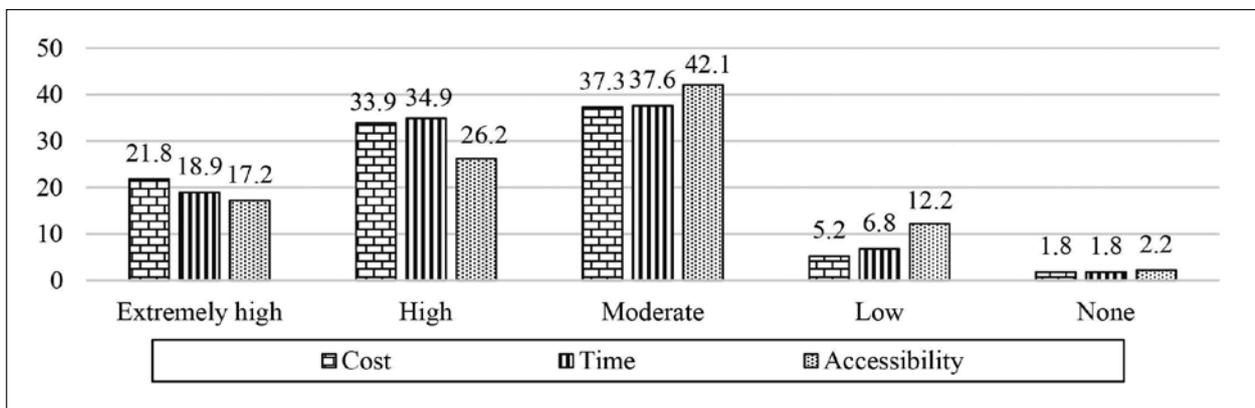
## 2. Common Obstacles in Conducting Foreign Trade within Mongolia

When participants were asked about the common obstacles for conducting foreign trade within Mongolia, they named domestic transportation, customs duties, time and fees spent collecting export/import documents, and additional costs originating from waiting at the border and customs (border wait-time). Therefore, we have looked into these difficulties by comparing the city of Ulaanbaatar and the four regions of Mongolia with the median for the country.

### 2.1 Domestic transportation

Around 2% of the survey participants responded that they face no problems related to domestic transportation, whereas the remaining 98% had difficulties related to transportation costs and time in domestic transportation.

**Figure 1: Obstacles in Domestic Transportation (%)**



Source: Author's calculations using the results of the study

As having the most negative influence on conducting foreign trade, 55.8% of the survey participants gave a response of transportation expenses, 53.8% transportation time, and 43.5% the inclusiveness of transportation means. Hence, cultivating logistics for domestic transportation can be seen as an essential matter.

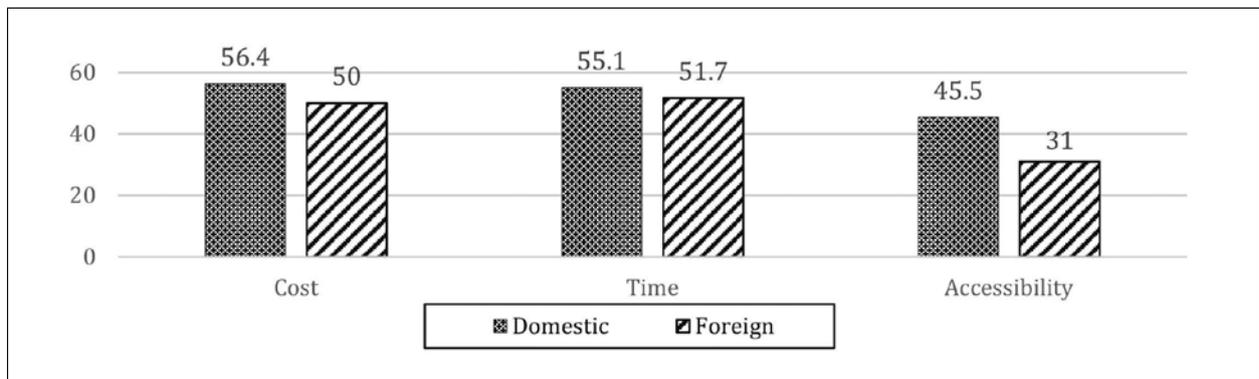
The following results were generated when comparing the difficulties in carrying out domestic transportation for the country's median, the four regions of Mongolia, and the city of Ulaanbaatar.

**Table 1: Obstacles to Domestic Transportation (by region, %)**

Difficulty	Country Median	Western Region	Khangai Region	Central Region	Eastern Region	Ulaanbaatar
Cost	55.8	64.2	62.7	49.3	47.1	51.8
Time	53.8	60.8	58.1	45.2	38.8	54.8
Accessibility	43.5	50.6	46.3	35.2	19.7	47.1

Source: Author's calculations using the results of the study

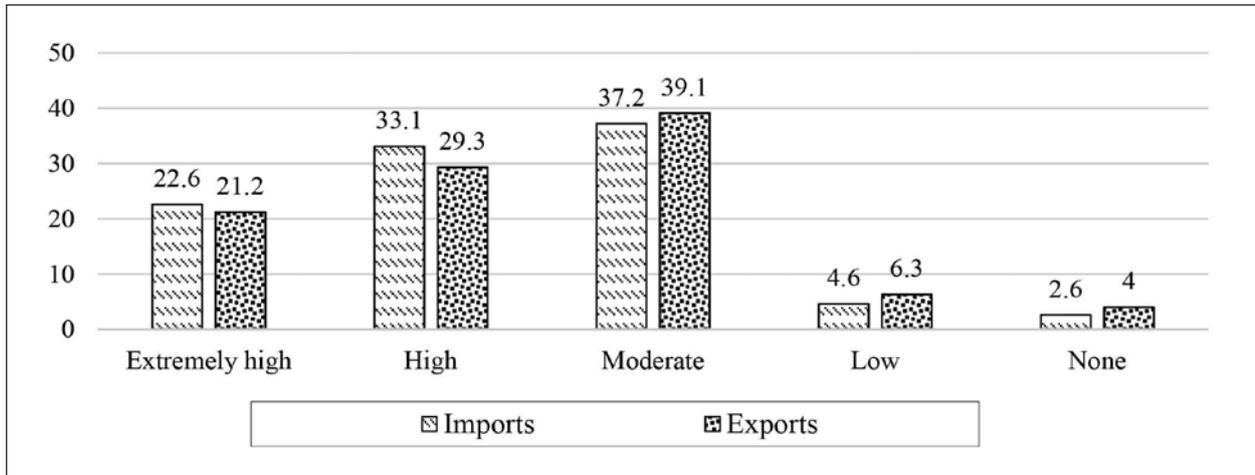
Looking at the content of Table 1, transportation costs cause the highest level of difficulty to international trade companies, and for isolated areas, the Western Region has the worst situation, followed by the Khangai [mountain] Region. Therefore, transportation infrastructure in these isolated areas needs to be cultivated with urgency. As for foreign and domestically invested entities, these obstacles may be displayed in the following way.

**Figure 2: Obstacles in Domestic Transportation (by investment type of entity, %)**

Source: Author's calculations using the results of the study

## 2.2 Customs duties

One of the biggest challenges for foreign traders are customs duties, for which it was found in the survey that 7.2% of the participants had responded that import duties don't affect them in any way, whereas 37% of the participants responded medium effects, and 55.7% of the participants responded that import duties greatly affect their business.

**Figure 3: Difficulty Level Caused by Customs Duties (%)**

Source: Author's calculations using the results of the study

Although Mongolia has some of the lowest import duties in Asia, that they still trouble business owners may suggest that the role of regulations in customs tariffs requires improvement. Therefore, we have investigated deeply the Government of Mongolia's policy toward the role of regulations on customs tariffs.

Mongolia developed the Comprehensive National Development Strategy document (CNDS: 2008–2021) in 2008, based on the Millennium Development Goals, which indicated: “Supporting small and medium manufacturing enterprises with an export orientation through policy on customs tariffs”; “Supporting some import substitution manufactures through policy on customs tariffs”; and “Supporting import of advanced-technology precision tools and equipment through policy on customs tariffs”. Hence the document played an essential role in the regulation of customs tariffs.

Based on this comprehensive strategy, the Government of Mongolia adopted a program called “Mongolian Industrialization 2009–2016” in 2009. The program indicated issues including: developing a legal basis to levy customs duties after a certain amount of time (once the operation of manufacturing becomes consistent) for final products and goods that are manufactured by using raw materials that can't be substituted, or a substitute raw material itself; and exempting the customs tariffs on the equipment required for core technology. However, dozens of business owners believed that the implementation of this program was insufficient.

The National Security Concept of Mongolia was ratified by the State Great Khural in July 2010, and states that: “Losses on foreign trade will be reduced, and tariff and non-tariff barriers will be utilized in a proper way in order to promote domestic industry”.

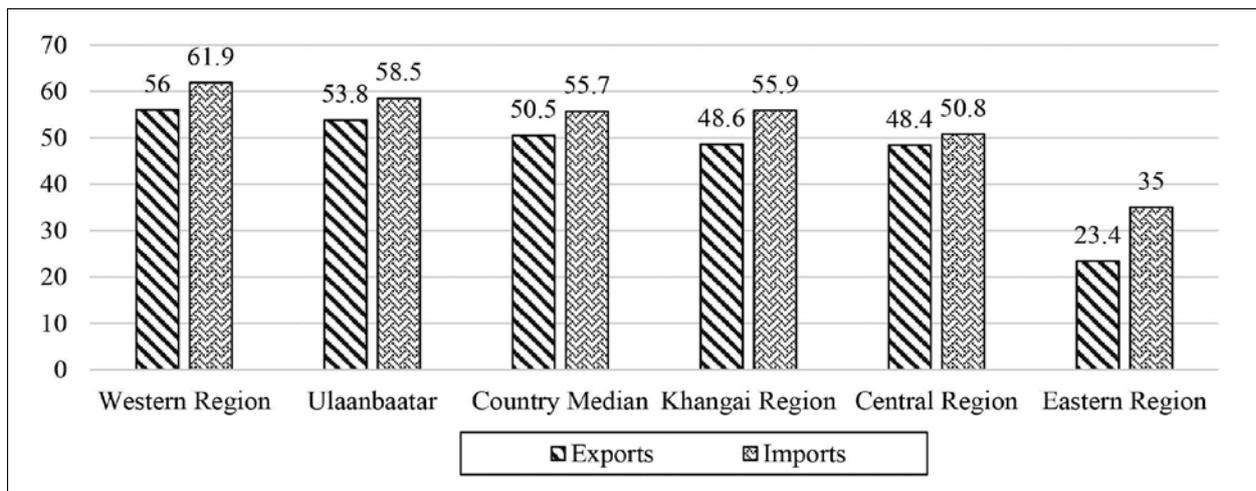
Within the implementation of the concept mentioned above, the Law on Customs Tariffs and Duties was revised and passed in 2008, and amendments were also made on more than ten occasions between 2012 and 2017. It is safe to say that these amendments were aimed toward improving the role for regulating customs tariffs to support domestic industry and investment.

The Law on Supporting Manufacturing was adopted in 2015, with certain amendments to related laws. For instance, an amendment of the Law on Customs Tariffs and Duties was made in December 2015, which included the tax exemption of equipment for research and the renewable energy industry, including spare parts, and accessories.

Even though some hefty policy documents were developed, with a purpose of improving the role of regulating customs tariffs, several amendments have been applied to the Law on Customs Tariffs and Duties in recent years, as this research shows, and those policy alterations and improvements do not have any positive impact on business owners.

In order to determine which region is most troubled by customs duties, survey responses of the most numerous difficulties were collected and analyzed by comparing the country median to the four regions of Mongolia and the city of Ulaanbaatar, which is shown in Figure 4.

**Figure 4: Difficulties Derived from Customs Duties (by region, %)**



Source: Author's calculations using the results of the study

Figure 4 shows that more than 50% in every region, excluding the Eastern Region, identify import duties as the more troublesome.

Several amendments, as follows, have been made since 2015 to the Annex to the State Great Khural's Resolution No. 27 of 1999,<sup>1</sup> which stipulated increased customs tariffs for products capable of being manufactured domestically. Therefore, the standard rate of 5% import duty for some products was pushed up to the WTO bound-tariff level,<sup>2</sup> in accordance with the World Trade Organization rules, which may have impacted importers.

- Customs tariff rates on meat products, a variety of meats, honey, canned products, cement, and trolleybuses were increased in August 2015.<sup>3</sup>
- Beginning on 1 March 2016, customs tariff rates on imported vodka and wine were raised to 40% and 20%, respectively.<sup>4</sup> On top of this, in order to fulfill the obligations Mongolia proposed to the WTO, and to implement the Economic Partnership Agreement between Mongolia and Japan, an amendment to the Excise Tax Law was made which equalized the duty for imported and domestic alcoholic beverages.<sup>5</sup>
- Beginning on 1 May 2016, the customs tariff rates were increased for over 100 products which have the potential for domestic manufacture.<sup>6</sup>

Changes to customs tariffs have both positive and negative impacts on society and the economy. The results of this study show that when carrying out alterations to customs tariffs, it

is crucial to implement them after accounting for the impact on domestic industry, consumption, and state revenue.

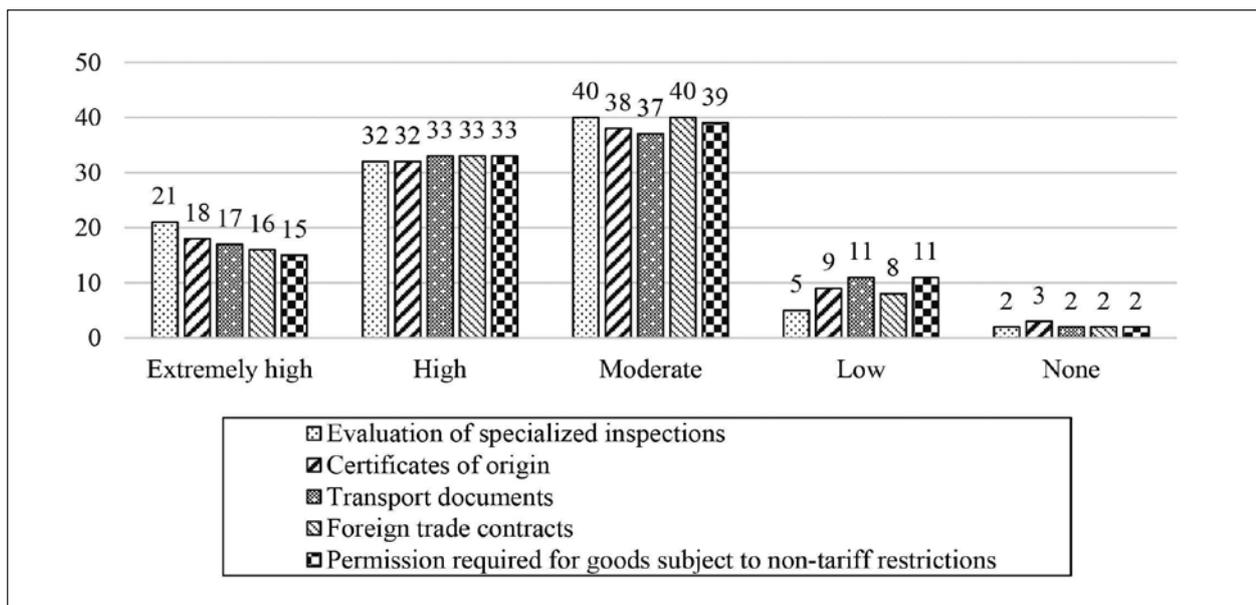
As for export duties, those that are imposed on lumber, timber and logs according to the law concerning customs duties on some export commodities cause business owners the same difficulties as import duties. In particular, more than 50% of foreign traders in the Western Region and Ulaanbaatar have responded that export duties are one of their biggest obstacles.

### 2.3 Difficulties in obtaining export/import documents

Prior to 2013, conducting international trade used to require more than ten documents, and take around a month. In order to reduce this problem, as well as to soften international trading procedures, an amendment to the customs law was applied in 2012, which changed the required documents to four, including foreign trade contracts or invoices, transport documents, permissions, licenses required for the goods subject to non-tariff restrictions, and evaluation for certain goods specified by the law issued by the agency for specialized inspections (Inspection Certificate, Health Certificate, Phytosanitary Certificate, and Product Testing Certificate). Foreign trade contracts or invoices, and transport documents are the mandatory documents. In addition, in accordance with the Economic Partnership Agreement with Japan, an amendment to the customs law was made in 2015, which states that “According to Mongolian law, it is necessary to apply for a certificate of origin if it is required by a legal entity”.

According to survey participants when they were asked whether they face any obstacles related to obtaining documents, 53% of the participants responded with the evaluation of specialized inspections, while 50% of the participants responded with certificates of origin and transport documents, 49% responded with foreign trade contracts, and 48% responded that licenses required for goods subject to non-tariff restriction were considered as highly difficult issues. (Figure 5).

**Figure 5: Obstacles in Obtaining Export/Import Documents (%)**



Source: Author's calculations using the results of the study

Table 2 shows the summary for responses of “extremely high” and “high” in a questionnaire on which region has the most problems with obtaining export/import documents, comparing the country median and regions.

**Table 2: Difficulties in Obtaining Export/Import Documents (by region, %)**

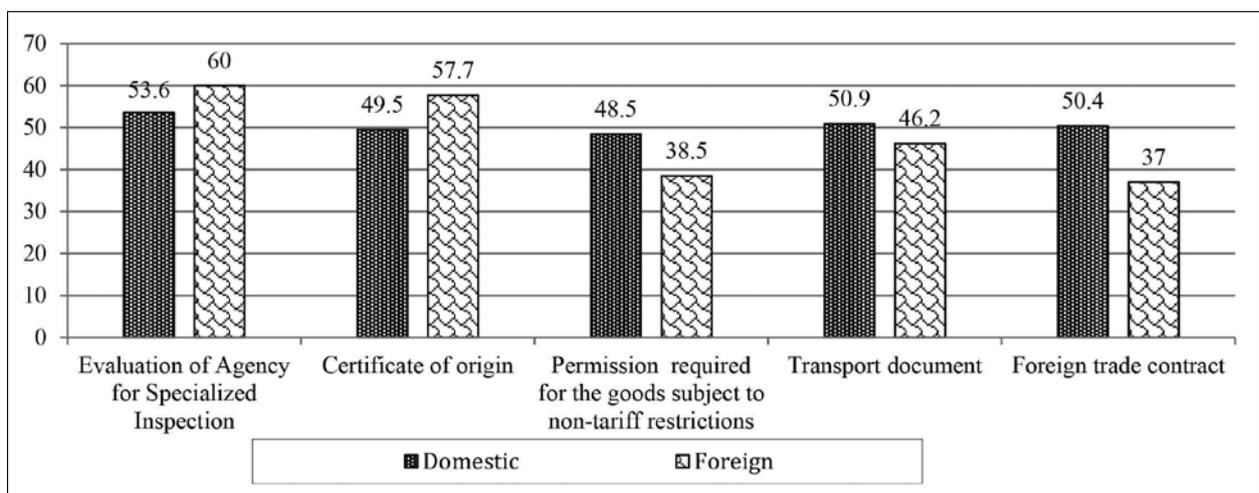
Region	Evaluation of Agency for Specialized Inspections	Certificates of origin	Permission required for goods subject to non-tariff restrictions	Transport documents	Foreign trade contracts
Western Region	<b>62</b>	<b>56</b>	52	<b>58</b>	<b>53</b>
Ulaanbaatar	57	46	46	47	48
<b>Country Median</b>	<b>53</b>	<b>50</b>	<b>48</b>	<b>50</b>	<b>49</b>
Khangai Region	44	50	46	49	50
Central Region	41	47	<b>53</b>	45	52
Eastern Region	38	52	33	56	33

Source: Author’s calculations using the results of the study

According to Table 2, international traders in the Western Region believe the excessive amount of time spent obtaining documents is one of their biggest challenges. In particular, it should be noted that 62% of the survey participants responded that the evaluation of specialized inspections causes them difficulty, and this was the worst in the nation as a whole.

When we take the investment type and characteristics into consideration regarding the time spent obtaining export/import documents, the certificates of origin and evaluation of specialized inspections are the most troublesome factors for foreign-invested entities, whereas evaluation of specialized inspections causes the most difficulty for domestically-invested entities.

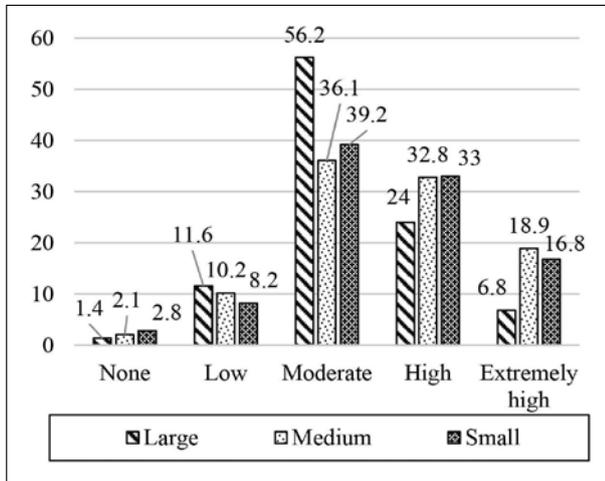
**Figure 6: Difficulties in Obtaining Export/Import Documents (by entity investment type, %)**



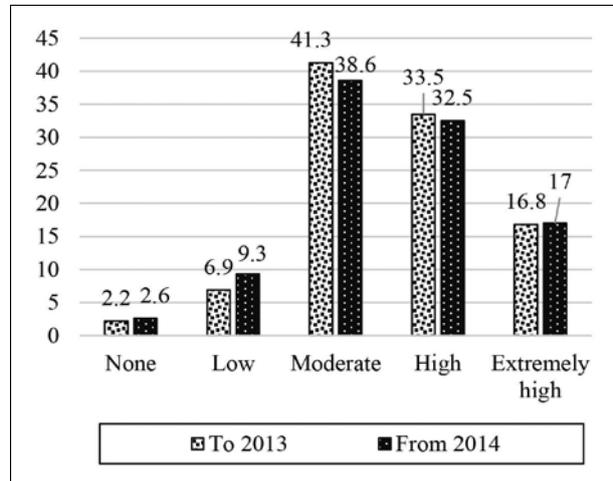
Source: Author’s calculations using the results of the study

Figures 7 and 8 show the differences among foreign traders in obtaining export/import documents regarding their company size and experience.

**Figure 7: Difficulties in Obtaining Export/Import Documents (by entity size, %)**



**Figure 8: Difficulties in Obtaining Export/Import Documents (by year established, %)**



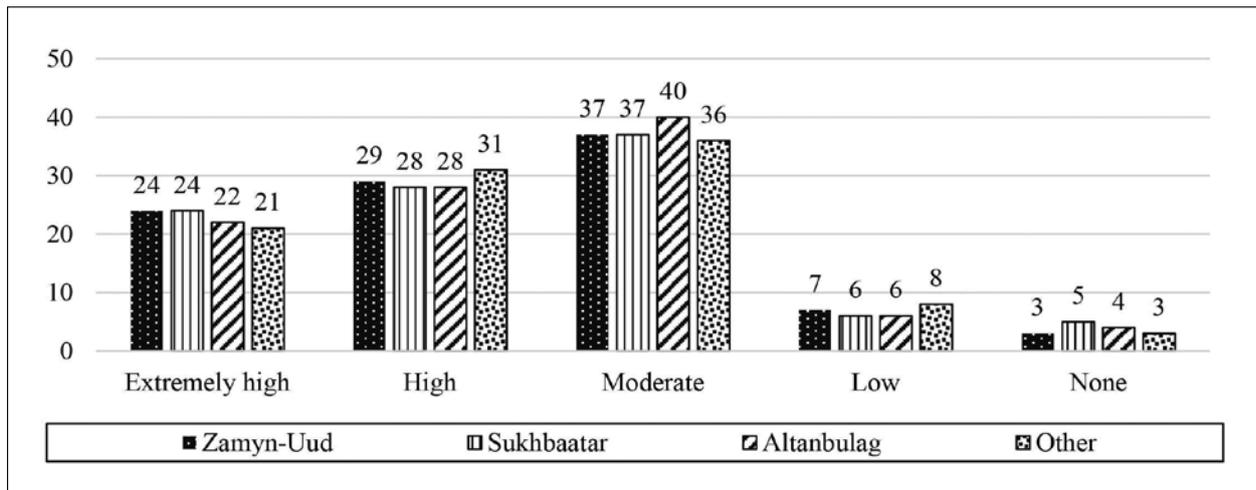
Source: Author's calculations using the results of the study

56.2% of large-sized entities responded that there is moderate difficulty in obtaining documents, whereas 49.8% of small and 51.7% of medium-sized entities responded that obtaining documents is the most problematic.

#### 2.4 Occurrence of additional costs due to extensive time spent at customs and borders

Quality, time and simplification of customs and border services (customs, border control, specialized inspections, restrictions, prohibitions, etc.) are significant indicators of the logistics performance index. Mongolia was ranked 100th at 2.39 points in 2016 according to this index, and had moved up 32 places compared to 2014 (132th place, 2.2 points).

Therefore, we investigated whether there is additional expense due to the waiting time at customs and borders when conducting foreign trade.

**Figure 9: Occurrence of additional costs due to waiting time at customs and borders (%)**

Source: Author's calculations using the results of the study

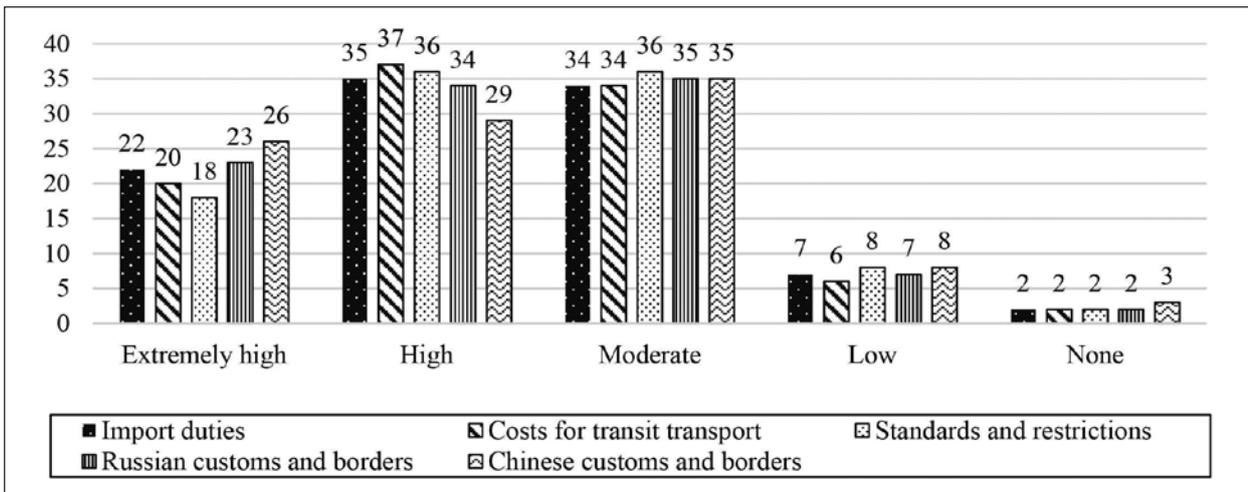
Figure 9 shows that 3–5% of international traders responded that they face no problem at customs and borders, whereas over 50% of the participants responded that they encounter difficulties due to losing time at customs and borders, and resultant additional costs. Hence, it is fair to assume that there is a lack of integrated regulation for customs and borders.

When respondents were asked whether they have difficulties related to the time spent obtaining export/import documents, they responded that the evaluation of specialized inspections takes an excessive amount of time in processing documents, and they suggested that evaluation of specialized inspections should be carried out without troubling other business owners. In addition, it should be noted that the government needs to take a set of actions in order to improve the capacity of the borders, control equipment and laboratories.

### 3. Common Obstacles within the Territory of Trade Partner Countries

We have looked into the common obstacles within the territory of trade partner countries, or in other words, the common difficulties business owners face after crossing of the Mongolian border. Participants named “import duties”, “standards and restrictions”, “transit costs”, and “additional costs due to the extensive amount of time spent at customs and borders” as the most problematic issues, which are shown in Figure 10.

**Figure 10: Common Obstacles within the Territory of Foreign Partner Countries (%)**



Source: Author’s calculations using the results of the study

Around 2% of the survey participants responded that they have no issues within the territory of foreign partner countries, whereas 54–57% of the participants responded that they experience problems to some degree.

According to the policy on customs tariffs of partner countries, there is a distinct tariff depending on the product manufactured. Although the customs tariffs for Mongolia’s main export products, such as raw material and minerals, are generally zero or very low, that the customs duties for non-mining products with added value are relatively high is causing some degree of difficulty in exports. Therefore, it is important to consider the beneficial factors of a product when Mongolia signs a preferential or free trade agreement with its main trading partner countries.

Transit transport is one of the biggest challenges for conducting foreign trade, thus resulting in an increase of costs and a decrease in profit in a country like Mongolia, which is landlocked and located between two major nations. Therefore, it is critical to reach agreement with these neighboring countries on reducing the rates for transit transport, and on reducing the transportation costs via reducing the volume of goods by processing raw materials and minerals.

Wool, cashmere, rawhide, leather, and food products have the highest potential for export among the non-mining export goods of Mongolia. Concerning these products, not only customs tariffs, but also the standards, sanitary and hygiene procedures, and restriction requirements of the importing countries cause a substantial amount of difficulty. Therefore, a systematic course of action needs to be urgently taken, such as establishing an integrated system for raw material preparation, providing a solution to transportation logistics, and introducing quality control and the standards of other countries.

When the survey participants were asked about the obstacles at the customs and borders of the neighboring countries, 57% responded that they encounter a certain level of difficulty at Russian customs and borders, and 55% responded that they run into trouble at Chinese customs and borders.

Evaluation of common obstacles in the territory of trade partner countries has been made by comparison with the country median, as shown in Table 3.

**Table 3: Common Obstacles within the Territory of Trade Partner Countries (by region, %)**

Region	Import Duties	Standards and Restrictions	Transit Costs	Russian Customs and Borders	Chinese Customs and Borders
Western Region	63.8	61.1	60.6	58.4	59.3
Khangai Region	57.4	48.4	50	48.8	48.3
<b>Country Median</b>	<b>57.1</b>	<b>54.5</b>	<b>57.3</b>	<b>56.2</b>	<b>54.5</b>
Ulaanbaatar	56.6	57.8	57.3	58.7	54.7
Eastern Region	52.1	26.5	66.7	41.2	46.5
Central Region	49.5	56.6	57	63.8	57

Source: Author's calculations using the results of the study

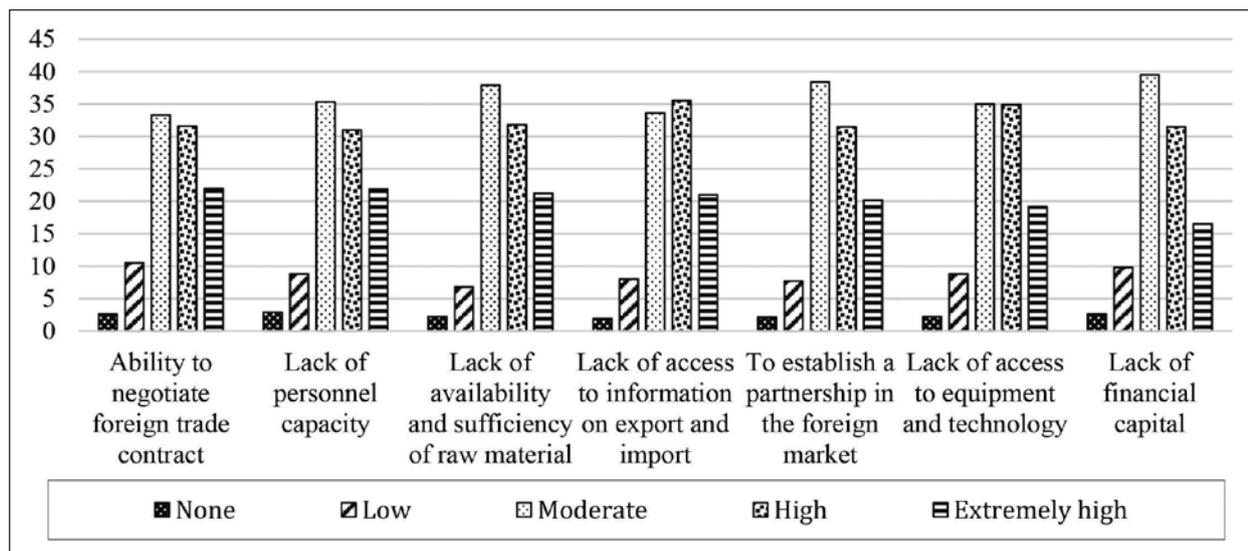
Regarding common obstacles within the territory of trade partner countries, the Western Region has difficulties with import duties, standards and restrictions, and Chinese customs and borders, whereas the Eastern Region has difficulties with the cost of transit transport, and the Central Region had trouble at Russian customs and borders. In order to overcome these obstacles, we suggest signing a memorandum or agreement of cooperation with the corresponding organizations of the neighboring countries, and to co-monitor implementation.

#### 4. Difficulties in the Operational Activities of Foreign-Trading Entities

A company's capacity building plays a crucial role in conducting foreign trade, and therefore we have evaluated the common difficulties they encounter. The most troublesome factors are: establishing partnerships in foreign markets; signing foreign trade contracts; the lack of availability of skilled employees; accessible information on exports and imports; the lack of financial capital; the lack and sufficiency of raw materials; and the lack of access to equipment and technology.

According to Figure 11, 2 to 3% of the survey participants responded that they face no difficulties in conducting foreign trade, whereas 50% replied otherwise. Moreover, 57% responded that they face a lack of access to information on exports and imports. Therefore, it is essential to introduce the best practices of top-notch export/import management companies from foreign countries, such as Japan, which have expertise in certain sectors, products, and markets. It is also important to provide foreign-trading entities with technical consultancy services and substantial information.

Moreover, issues including lack of experts, and inability to establish trade partners in the foreign market and to negotiate trade contracts are crucial to every entity. Lack of personnel capacity is considered the most troublesome factor for medium-sized enterprises (60.4%) and for small entities (55.6%), whereas processing foreign trade contracts is a major issue for large entities (50%); on the average, however, establishing trade partners in foreign markets is the most difficult obstacle for all entities.

**Figure 11: Common Obstacles in the Operational Activities of Foreign-Trading Entities (%)**

Source: Author's calculations using the results of the study

A foreign trade contract is one of the main documents required at customs. The profits or losses of foreign-trading companies depend on how well the contract was negotiated. Some entities, however, attempt to fabricate a contract in order to reduce customs tariffs. Contracts have no legal power to enforce customs declarations; in other words, if the main required documents don't meet the requirements, importers will be turned down at the border, which causes a certain level of difficulty for foreign trading entities.

When respondents were asked via an open question about the initiatives and activities the government should implement in order to support business owners in accessing international markets, 27.4% of survey participants responded: support of domestic industry, including implementing special policy to support small and medium-sized manufacturers and companies in local areas, and protection from imported goods; 25.2% responded: implementing policy on tax incentives, reducing customs duties and easing inspections at border controls. 21.9% of the respondents suggested implementing strategy supporting exports, including exemption of fees for research and investigation of exported goods, reducing the number of required documents, and specifically supporting the export of agricultural products. 20% of the respondents suggested that it is crucial to develop foreign relationships, concluding trade and business contracts (with the involvement of the government and guaranteed by the state), supporting international cooperation, and reaching agreement with neighboring countries on reducing customs tariffs.

## Conclusions

- Over 50% of the survey participants responded that the expenses and time for transportation are the main problem factors, in which the Western Region had the worst result among the regions, followed by the Khangai Region. This shows that there is an urgent need for developing the logistics for domestic transportation in Mongolia.

- 56% of the survey participants responded that the import duties of Mongolia cause them trouble due to a lack of implementation of policy on customs tariffs and of its effectiveness.
- Although the Government of Mongolia has taken a certain amount of action on reducing the number of documents related to international trade, 50% of the survey participants responded that they encounter problems obtaining documents. In addition, they specified that there is a need for action to be taken, such as speeding up the process of obtaining documents, introducing a single-window system, and computerization.
- 49% of the respondents replied that foreign trade contracts are a problem. The main cause is that no contract would be carried out for a low product amount and value, and even in some cases contracts signed do not meet requirements.
- Over 50% of the survey participants responded that additional costs due to spending an excessive amount of time at customs and borders is one of their greatest obstacles. Therefore, the government needs to take courses of action to improve the capacity of customs and borders, control equipment, and laboratories.
- 54–57% of total respondents answered that the import duties of the partner country, restrictions and prohibitions, and the cost of transit transport were the most problematic when exporting goods. Hence, it is essential to agree upon a memorandum or agreement of cooperation with the corresponding organizations of the neighboring countries, and to co-monitor implementation.
- A company's capacity plays a crucial role in conducting foreign trade. 60% of the survey participants (mostly entities in the countryside) responded that they lack experts in certain sectors, products, and markets, and this leads to complications in accessing the foreign market, due to the absence of expert information, analysis, and assessment.

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- <sup>1</sup> “Adopting Customs Duty Rates on Import Commodities” on 3 June 1999.
- <sup>2</sup> Bound tariffs are specific commitments made by individual WTO member governments. The bound tariff is the maximum MFN tariff level for a given commodity line.
- <sup>3</sup> State Great Khural Resolution No. 332 of 17 August 2015.
- <sup>4</sup> State Great Khural Resolution No. 17 of 4 February 2016.
- <sup>5</sup> Excise Tax Law of Mongolia, 2006.
- <sup>6</sup> State Great Khural Resolution No. 185 of 28 March 2016.

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# The Transportation and Logistics Environment of the Eastern Region of Russia: A Comparative Evaluation with the Western Region Based on Microdata

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## Abstract

*In this paper, the author aims to comprehensively evaluate the transportation and logistics environment of the eastern region of Russia via making comparison with western Russia, based on microdata obtained via a large-scale interview survey of firms. From the simple aggregation of the response results, it can be understood that the firms of eastern Russia strongly demand an improvement in the environment in various aspects, not only for hard infrastructure, but also soft infrastructure. Most of the difference between east and west in the strength of this demand is explained by the external conditions surrounding individual firms and the special characteristics of the firms themselves. As a conclusion it can be said that the transport and logistics environment of eastern Russia is inferior in comparison with western Russia.*

Key words: Logistics environment, Transport service, Infrastructure development, Railway, Russian Far East

JEL classification codes: L91, O18, R40

## 1. Introduction

Far from the economic center of the country and with a sparse spatial distribution of population and corporate activity, the overcoming of “distance” is a serious economic problem for the Russian Far East. In that light, the securing of a transport and logistics environment centered on transportation infrastructure is considered a major life-or-death economic issue by many firms located in the Far Eastern region.

Despite being so important, the Russian Far East is still a region lagging behind in the development of transportation infrastructure. In the “Strategy for the Socio-Economic Development of the Far East and Zabaykalye for the Period up to 2025” (henceforward “The Far East and Zabaykalye Development Strategy”) which the Government of Russia adopted in 2009, it was pointed out that the Russian Far East is a disadvantaged region, and in particular the development level of transportation and electricity infrastructure is low (Government of Russia, 2009).

Meanwhile, in the Far East there are also infrastructure construction projects whose feasibility is considered doubtful. For example, within the government formulated “Strategy for Developing Rail Transport in the Russian Federation up to 2030”, a project was raised of constructing a new 1,866-km line over a practically uninhabited plain with only a sprinkling of settlements from the city of Yakutsk (Sakha Republic) to the city of Magadan (Magadan Oblast) (Government of Russia, 2008). If they proceed with infrastructure development via political considerations alone, then it will lead to wasteful spending increasing.

Zooming out a little, it is not the case that the transport and logistics environment for firms has been stipulated by hard transportation infrastructure alone. It has also been stipulated from the soft perspectives of the content of legal systems including transportation fee regimes, transport safety regulations, and border-crossing procedures, as well as the efficiency of their

implementation by the respective institutions, and the private-sector firms offering transport services. Even if a large amount of infrastructure investment is not undertaken, it is possible to improve the transport and logistics environment.

Taking such societal demands into consideration, this paper takes as its aim the comprehensive evaluation of the problem of the transport and logistics environment of the Russian Far East, based on the demands and activities of firms. Specifically, it aims to elucidate what kind of improvement in the environment the managements of firms want, and how they are attempting the resolution of the problems.

To that end, this paper will use the results of a large-scale interview survey (henceforward referred to as the “ERINA Survey”) which the Economic Research Institute for Northeast Asia (ERINA) undertook in Russia in September–December 2015 aimed at the managements and senior managers of firms.<sup>1</sup> The basic objective of this survey, in order to elucidate the potential for the economic development of the Russian Far East, is to evaluate the organization of firms and various aspects of company activities in the region via a comparison with European Russia. The target regions in the ERINA Survey were eight federal subjects of the Russian Federation from eastern Russia and nine from western Russia (Table 1). The target regions of the survey in the east and west are regions adjoining the borders with the Asia-Pacific and Europe, respectively. The target regions for the survey in the east are among the target regions of the Far East and Zabaykalye Development Strategy, and are along the Trans-Siberian Railway and the Baikal-Amur Mainline (BAM) with their branch lines. These railways connect to the ports on the Sea of Japan. With the exception of the Sakha Republic, seven of the federal subjects border on one or both of China and Mongolia. The target regions for the survey in the west were set in order to undertake a comparison with the east, and nine federal subjects were selected so as to be almost the same scale as the east in terms of population, gross regional production, and number of firms. While the focus is on the Northwestern Federal District which adjoins the Barents and Baltic Seas, as a result of taking geographical connectedness into consideration, it includes part of the Central Federal District. On the other hand, taking into consideration the risk of the city of Saint Petersburg—an international hub of higher level—causing a bias in the survey results, it was excluded from the survey region. As a result, the area of the eastern region grows to more than four times that of the western region.

In line with the basic objective of the survey, it included wide-ranging questions on firms’ organization and operations. In order to exclude small firms with weak corporate governance, the target firms were limited to joint-stock companies and limited liability companies with 50 or more employees. The criteria for selection of target firms in terms of industrial classification was whether firms in a certain industry would undertake economic activity beyond their urban areas so to be able to ascertain the impact from differences in the spatial characteristics of the two regions (the density of population and economic activity). In the next step, the number of firms by sector was assigned so as to reflect the regional industrial structure. As a result, valid responses from 358 firms in the east and 384 firms in the west, for a total of 742, were obtained with a composition of business sectors as shown in Table 2.

Below, first Section 2 introduces several indicators and prior analyses showing the inadequacies in the transport and logistics environment of the Russian Far East. Then Section 3 shows the picture ascertained from the aggregate results of the ERINA Survey. In Section 4, using a multiple regression analysis method, the author undertakes an analysis of the factors impacting the evaluation at a time when the managements of firms are demanding improvement

Table 1: Basic Economic Indicators for the Target Regions of the ERINA Survey

	Area <sup>1</sup>		Population <sup>1</sup>		Population Density <sup>1</sup> pop. / sq. km	Gross Regional Product (GRP) <sup>2</sup>		GRP per capita <sup>2</sup> Thous. Ruble	Number of Firms	
	Thous. sq. km	Share (%)	Thous.	Share (%)		Mln. Ruble	Share (%)		Number	Share (%)
Total	7,380	100.0	18,731	100.0	2.5	7,339	100.0	391	523,536	100.0
Eastern Region	5,992	81.2	9,673	51.6	1.6	3,826	52.1	395	269,932	51.6
Republic of Buryatia	351	4.8	982	5.2	2.8	204	2.8	208	20,933	4.0
Sakha Republic	3,084	41.8	960	5.1	0.3	750	10.2	783	27,178	5.2
Khabarovsk Krai	788	10.7	1,335	7.1	1.7	572	7.8	428	46,136	8.8
Primorsky Krai	165	2.2	1,929	10.3	11.7	717	9.8	371	70,873	13.5
Zabaykalsky Krai	432	5.9	1,083	5.8	2.5	249	3.4	229	16,585	3.2
Amur Oblast	362	4.9	806	4.3	2.2	277	3.8	343	16,676	3.2
Irkutsk Oblast	775	10.5	2,413	12.9	3.1	1,014	13.8	420	68,106	13.0
Jewish Autonomous Oblast	36	0.5	166	0.9	4.6	45	0.6	268	3,445	0.7
Western Region	1,388	18.8	9,058	48.4	6.5	3,513	47.9	387	253,604	48.4
Republic of Karelia	181	2.4	630	3.4	3.5	211	2.9	334	24,341	4.6
Arkhangelsk Oblast	590	8.0	1,174	6.3	2.0	617	8.4	524	26,196	5.0
Leningrad Oblast <sup>3</sup>	84	1.1	1,779	9.5	21.2	854	11.6	480	38,320	7.3
Murmansk Oblast	145	2.0	762	4.1	5.3	390	5.3	511	22,579	4.3
Novgorod Oblast	55	0.7	616	3.3	11.3	240	3.3	389	16,379	3.1
Pskov Oblast	55	0.8	646	3.5	11.7	133	1.8	205	16,451	3.1
Smolensk Oblast	50	0.7	959	5.1	19.2	257	3.5	267	27,754	5.3
Tver Oblast	84	1.1	1,305	7.0	15.5	341	4.6	260	36,149	6.9
Vologda Oblast	145	2.0	1,188	6.3	8.2	469	6.4	394	45,435	8.7

Notes: 1. As of 1 January 2016.

2. As of 2015.

Source: Compiled by author based on Rosstat data

**Table 2: Composition of Surveyed Firms by Industrial Sector**

	Total		Eastern Region <sup>1</sup>		Western Region	
	Number	Share (%)	Number	Share (%)	Number	Share (%)
All firms surveyed	742	100.0	358	100.0	384	100.0
Agriculture, Forestry and Fishing	113	15.2	51	14.2	62	16.1
Agriculture	71	9.6	32	8.9	39	10.2
Forestry	20	2.7	13	3.6	7	1.8
Fishing	22	3.0	6	1.7	16	4.2
Mining and Manufacturing	267	36.0	107	29.9	160	41.7
Production and distribution of electricity, gas and water	43	5.8	24	6.7	19	4.9
Production of fuel and energy minerals	4	0.5	3	0.8	1	0.3
Production of other minerals	21	2.8	14	3.9	7	1.8
Food industry	58	7.8	21	5.9	37	9.6
Light industry	11	1.5	4	1.1	7	1.8
Forest, paper-pulp and woodworking industry	38	5.1	11	3.1	27	7.0
Chemical and petrochemical industry	12	1.6	3	0.8	9	2.3
Metallurgy and metalwork	15	2.0	5	1.4	10	2.6
Machine-building industry	37	5.0	11	3.1	26	6.8
Building materials industry	28	3.8	11	3.1	17	4.4
Building	105	14.2	62	17.3	43	11.2
Wholesale trade	184	24.8	103	28.8	81	21.1
Transport	55	7.4	27	7.5	28	7.3
Communications	18	2.4	8	2.2	10	2.6

Note: Test of equality of proportion for 17 sectors of industrial classification with the western region: Chi2(16)=40.4000, p=0.0006; Cramer V=0.2333

Source: Compiled by author based on the ERINA Survey

in the transport and logistics environment and adopting improvement measures. Lastly, conclusions are drawn in Section 5.

## 2. The East–West Difference in the Transport and Logistics Environment

As stated above, the transportation infrastructure of the Russian Far East is meager. What demonstrates the situation most straightforwardly is the state of development of the railways and roads. Among the target regions of the ERINA Survey, half of the federal subjects in the eastern region fall below the average railway density of 50 km/10,000 km<sup>2</sup> (2015) for the Russian Federation, in contrast to Arkhangelsk Oblast alone in the western region (Table 3). The average for the Far Eastern Federal District is under 14 km/10,000 km<sup>2</sup>, and ranks lowest among all Federal Districts. The same also goes for paved road density (2015). Only two federal subjects in the eastern region exceed the Federation average of 61 km/1,000 km<sup>2</sup>, whereas conversely in the western region only three federal subjects fall below it (Table 3). The average paved road density for the Far Eastern Federal District (9.5 km/1,000 km<sup>2</sup>) is one-sixth of the Federation average, and as expected ranks bottom.

**Table 3: Road and Railway Density by Federal Subject of the Russian Federation**

Federal Subject	Paved Road <sup>1</sup>	Rail <sup>2</sup>
	km/1,000km <sup>2</sup>	km/10,000km <sup>2</sup>
Russian Federation Average	61	50
Eastern Region		
Republic of Buryatia	26	35
Sakha Republic	3.8	2
Khabarovsk Krai	12	27
Primorsky Krai	93	95
Zabaykalsky Krai	34	56
Amur Oblast	34	81
Irkutsk Oblast	30	32
Jewish Autonomous Oblast	68	141
Western Region		
Republic of Karelia	47	123
Arkhangelsk Oblast	21	30
Leningrad Oblast <sup>3</sup>	207	341
Novgorod Oblast	198	210
Murmansk Oblast	23	60
Pskov Oblast	299	197
Smolensk Oblast	283	232
Tver Oblast	248	214
Vologda Oblast	118	53

Note: As of 2015.

Source: Rosstat data

Elsewhere, concerning seaports, the eastern region is not so disadvantaged. Vostochny Port, with the largest volume of cargo handled in the Russian Far East (69.29 million tonnes in 2017), is even third nationwide in volume handled.<sup>2</sup> Moreover, the number of containers handled at the Port of Vladivostok (840,000 TEU in 2017) is second in Russia behind the Port of Saint Petersburg on the Baltic Sea. However, despite the presence of such pivotal ports, the ports of the Russian Far East have great problems. On this point, the following problems were pointed out in Minakir and Sergienko (eds., 2011, p. 145): “technological constraints bring delays in transshipment operations”,<sup>3</sup> “there are ports where development is constrained due to being located within an urban area”,<sup>4</sup> and “a long period of time is required for the transit of overseas trade cargo due to the lack of infrastructure in the inspection and supervisory organs”.

As stated above, the transport and logistics environment is also stipulated by elements on the software side. There are data which show that firms in the Russian Far East are also actually placing emphasis on the elements in soft infrastructure. In fact, in a questionnaire survey targeting 64 shipper firms in Khabarovsk Krai in 2008 it was ascertained that “shipping rates” were a more significant problem than “(insufficient) quality of roads.” What is more, as the results of analysis combining an evaluation of the degree of satisfaction, the survey concluded that emphasis should be placed on three points, adding “timely dispatch of transport vehicles” to the other two (Balalaev et al., 2008, pp. 69–71).

From a different angle again comes circumstantial evidence indicating the inadequacies in the transport and logistics environment of the Russian Far East. There is one example to mention. In the Russian Far East, as part of regional development policy, the two kinds of special zone systems of “Advanced Special Economic Development Zones (ASEZ)” and the “Free Port of Vladivostok (FPV)” were established in 2016. Looking at the breakdown by industry classification of “resident” firms’ business<sup>5</sup> as of the end of June 2017, 35 firms within the 136 in the ASEZ and 78 firms within the 220 in the FPV were planning to perform “warehousing and services incidental to transport”. In both cases, the category gives the largest number among the industry sectors, which suggests that many and most firms intend to enter into the market, discovering business opportunities there. There is no need to stress that the inadequacies of the provision of transportation and logistics services are in the background. Furthermore, even though there is still the possibility that some of the firms may designate it as an incidental business for their own company’s distribution and not for profit, it suggests that these firms will come not to rely on the services of established businesses, but attempt to tackle matters within their own firm. In any case, the tendencies of the resident firms in these special zones suggest that “there are unsatisfied needs of firms in the market for warehousing, etc.”

Up to this point this section has introduced the data and several analyses indicating that the transport and logistics environment in the Russian Far East is at a disadvantage in comparison with other regions within Russia. However, these remain fragmentary pieces of information. Certainly, it can generally be said that the small amount of infrastructure is a problem. However, the profundity of that problem should probably be judged on the magnitude of the divergence from the needs. In addition, even when some of the firms located in the Russian Far East have sensed an inadequacy in the provision of certain transportation and logistics services, it is not pertinent to take that for evaluation of the entire transport and logistics environment in the Russian Far East. After all, these problems may not be peculiar to the Russian Far East, but may be universal problems for Russia.

In this regard the data from the ERINA Survey make possible an overall evaluation,

via comparative analysis between the east and west target regions of the survey, as well as a crosswise analysis of hard and soft infrastructure. A case example cannot be found where micro-level data on logistics has been gathered in such a way within Russia. From Section 3 on, the author analyzes this valuable data, and aims to elucidate whether the transport and logistics environment in the Russian Far East really is inferior.

### 3. The Results of the Survey

In this section, in order to tackle the concerns mentioned in the previous section, based on the ERINA Survey data, the author carries out analysis as to whether differences exist between eastern and western Russia with regard to the evaluations and judgements of the managers of firms and the actions of firms in the area of transportation and logistics. Here on in, sub-sections 3.1 and 3.2 show the reality revealed for the evaluation of the external environment, followed by sub-section 3.3 for the actions of firms. In sub-section 3.4, after summarizing these, the author presents interpretations and further questions for in-depth consideration in Section 4.

#### 3.1 The Impact of the External Environment on the Management of Firms

First, in order to evaluate the relative acuteness for the upgrading of transportation and logistics infrastructure, an analysis was done as to the responses to the crosswise question on impacts of various factors of the external environment on management of firms.

For this question the interviewers requested a five-grade evaluation—“a definitely negative impact”, “a rather negative impact”, “no impact”, “a rather positive impact”, and “a definitely positive impact”—regarding a total of 12 categories of factors and structures of the external environment, including “federal government economic policy” and “local government and municipal bodies’ economic policy”, and 10 others as in Table 4.

Comparing the responses from eastern and western firms, a chi-squared test for equality of proportion revealed that out of the total 12 target categories there were 8 categories where a null hypothesis of no difference between the two regions was rejected at a 10% level or below. “Transportation and logistics infrastructure”, the main subject of this paper, was included among those 8 categories, and for that category the null hypothesis was rejected particularly strongly ( $\chi^2 = 21.8039$ ,  $p = 0.0002$ ). By comparing the responses from both regions in this category, negative responses (the total of “a definitely negative impact” and “a rather negative impact”) were 41.0% (139 out of 339 firms) in the eastern region, as against 27.2% (98 out of 360 firms) in the western region (Table 4). On the other hand, the percentages for the positive responses (the total of “a definitely positive impact” and “a rather positive impact”) were 22.7% in the eastern region (77 out of 339 firms) and 26.4% in the western region (95 out of 360 firms), with the western region higher. In other words, it is graphically illustrated in these results that firms in the eastern region have a strong awareness that the infrastructure for transportation and logistics is insufficient.

Due to space constraints, the author will omit detailed examination of the other categories, but there were categories which can confirm a similar trend for transportation infrastructure where there were significant differences in the proportion of responses between east and west, and in addition there were many responses of negative impacts in the eastern region: “federal government economic policy”, “local government and municipal bodies’ economic policy”, “local legislation”, “the electricity grid” and “the shadow economy”. On the other hand, for the response results regarding “communications”, which also belongs within infrastructure, there was a significantly positive evaluation in the eastern region. Furthermore, for “federal legislation”,

**Table 4: The Impact of External Economic Environment on Management of Firms**

	All Firms Surveyed <sup>1</sup>		Eastern Region		Western Region	
	No. Firms	% of Total	No. Firms	% of Total	No. Firms	% of Total
<b>(a) Federal Government Economic Policy</b>						
A definitely negative impact	38	5.5	21	6.2	17	4.8
A rather negative impact	243	35.1	133	39.1	110	31.2
No impact	302	43.6	128	37.6	174	49.3
A rather positive impact	95	13.7	45	13.2	50	14.2
A definitely positive impact	15	2.2	13	3.8	2	0.6
Total	693	100.0	340	100.0	353	100.0
Test of equality: $\chi^2(4) = 17.6968, p = 0.0014$ ; Cramér V = 0.1598						
<b>(b) Local Government and Municipal Bodies' Economic Policy</b>						
A definitely negative impact	41	5.9	26	7.6	15	4.2
A rather negative impact	211	30.1	107	31.3	104	29.1
No impact	326	46.6	154	45.0	172	48.0
A rather positive impact	107	15.3	45	13.2	62	17.3
A definitely positive impact	15	2.1	10	2.9	5	1.4
Total	700	100.0	342	100.0	358	100.0
Test of equality: $\chi^2(4) = 7.9938, p = 0.0918$ ; Cramér V = 0.1068						
<b>(c) Federal Legislation</b>						
A definitely negative impact	37	5.3	21	6.2	16	4.4
A rather negative impact	237	33.9	117	34.5	120	33.3
No impact	311	44.5	144	42.5	167	46.4
A rather positive impact	100	14.3	48	14.2	52	14.4
A definitely positive impact	14	2.0	9	2.7	5	1.4
Total	699	100.0	339	100.0	360	100.0
Test of equality: $\chi^2(4) = 3.0893, p = 0.5429$ ; Cramér V = 0.0664						
<b>(d) Local Legislation</b>						
A definitely negative impact	31	4.5	20	5.9	11	3.1
A rather negative impact	193	28.0	95	28.2	98	27.8
No impact	361	52.3	171	50.7	190	53.8
A rather positive impact	95	13.8	42	12.5	53	15.0
A definitely positive impact	10	1.4	9	2.7	1	0.3
Total	690	100.0	337	100.0	353	100.0
Test of equality: $\chi^2(4) = 10.9681, p = 0.0269$ ; Cramér V = 0.1260						
<b>(e) Judicial System</b>						
A definitely negative impact	18	2.8	11	3.5	7	2.1
A rather negative impact	97	15.2	46	14.7	51	15.6
No impact	452	70.7	221	70.8	231	70.6
A rather positive impact	64	10.0	29	9.3	35	10.7
A definitely positive impact	8	1.3	5	1.6	3	0.9
Total	639	100.0	312	100.0	327	100.0
Test of equality: $\chi^2(4) = 2.0793, p = 0.7211$ ; Cramér V = 0.0570						
<b>(f) Power Enforcement Organs (police activity and enforcement of laws)</b>						
A definitely negative impact	16	2.4	8	2.5	8	2.4
A rather negative impact	110	16.7	44	13.6	66	19.7
No impact	455	69.1	233	72.1	222	66.3
A rather positive impact	71	10.8	33	10.2	38	11.3
A definitely positive impact	6	0.9	5	1.5	1	0.3
Total	658	100.0	323	100.0	335	100.0
Test of equality: $\chi^2(4) = 7.4683, p = 0.1131$ ; Cramér V = 0.1065						

Note: Targets were firms with valid responses.

Source: Compiled by author based on the ERINA Survey

**Table 4: The Impact of External Economic Environment on Management of Firms (continued)**

	All Firms Surveyed <sup>1</sup>		Eastern Region		Western Region	
	No. Firms	% of Total	No. Firms	% of Total	No. Firms	% of Total
<b>(g) Banking and Financial Institutions</b>						
A definitely negative impact	45	6.4	29	8.6	16	4.3
A slightly negative impact	221	31.2	97	28.8	124	33.4
No impact	295	41.7	135	40.1	160	43.1
A slightly positive impact	132	18.6	67	19.9	65	17.5
A definitely positive impact	15	2.1	9	2.7	6	1.6
Total	708	100.0	337	100.0	371	100.0
Test of equality: $\chi^2(4) = 8.1892, p = 0.0848$ ; Cramér V = 0.1075						
<b>(h) Transportation and Logistics Infrastructure</b>						
A definitely negative impact	42	6.0	31	9.1	11	3.1
A slightly negative impact	195	27.9	108	31.9	87	24.2
No impact	290	41.5	123	36.3	167	46.4
A slightly positive impact	150	21.5	64	18.9	86	23.9
A definitely positive impact	22	3.1	13	3.8	9	2.5
Total	699	100.0	339	100.0	360	100.0
Test of equality: $\chi^2(4) = 21.8039, p = 0.0002$ ; Cramér V = 0.1766						
<b>(i) Electricity Grid</b>						
A definitely negative impact	37	5.3	31	9.3	6	1.7
A slightly negative impact	229	32.9	112	33.5	117	32.4
No impact	314	45.2	134	40.1	180	49.9
A slightly positive impact	97	14.0	45	13.5	52	14.4
A definitely positive impact	18	2.6	12	3.6	6	1.7
Total	695	100.0	334	100.0	361	100.0
Test of equality: $\chi^2(4) = 25.2342, p = 0.00004$ ; Cramér V = 0.1905						
<b>(j) Communications (optical fiber, Internet, mobile communications)</b>						
A definitely negative impact	10	1.4	7	2.1	3	0.8
A slightly negative impact	93	13.2	34	10.1	59	16.0
No impact	345	48.9	168	49.9	177	48.1
A slightly positive impact	197	27.9	91	27.0	106	28.8
A definitely positive impact	60	8.5	37	11.0	23	6.3
Total	705	100.0	337	100.0	368	100.0
Test of equality: $\chi^2(4) = 11.6233, p = 0.0203$ ; Cramér V = 0.1284						
<b>(k) Educational and Research Institutions (universities, scientific research institutes)</b>						
A definitely negative impact	5	1.0	2	0.8	3	1.1
A slightly negative impact	32	6.1	10	4.0	22	7.9
No impact	363	69.1	174	70.2	189	68.2
A slightly positive impact	84	16.0	39	15.7	45	16.2
A definitely positive impact	41	7.8	23	9.3	18	6.5
Total	525	100.0	248	100.0	277	100.0
Test of equality: $\chi^2(4) = 4.7708, p = 0.3116$ ; Cramér V = 0.0953						
<b>(l) Shadow Economy (black market, organized crime)</b>						
A definitely negative impact	38	6.8	31	10.9	7	2.6
A slightly negative impact	100	18.0	52	18.2	48	17.8
No impact	390	70.3	187	65.6	203	75.2
A slightly positive impact	24	4.3	12	4.2	12	4.4
A definitely positive impact	3	0.5	3	1.1	0	0.0
Total	555	100.0	285	100.0	270	100.0
Test of equality: $\chi^2(4) = 18.5824, p = 0.0009$ ; Cramér V = 0.1829						

Note: Targets were firms with valid responses.

Source: Compiled by author based on the ERINA Survey

“judicial system”, “power enforcement organs”, and “educational and research institutions” a significant east–west difference was not observed.

As above, for 6 categories, half of the total 12, a tendency of responses was discernable of the eastern firms being even more negatively impacted than the western ones. Included among the 6 categories were “transportation and logistics infrastructure” and the “electricity grid”, and the Government of Russia’s recognition that “the development of transportation and electricity infrastructure in the Russian Far East is lagging behind” can be discerned in the fact that it is a shared view at the level of the management of firms.

### **3.2 The Improvement of the External Environment Required by Firms**

On the point of being able to discern that firms in the eastern region are firmly regarding the lack of development of transportation and logistics infrastructure as a problem, the next analysis was of the problem focused on the transport and logistics environment. Here, based on the hypothesis that at the same time as many firms desiring development of hard infrastructure—infrastructure in a narrower sense—also desire the improvement of the transport and logistics environment by other means, such as deregulation, the author examined whether there is a difference in those demands between east and west. On the question of the target for the analysis, relating to the improvement of the transport and logistics environment there were the following 8 categories as those considered desired by firms: “new construction and expansion of infrastructure”; “improvement and modernization of infrastructure”; “transportation fee reduction or subsidies for transportation fees”; “relaxation of freight transportation-related regulations”; “strengthening of competition policy in the transportation market”; “raising of the quality of the services of forwarding businesses”; “streamlining and expedition of cross-border procedures for freight”; and “enhancement of transportation services for special freight (including frozen and refrigerated freight, and oversize freight)”. Regarding the necessity of each, the interviewers asked for responses in three divisions: “necessary”; “desirable”; and “don’t recognize a necessity”. All these issues are clearly given external environments for individual firms, and it is a difficult matter for the companies alone to improve them by their own efforts.

The aggregate results of the responses are as in Table 5. In whichever category the proportion of companies considering it “necessary” was greater in the eastern than the western region, whereas the proportion of companies considering “don’t recognize a necessity” were fewer in the eastern region. A chi-squared test of equality detected a statistically significant east–west difference at a 1% level for responding firms in all categories. Comparing reciprocally the responses to the questions for the eight categories within eastern firms, only the response to “transportation fee reduction or subsidies for transportation fees” of “necessary” exceeded 50%, and the total together with “desirable” exceeded 90%.

From the above it can be understood that, in the comparison with western region firms, eastern firms more strongly require improvement in the overall broader transport and logistics environment, including institutions and policy, as well as the development of soft infrastructure, such as the service content of logistics firms, as their requirements are not limited to the development of hard infrastructure. Among these transportation fee reduction is strongly demanded.

**Table 5: The External Environment Requiring Improvement**

	All Firms Surveyed <sup>1</sup>		Eastern Region		Western Region	
	No. Firms	% of Total	No. Firms	% of Total	No. Firms	% of Total
<b>(a) New Construction and Expansion of Infrastructure</b>						
Don't recognize a necessity	137	22.0	53	17.2	84	26.6
Desirable	315	50.5	145	47.1	170	53.8
Necessary	172	27.6	110	35.7	62	19.6
Total	624	100.0	308	100.0	316	100.0
Test of equality: $\chi^2(2) = 22.2951, p = 0.00001$ ; Cramér V = 0.1890						
<b>(b) Improvement and Modernization of Infrastructure</b>						
Don't recognize a necessity	139	22.3	55	18.2	84	26.3
Desirable	306	49.2	128	42.2	178	55.8
Necessary	177	28.5	120	39.6	57	17.9
Total	622	100.0	303	100.0	319	100.0
Test of equality: $\chi^2(2) = 36.2564, p = 0.0000$ ; Cramér V = 0.2414						
<b>(c) Transportation Fee Reduction or Transportation Fee Supplementary Payments</b>						
Don't recognize a necessity	77	11.7	20	6.3	57	16.7
Desirable	298	45.2	120	37.6	178	52.2
Necessary	285	43.2	179	56.1	106	31.1
Total	660	100.0	319	100.0	341	100.0
Test of equality: $\chi^2(2) = 47.0850, p = 0.0000$ ; Cramér V = 0.2670						
<b>(d) Relaxation of Freight Transportation-related Regulations</b>						
Don't recognize a necessity	140	22.1	56	19.1	84	24.6
Desirable	287	45.3	121	41.3	166	48.7
Necessary	207	32.6	116	39.6	91	26.7
Total	634	100.0	293	100.0	341	100.0
Test of equality: $\chi^2(2) = 12.1104, p = 0.0023$ ; Cramér V = 0.1382						
<b>(e) Strengthening of Competition Policy in the Transportation Market</b>						
Don't recognize a necessity	172	28.9	53	18.3	119	39.0
Desirable	248	41.7	122	42.1	126	41.3
Necessary	175	29.4	115	39.7	60	19.7
Total	595	100.0	290	100.0	305	100.0
Test of equality: $\chi^2(2) = 42.3245, p = 0.0000$ ; Cramér V = 0.2667						
<b>(f) Raising of the Quality of the Services of Forwarding Businesses</b>						
Don't recognize a necessity	184	31.5	82	28.8	102	34.1
Desirable	261	44.7	116	40.7	145	48.5
Necessary	139	23.8	87	30.5	52	17.4
Total	584	100.0	285	100.0	299	100.0
Test of equality: $\chi^2(2) = 13.8814, p = 0.0009$ ; Cramér V = 0.1541						
<b>(g) Streamlining and Expedition of Cross-Border Customs Procedures for Freight</b>						
Don't recognize a necessity	127	26.9	40	18.9	87	33.5
Desirable	194	41.1	88	41.5	106	40.8
Necessary	151	32.0	84	39.6	67	25.8
Total	472	100.0	212	100.0	260	100.0
Test of equality: $\chi^2(2) = 16.2645, p = 0.0002$ ; Cramér V = 0.1856						
<b>(h) Enhancement of Transportation Services for Special Freight</b>						
Don't recognize a necessity	139	28.0	53	23.0	86	32.3
Desirable	219	44.2	91	39.6	128	48.1
Necessary	138	27.8	86	37.4	52	19.5
Total	496	100.0	230	100.0	266	100.0
Test of equality: $\chi^2(2) = 19.9547, p = 0.0000$ ; Cramér V = 0.2005						

Note: Targets were firms with valid responses.

Source: Compiled by author based on the ERINA Survey

### 3.3 Firms' Independent Efforts at Logistics Improvement

The next examination is whether there is an east–west difference in the efforts which firms are making themselves to resolve logistical problems. On the questions concerning this, the survey presented the following 7 categories as improvement measures which are conceivable for execution at each firm: “change the procurement source to a supplier in a convenient location”; “change the shipping market to a convenient location”; “utilization of comprehensive distribution service providers, including third-party logistics”; “possession of firm’s own transportation means, such as trucks and freight wagons”; “establishment of warehouses and logistics centers other than at company HQ”; “utilization of computer systems for logistics management”; and “utilization and nurturing of specialist logistics personnel”, requiring responses in the form of two choices, affirmative and negative, based on whether a firm has adopted the respective measures.

The aggregate results are as in Table 6. Via a Z-test on the difference in proportion, a null hypothesis of no difference between east and west was rejected for three categories: “utilization of comprehensive distribution service providers, including third-party logistics” ( $z = 2.4531$ ,  $p = 0.0142$ ); “establishment of warehouses and logistics centers other than at company HQ” ( $z = 3.8897$ ,  $p = 0.0001$ ); and “utilization and nurturing of specialist logistics personnel” ( $z = 2.1024$ ,  $p = 0.0355$ ).

Confirming the content of these responses, the former two were adopted more in the eastern region, and the latter more in the western region. For firms utilizing comprehensive distribution service providers, there were 48 in the eastern region (16.7% of firms with valid responses), as against 31 (9.9%) in the western region. Regarding firms which have installed distribution hubs, there were 59 (20.6%) in the eastern region and 29 (9.3%) in the western region, practically double in difference. On the other hand, for firms undertaking utilization and nurturing of specialist personnel, there were 24 (8.4%) in the eastern region and 43 (13.8%) in the western region.

In the other four categories, the null hypothesis of no east–west difference was not rejected. “Possession of firm’s own transportation means, such as trucks and freight wagons” was included within that, the sole category among all seven which more than half the firms were carrying out. That is, in the adoption or rejection of the majority of improvement measures, including the strategies most broadly in use, there were less differences in the actions of firms between the eastern and western regions.

Collecting these together, compared with the improvement demands for the external environment where it is discerned that the eastern firms have strong demands in all categories, it can be concluded that the east–west difference is small in terms of the actions in efforts to improve independently by investing their own resources.

### 3.4 Short Summary

As discussed above, the analyses in this section have confirmed differences in the trends for responses in the eastern and western regions from the simple aggregation of the questionnaire survey. Their summation is as follows.

In the area of the evaluation and awareness of the external environment, it was shown that for eastern firms the development of transportation and logistics infrastructure is insufficient. Furthermore, regarding the necessity of development of transportation and logistics infrastructure (construction and renovation) as well as the improvement of the wider overall transport and

**Table 6: Independent Efforts toward Logistics Improvement**

	All Firms Surveyed <sup>1</sup>		Eastern Region		Western Region	
	No. Firms	% of Total	No. Firms	% of Total	No. Firms	% of Total
<b>(a) Change the Procurement Source to a Supplier in a Convenient Location</b>						
Adopted	149	24.9	78	27.2	71	22.8
Not adopted	450	75.1	209	72.8	241	77.2
Total	599	100	287	100	312	100
Test of proportion: $z = 1.2505, p = 0.2111$						
<b>(b) Change the Shipping Market to a Convenient Location</b>						
Adopted	63	10.5	34	11.8	29	9.3
Not adopted	536	89.5	253	88.2	283	90.7
Total	599	80.7	287	38.7	312	42
Test of proportion: $z = 1.0170, p = 0.3091$						
<b>(c) Utilization of Comprehensive Distribution Service Providers, incl. Third-Party Logistics</b>						
Adopted	79	13.2	48	16.7	31	9.9
Not adopted	520	86.8	239	83.3	281	90.1
Total	599	80.7	287	38.7	312	42
Test of proportion: $z = 2.4531, p = 0.0142$						
<b>(d) Possession of Firm's Own Transportation Means, such as Trucks and Freight Wagons</b>						
Adopted	378	63.1	184	64.1	194	62.2
Not adopted	221	36.9	103	35.9	118	37.8
Total	599	80.7	287	38.7	312	42
Test of proportion: $z = 0.4896, p = 0.6245$						
<b>(e) Establishment of Warehouses and Logistics Centers other than at Company HQ</b>						
Adopted	68	11.7	59	20.6	29	9.3
Not adopted	511	88.3	228	79.4	283	90.7
Total	579	78	287	38.7	312	42
Test of proportion: $z = 3.8897, p = 0.0001$						
<b>(f) Utilization of Computer Systems for Logistics Management</b>						
Adopted	35	5.8	18	6.3	17	5.4
Not adopted	564	94.2	269	93.7	295	94.6
Total	599	80.7	287	38.7	312	42
Test of proportion: $z = 0.4290, p = 0.6679$						
<b>(g) Utilization and Nurturing of Specialist Logistics Personnel</b>						
Adopted	67	11.2	24	8.4	43	13.8
Not adopted	532	88.8	263	91.6	269	86.2
Total	599	80.7	287	38.7	312	42
Test of proportion: $z = -2.1024, p = 0.0355$						

Note: Targets were firms with valid responses.  
 Source: Compiled by author based on the ERINA Survey

logistics environment, including the legal system governing the distribution and logistics and freight transport services, the eastern firms discern a necessity more than the western ones.

On the other hand, regarding efforts being implemented to improve logistics by firms investing their own resources, although in part it is possible to discern a difference between eastern and western firms, the statistical analysis does not show such a clear difference, as on the stance of requiring improvement in the external environment.

Considering these analytical results altogether, while the east–west difference is small in terms of each firm tackling the problems by acting autonomously for the resolution of transportation and logistics problems, in terms of demands to the external environment (other players) it is possible to obtain a tentative conclusion with the trend of eastern firms' strongly requiring improvement.

Taking into consideration this paper's main issue of the evaluation of east–west differences in the transport and logistics environment, then how should we interpret the tentative conclusion obtained here? One interpretation is that out of two groups of the firm managements taking similar actions, one group strongly requires improvement of the environment and the other not as much, which suggests that the group of firms which strongly requires improvement of the environment is one which is in a relatively unfortunate environment. According to this interpretation, the transport and logistics environment in the eastern region should be inferior in comparison to the western region.

On the other hand, investigating the analytical results up to this point in a little more detail, there are also factors calling for hesitation in such an interpretation. Some of the survey categories, like transportation-related regulations and cross-border procedures are uniform systems nationwide, and that fact has also naturally been acknowledged by business people both east and west. Consequently, regarding the necessity of these improvements, the fact that the response trends differ greatly between eastern and western firms can be called an extremely unnatural result. Considered this way, the result in all categories of eastern firms more strongly demanding improvement than western firms, gives rise to the suspicion that it comes from the bias held by the responders of: "while the managements of firms in the Russian Far East are neglecting self-help efforts, the level of their demands tends to be high". Therefore in the next section the author will attempt to investigate this suspicion.

#### **4. Factor Analysis on the East–West Differences via Regression Analysis**

In order to examine the questions arising from the results of the analysis in the previous section, this section conducts a multiple regression analysis as to whether the regional difference between east and west, which was observed as the aggregate results of the ERINA Survey, is detectable at the same time as controlling other factors which would have an influence on the responses of firms.

Below, sub-section 4.1 explains the analytical method, and sub-sections 4.2 and 4.3 undertake factor analysis of the east–west differences observed in the previous section regarding demand for external environment improvement and independent improvement efforts, respectively.

##### **4.1 Analytical Method**

Within the two fields of "demand for improvement in the external environment" and "independent improvement efforts", taking as examination targets the categories where a significant difference between east and west was discernible, an analysis of which factors strengthen demand (demand promotion factors) and which factors encourage independent efforts

(independent effort promotion factors) was undertaken. The semantic content and definition of the variables used in the regression analysis and the descriptive statistics are shown in Table 7.

First, in the analysis of the demand promotion factors, as significant east–west differences were ascertained in all eight categories, eight models were estimated with all as targets for analysis. The dependent variables for each model were: new construction and expansion of infrastructure (*logiinfra dev*); improvement and modernization of infrastructure (*logiinfra res*); transportation fee reduction or subsidies for transportation (*transfee*); relaxation of freight transportation-related regulations (*transreg*); strengthening of anti-monopoly policy in the transportation sector (*transanti*); raising of the quality of the services of forwarding businesses (*transqua*); streamlining and expedition of cross-border procedures for freight (*custom*); and enhancement of transportation services for special freight (including frozen and refrigerated freight, and oversize freight) (*spectrans*). Each dependent variable was an ordinal variable with incremental figures in three levels depending on the degree of necessity given in the responses.

As independent variables, other than the dummy variable (*east*) which designates eastern firms as 1, the author introduced control variables representing several factors which might influence what kind of improvement in the transport and logistics environment firms demand. More specifically, as a proxy variable for the local regional environment, and in particular the level of infrastructure development, the models employed the railway density (*raildens*) by area for the federal subjects of the Russian Federation as shown above in Table 3. Furthermore, as it is conceivable that the closeness of relations with the government has an impact on the manner of requesting changes in rules and policy, the models employed another proxy variable for this, a dummy variable (*staown*) which designates state-owned enterprises as 1. Further still, as it is conceivable that the nature of relations with clients also has an impact on the logistics needs of firms, the models introduced: a dummy variable (*b2c*) which designates as 1 firms which engage in consumer-oriented business (business-to-consumer firms); a dummy concerning the existence of dealings with overseas firms (*forpart*); an ordinal variable (*inputrange*) which represents the distance to the location of the main procurement source for raw materials, components, etc.; and an ordinal variable (*outputrange*) which represents the distance to the main shipping destination or markets for merchandise and finished goods. Lastly, adding a group of industrial sector dummies<sup>6</sup> to control the fixed effect for the industries to which the surveyed firms belong, the regression analysis estimated all these variables simultaneously with *east*. In dealing with the dependent variables being ordinal variables, an ordered probit model was used in the estimation of the regression model.

In the analysis of independent effort promotion factors, there were three target categories—the utilization of comprehensive distribution (3PL) firms (*logicom*), establishment of own-company distribution facilities (warehouses, etc.) (*ownlogicen*), and utilization and nurturing of specialist logistics personnel (*logistaff*)—where there were significant east–west differences, and three models respectively were estimated for each with the dependent variables. All the dependent variables (*x*) were estimated simultaneously, employing the same set of control variables as the factor analysis of the demand for improvement in the external environment, in addition to the eastern firm dummy (*east*). As the dependent variables were dummy variables containing the two options of adoption or non-adoption of improvement measures, a probit model was used for the estimations.

**Table 7: The Semantic Content and Definition of the Variables Used in the Regression Analysis and the Descriptive Statistics**

Variable Name	Semantic Content and Definition of Variables	Descriptive Statistics					
		No. of Obs.	Avg.	S.D.	Median	Min.	Max.
<i>logiinfra dev</i>	Freight transportation infrastructure: new construction and expansion <sup>1</sup>	624	1.056	0.702	1	0	2
<i>logiinfra es</i>	Freight transport infrastructure: improvement and modernization <sup>1</sup>	622	1.061	0.711	1	0	2
<i>transfee</i>	Transportation fee reduction or subsidies to transportation fee <sup>1</sup>	660	1.315	0.671	1	0	2
<i>transreg</i>	Relaxation of freight transportation-related regulation <sup>1</sup>	634	1.106	0.733	1	0	2
<i>transanti</i>	Strengthening of anti-monopoly policy in the transportation sector <sup>1</sup>	595	1.005	0.764	1	0	2
<i>transqua</i>	Raising of the quality of the services of forwarding businesses <sup>1</sup>	584	0.923	0.740	1	0	2
<i>custom</i>	Streamlining and expedition of cross-border procedure for freight <sup>1</sup>	472	1.051	0.767	1	0	2
<i>spectrans</i>	Enhancement of transportation services for special freight <sup>1</sup>	496	0.998	0.748	1	0	2
<i>logicom</i>	Utilization of comprehensive distribution firms (3PL, etc.) <sup>2</sup>	599	0.132	0.339	0	0	1
<i>ownlogicen</i>	Securing of firm's own distribution facilities <sup>2</sup>	599	0.147	0.354	0	0	1
<i>logistaff</i>	Utilization and nurturing of specialist logistics personnel <sup>2</sup>	599	0.112	0.315	0	0	1
<i>east</i>	Dummy for firms in eastern Russia <sup>3</sup>	742	0.482	0.500	0	0	1
<i>raildens</i>	Rail density of host federal subject <sup>4</sup>	742	148.657	100.810	95	2	295
<i>staown</i>	Dummy for state-owned enterprises <sup>5</sup>	690	0.101	0.302	0	0	1
<i>b2c</i>	Dummy for transactions and services aimed at consumers <sup>5</sup>	724	0.608	0.489	1	0	1
<i>forpart</i>	Dummy for existing of foreign partners <sup>6</sup>	733	0.317	0.465	0	0	1
<i>inputrange</i>	Location of main suppliers of raw and intermediate inputs <sup>7</sup>	680	1.429	1.126	1	0	4
<i>outputrange</i>	Location of main destination of products and merchandize goods <sup>7</sup>	732	1.092	1.075	1	0	4

Notes: 1. Category variable: 0 = not necessary; 1 = desirable; 2 = necessary  
 2. Dummy variable: 0 = not adopted; 1 = adopted  
 3. Dummy variable: 0 = western region; 1 = eastern region  
 4. Continuous variable: km/10,000 km<sup>2</sup>  
 5. Dummy variable: 1 = applicable firm (state-owned enterprise, business-to-consumer firms); 0 = other  
 6. Dummy variable: 0 = no; 1 = yes  
 7. Category variable: 0 = same city; 1 = outside city, same federal subject; 2 = up to 3,000 km away in other federal subject; in federal subject further than 3,000 km away; 4 = abroad

Source: Compiled by author based on the ERINA Survey

#### 4.2 Factors Promoting Demand for Improvement of the External Environment

The estimation results of the ordered probit model taking the eight variables from *logiinfra* to *spectrans* as dependent variables, are as shown in Table 8. While the analysis in the previous section made it clear that for eastern firms the tendency to demand improvement in the external environment is significantly strong, the model estimation results revealed that out of eight demand categories the only category where the strong demand could be attributed to the eastern firm dummy (*east*) was the “enhancement of transportation services for special freight”. For the other categories, the results were ones that several factors introduced as control variables—specifically factors related to the external conditions surrounding the relevant firms or the firms’ own peculiarities—can explain for the recognition of the necessity of improvement. The paragraphs below describe what kind of external conditions and peculiarities of the firms tend to enhance their necessity of improvement of the external environment.

First, looking at railway density (*raildens*), a proxy variable for the level of infrastructure development, a significant negative regression coefficient was estimated in five estimation models from the total eight. That is, the estimation results showed that the lower a region’s railway density, the stronger the tendency becomes for firms located there to demand improvements in the environment in a wide range of sectors. The railway density was introduced as a proxy variable for the level of infrastructure development. It can easily be understood that in regions where this is low the demand for improvement relating to infrastructure strengthens. At the same time, it is also conceivable that railway density is a variable which shows the spatial density of economic activity. In case of firms located in regions with sparse economic activity, it is highly likely that part or all of the transportation distance among the various procured raw materials and components and shipped products will be long, and consequently it is conceivable that this will become a factor for demanding a reduction in transportation fees. Furthermore, it is imaginable that in these regions transportation firms are monopolistic or oligopolistic and that the forwarders able to provide the desired services are not in place, and there is the possibility of this being linked with the respective demands for improvement.

Furthermore, in model [7] which analyzed cross-border procedures, the coefficient of the dealings with overseas firms dummy (*forpart*) having the extremely large value of 0.554 clearly shows where the problem is, which is considered a suggestive analytical result.

Otherwise characteristic was that the estimated coefficient for the business-to-consumer (*b2c*), one of the control variables, was significantly positive in all the estimation models. That is, B-to-C firms demand improvement of the external environment in all categories; in other words, they have a higher demand level relating to the transport and logistics environment.

As said before, the eastern firm dummy had a significant positive effect only on the demand for improvement regarding the “enhancement of transportation services for special freight”. It may be said that the need for transportation services for special freight in the eastern region is particularly high, or that the service providers are particularly lacking. In any case, on this issue, elements other than the factors introduced as control variables are having a strong effect in the eastern region.

As a whole, in the great majority of models the coefficient for *east* was not significant, which means that among the managements of firms in the eastern region, the managements in a position where they should naturally demand improvement, considering their external conditions (lack of infrastructure, etc.) and their company’s own characteristics (B2C firms, etc.), respond that it is necessary, and those not in such a position do not recognize a necessity. In other words,

Table 8: The Estimation Results for the Demand Promotion Factors

Model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Estimator	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit
Dependent Variable	<i>logiinfradev</i>	<i>logiinfrases</i>	<i>transfee</i>	<i>transreg</i>	<i>transanti</i>	<i>transqua</i>	<i>custom</i>	<i>spectrans</i>
<i>east</i>	0.096 (0.16)	0.120 (0.16)	0.151 (0.16)	0.156 (0.16)	0.277 (0.18)	-0.128 (0.17)	0.100 (0.22)	0.356 * (0.20)
<i>raidens</i>	-0.002 ** (0.00)	-0.002 *** (0.00)	-0.002 *** (0.00)	0.000 (0.00)	-0.002 * (0.00)	-0.002 ** (0.00)	-0.001 (0.00)	-0.001 (0.00)
<i>staown</i>	0.280 * (0.16)	0.187 (0.13)	0.046 (0.17)	0.277 * (0.15)	0.267 (0.16)	0.258 (0.16)	0.259 (0.19)	0.268 (0.16)
<i>b2c</i>	0.285 ** (0.12)	0.276 ** (0.11)	0.188 * (0.11)	0.223 ** (0.11)	0.507 *** (0.12)	0.355 *** (0.11)	0.459 *** (0.13)	0.425 *** (0.12)
<i>forpart</i>	0.177 (0.13)	0.236 * (0.12)	0.212 * (0.12)	0.203 * (0.12)	-0.003 (0.13)	0.183 (0.13)	0.564 *** (0.14)	0.274 * (0.14)
<i>inputrange</i>	-0.007 (0.05)	0.045 (0.05)	0.101 * (0.05)	0.027 (0.05)	0.050 (0.05)	-0.009 (0.05)	-0.005 (0.06)	0.003 (0.06)
<i>outputrange</i>	0.032 (0.06)	-0.001 (0.06)	0.089 (0.06)	-0.025 (0.06)	0.084 (0.06)	0.064 (0.06)	0.063 (0.06)	0.107 * (0.06)
Industry Dummies	yes	yes	yes	yes	yes	yes	yes	yes
N	528	531	563	546	508	506	405	430
Wald Test ( $\chi^2$ ) <sup>1</sup>	65.23 ***	77.29 ***	89.15 ***	36.73 **	87.29 ***	59.28 ***	598.25 ***	72.39
Pseudo R2	0.01	0.06	0.08	0.03	0.07	0.05	0.09	0.06
Log likelihood	-514.82	-512.42	-507.46	-563.40	-511.43	-513.63	-513.63	-430.43

Notes: 1. Null hypothesis: all coefficients are zero.

2. The figures in parenthesis are robust standard errors. \*\*\* = significance level of 1%; \*\* = significance level of 5%; and \* = significance level of 10%;

Source: Author's estimates. For the semantic content and definition and the descriptive statistics for each variable, see Table 7

the concerns of an “external-dependent pattern of thinking or bias” mentioned at the end of the previous section was not identified.

#### 4.3 Factors Promoting Firms’ Independent Efforts

The estimation results of the probit models taking the three variables of *logicom*, *ownlogicen*, and *logistaff*, as dependent variables are as shown in Table 9.

**Table 9: The Estimation Results for the Independent Effort Promotion Factors**

Model	[9]	[10]	[11]
Estimator	Probit	Probit	Probit
Dependent Variable	<i>logicom</i>	<i>ownlogicen</i>	<i>logistaff</i>
<i>east</i>	-0.005 (0.24)	0.600 ** (0.24)	0.233 (0.26)
<i>raildens</i>	-0.003 ** (0.00)	0.001 (0.00)	0.003 ** (0.00)
<i>staown</i>	-0.534 * (0.29)	-0.289 (0.25)	-0.043 (0.25)
<i>b2c</i>	0.235 (0.16)	0.297 ** (0.15)	-0.371 ** (0.17)
<i>forpart</i>	0.130 (0.17)	0.495 *** (0.16)	0.183 (0.17)
<i>inputrange</i>	0.202 *** (0.07)	0.004 (0.07)	-0.032 (0.08)
<i>outputrange</i>	0.213 *** (0.07)	-0.062 (0.08)	0.005 (0.08)
Industry Dummies	yes	yes	yes
N	491	516	449
Wald Test ( $\chi^2$ ) <sup>1</sup>	66.52 ***	55.65 ***	28.35 *
Pseudo R2	0.19	0.11	0.09
Log Likelihood	-160.76	-197.00	-158.85

Notes: 1. Null hypothesis: all coefficients are zero.  
2. The figures in parenthesis are robust standard errors. \*\*\* = significance level of 1%; \*\* = significance level of 5%; and \* = significance level of 10%;

Source: Author’s estimates. For the semantic content and definition and the descriptive statistics for each variable, see Table 7

In model [9] which analyzed the utilization of comprehensive distribution firms, the estimation result was that the regression coefficient for *east* was non-significant, whereas *inputrange* and *outputrange* both had significant positive coefficients, and conversely *raildens*

had a significant negative coefficient. Considered in conjunction with the analysis results in the previous section of there being many firms utilizing comprehensive distribution firms in the eastern region, the possible interpretation is that external services are being used proactively in the eastern region, as there are many firms undertaking long-distance procurement and shipment, and there are limits for them to tackle the issues by themselves.

In model [10] which analyzed the establishment of own-company distribution facilities, the effect of *east* was estimated to be significant and positive. The coefficients for *forpart* and *b2c* were also significant positive ones, but in terms of the magnitude of coefficients, *east* was the largest. This result shows that the special circumstances of the eastern region have a strong impact which cannot be explained by the independent variables introduced into this model. As discussed in Section 2, the current situation in the special zones of the Russian Far East witnesses the unsatisfied needs of firms for warehousing and services incidental to transportation. Given such circumstances, the estimation results of this model suggest that the provision of transportation-related services including commercial warehousing and logistics centers is lacking in the eastern region.

Regarding the utilization and nurturing of specialist logistics personnel, the analysis of the previous section gave the result of the eastern region being lower for this. In the regression analysis results here (model [11]), the regression coefficient for *east* was non-significant. On the other hand, a significant positive coefficient was estimated for *raildens*, and a significant negative coefficient for *b2c*. Taken together with the model estimation results on the utilization of comprehensive distribution firms mentioned above, in regions where railway density is low, firms don't undertake the utilization and nurturing of specialist logistics personnel in house, but have a tendency to pursue outsourcing.

## 5. Conclusion

In this paper, based on the results of the 2015 ERINA Survey, the author attempted to grasp, via comparison with the western region, the actual situation for eastern Russia's transport and logistics environment.

From the simple east–west comparison of the aggregated results, it was shown that although the east–west difference was small in terms of company activities to tackle logistics problems by investing a certain amount of their own resources, in terms of making demands externally (other players), there was a tendency for eastern firms to strongly demand improvement.

In so doing, the demand for improvement of eastern firms doesn't stop only at the development of infrastructure, but extends into wide-ranging areas, including the reduction of the burden of transportation costs in particular, and other institutions and policy as well as the quality and breadth of transportation services.

Regarding such demands for improvement, according to the testing via multivariate analysis, the author reached the conclusion that it is proper to interpret the result in such a way that there are many firms hoping for improvement in the eastern region, as there are many firms which necessitate the improvement of the transport and logistics environment from such matters as the external conditions and the firm's characteristics. That is, it is not the case that the managements of eastern firms are groundlessly taking up "demand for demand's sake". When talking with Russians, one often hears "the residents of the Far East are too used to support from the center, and there is a tendency to demand things originally unnecessary", but such a tendency cannot be seen from the managements of firms targeted in the ERINA Survey.

To summarize this conclusion, the transportation and logistics environment of eastern Russia is inferior in comparison with the western region, and improvement in both hard and soft aspects is necessary. On this point, because it is considered that the managements of firms have reasonable demands, it will be necessary for Russia's federal and regional policymakers to seriously confront such demand from eastern firms.

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<sup>1</sup> For the details of the ERINA Survey, see Arai and Iwasaki (2016).

<sup>2</sup> Cargo handling volumes and container figures from Mortsentr (2018).

<sup>3</sup> In Russia's Far Eastern ports, there are the cases of cargo-handling machinery such as cranes being decrepit, and the railway sidings to wharves being few.

<sup>4</sup> The Port of Vladivostok and the Port of Nakhodka are in urban areas, and enlarging the area for wharves is extremely difficult.

<sup>5</sup> In these special zones, only those firms which have obtained the status of "resident" are able to enjoy the preferential treatment stipulated in the special zone systems. When applying to become resident firms, it is required that they make clear the business they plan to engage in. At that time, there are many cases of applications which also include other incidental business in the original business.

<sup>6</sup> Industries in a total of 13 sectors: mining; food; light industry; paper manufacturing and wood processing; the chemical and petrochemical industry; construction materials; metal processing; machine manufacturing; essential utilities; construction; distribution; transportation; and communications. The default category is agriculture, forestry, and fisheries.

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# Economic Effects of Free Trade Agreements in Northeast Asia: CGE Analysis with the GTAP 9.0a Data Base

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## Abstract

*Despite growing trade and economic relations among the countries in the Northeast Asian (NEA) region, there are only two bilateral free trade agreements in effect currently. The China–ROK Free Trade Agreement entered into force on 20 December 2015 and the Japan–Mongolia Economic Partnership Agreement (EPA) became effective on 7 June 2016. However, several EPAs and free trade agreements (FTAs) are under negotiation or have prospects to emerge among not only the countries in the region, but also surrounding regions and countries.*

*An analysis of the economic effects of the ongoing FTA (China–Japan–Korea Trilateral Free Trade Agreement (CJK FTA)), and several other prospective FTAs—Northeast Asia Preferential Free Trade Agreement (NEA FTA); Northeast Asia plus the Eurasian Economic Union (EAEU) Preferential Free Trade Area (NEA+EAEU FTA); and Northeast Asia plus the Regional Comprehensive Economic Partnership (RCEP) plus the EAEU Preferential Free Trade Area (NEA+RCEP+EAEU FTA)—using the standard CGE Model and GTAP Data Base 9.0a revealed that all parties of the agreements will benefit from the formation of these free trade agreements, having welfare gains and real GDP expansions regardless of international capital mobility status—i.e. whether the capital is internationally mobile or not. Moreover, the results indicated that for the NEA region as a whole, the NEA FTA is preferable to the CJK FTA alone, and it would be even better off with the formation of wider free trade areas, such as with the other RCEP and EAEU members.*

Keywords: Free trade, CGE analysis

JEL classification codes: F150, C680

## 1. The Model

In analyzing the expected economic effects of FTAs in Northeast Asia, we employed the Global Trade Analysis Project (GTAP) Data Base (Version 9.0a) and the standard GTAP Model (The Model). The GTAP Model is a multi-region and multi-sector Computable General Equilibrium (CGE) model<sup>1</sup> with perfect competition and constant returns to scale. Bilateral trade is handled via the Armington assumption. It combines detailed bilateral trade, transport and protection data characterizing the economic linkages among regions, together with individual country input–output databases, which account for inter-sectoral linkages.

The GTAP Data Base 9.0a has triple reference years (2004, 2007 and 2011) and this analysis used 2011 as the reference year. Thus the values indicated in this analysis are expressed in constant 2011 US\$ terms. The data are for 140 regions and 57 commodities, and in the consideration of the target countries the regions were aggregated into 12 from the original 140 regions in the model, while the original 57 sectors in the model were not aggregated. The aggregated regions are: China, Japan, the ROK, Mongolia, Russia, the EAEU4, ASEAN9, ANZI, the Rest of Asia, the United States, the EU\_28, and Rest of World. Due to lack of data, the DPRK was not included in the Northeast Asia region, but the country is included implicitly in the Rest of Asia region as a part of the Rest of East Asia. Thus, the NEA region in this analysis refers to

five countries in the region, excluding the DPRK (Appendix Tables I and II).

The original eight factors in the Model were aggregated into four factors: land, labor, capital and natural resources, where land and natural resources are immobile and labor and capital are mobile factors (Appendix Table III).

The composition of GDP of the countries in question is provided in Table 1. GDP shares of foreign trade activities were the highest for Mongolia among the selected countries with exports and imports each exceeding 70% of the country's GDP.

**Table 1: Composition of GDP, %**

Regions/ Countries	Private Consumption	Investment	Government Consumption	Exports	Imports	Total
China	36.3	46.1	13.5	26.7	-22.6	100
Japan	59.7	20.4	20.2	16.0	-16.2	100
ROK	52.7	31.0	14.4	51.3	-49.4	100
Mongolia	47.3	47.7	12.6	71.0	-78.6	100
Russia	49.5	21.8	18.5	29.2	-19.0	100
EAEU4	54.5	26.5	12.8	43.7	-37.4	100
ASEAN9	57.9	28.2	10.8	56.7	-53.6	100
ANZI	58.7	30.2	14.8	20.5	-24.2	100
Rest of Asia	65.9	20.9	10.6	53.8	-51.2	100
USA	70.1	18.5	16.5	12.1	-17.2	100
EU_28	59.9	19.0	22.0	39.3	-40.3	100
Rest of World	58.3	21.8	16.7	30.8	-27.6	100
World	58.9	23.5	17.6	28.2	-28.2	100

Source: GTAP 9.0a Data Base

## 2. The Experiments

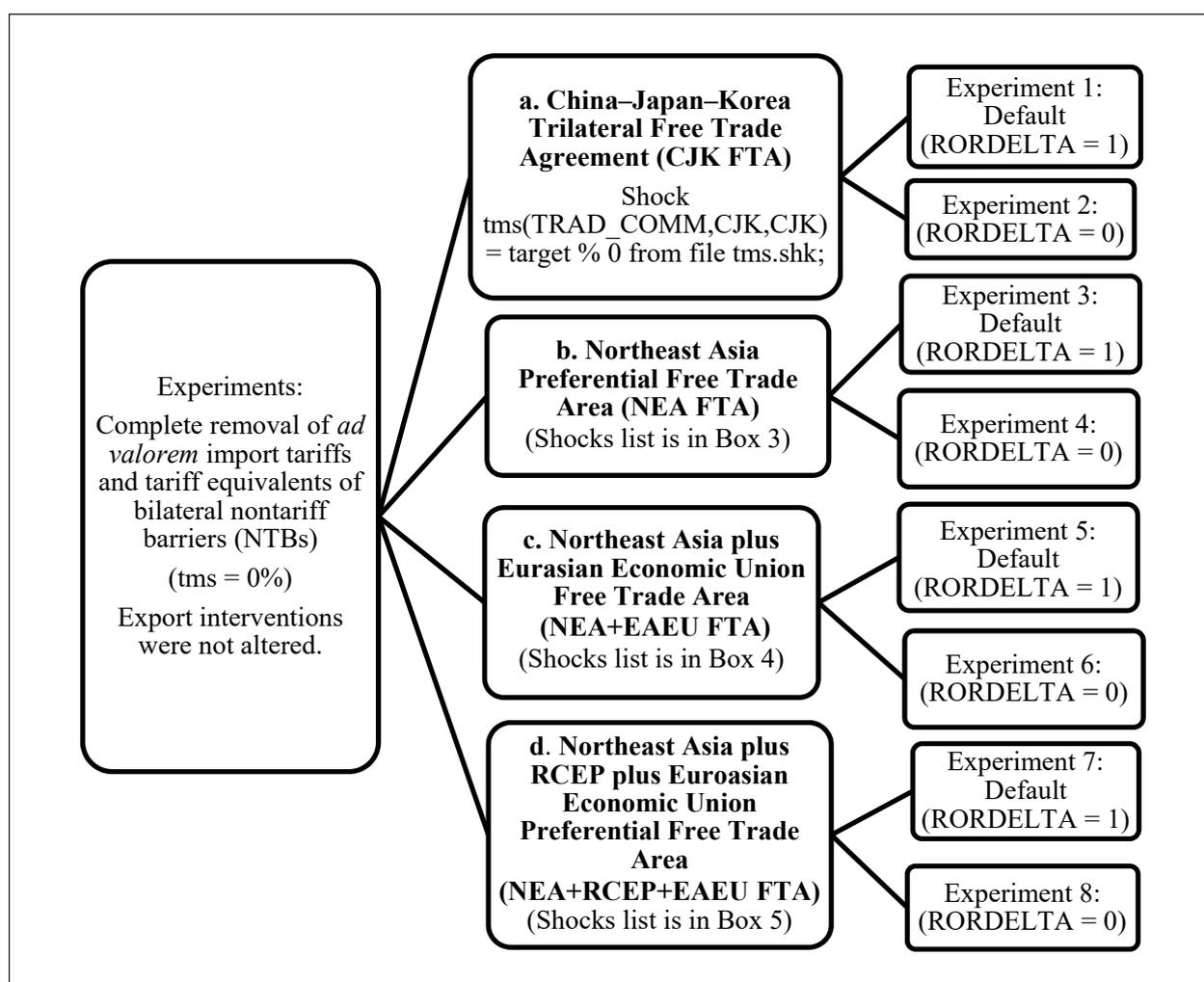
Four FTA scenarios in the NEA region were considered in the simulations where the *ad valorem* import tariffs and tariff equivalents of bilateral nontariff barriers (NTBs) between the countries in question were removed on a preferential basis. The scenarios were:

- i) China–Japan–Korea Trilateral Free Trade Agreement (CJK FTA). The members are: China, Japan and the ROK (CJK);
- ii) Northeast Asia Preferential Free Trade Agreement (NEA FTA). The members are the CJK members plus Mongolia and Russia (NEA);
- iii) Northeast Asia plus the Eurasian Economic Union (EAEU) Free Trade Area (NEA+EAEU FTA). The members are CJK, Mongolia, Russia and the other four members of the EAEU (EAEU4). The EAEU4 members are described in the Appendix Table I;
- iv) Northeast Asia plus RCEP plus the EAEU Preferential Free Trade Area (NEA+RCEP+EAEU FTA). The members are NEA plus the EAEU4, ASEAN9 and ANZI members. The ASEAN9 and ANZI members are described in the Appendix Table I.

Source-specific change in tax on imports of commodity “*i*” from country “*r*” into country “*s*” is expressed by a variable “*tms (i,r,s)*” in the Model and shocks were applied for a target rate of zero for this variable. Both values of the parameter “RORDELTA”, which is the investment allocation binary coefficient in the Model, were applied in each scenario to observe the impacts of investment allocation decisions in the assumed FTAs. The default value of the parameter RORDELTA in the Model equals 1, where investment is allocated across regions to equate the change in the expected rates of return, *rore (r)* which implies international capital mobility. When RORDELTA equals 0, investments are allocated across regions to maintain the existing composition of capital stock (no international capital mobility) and it effectively fixes the trade balance for each country/region. Description of the experiments is provided in Box 1. The solution method was Gragg, or a multiple step extrapolation method.

In order to simplify the application of shocks to the Model, three additional subsets of the regions were created by modifying the CMFSTART file of the GTAP Model. These are: CJK, NEA4 (China, Japan, the ROK, and Mongolia) and RCEP (China, Japan, the ROK, ASEAN9 and ANZI) and the modified CMFSTART file is illustrated in Box 2, where rows numbered from 7 to 15 were added into the default version of the CMFSTART file. The CMFSTART file contains some additional instructions, which are sent to GEMPACK prior to solving the model.

**Box 1: Description of the Experiments**



**Box 2: The Modified CMFSTART file**

1. ! If a version has no CMFSTART file of its own
2. ! RunGTAP creates one by copying the supplied file CMFSTART.DEF
3. CPU = yes; ! log show simulation times
4. NDS = yes; ! no displays
5. Extrapolation accuracy file = NO ; ! No XAC file
6. !servants = 1; ! use 2 processors at once, if possible
7. XSET NEA4 #NEA4 regions#
8. (China, Japan, ROK, Mongolia);
9. XSUBSET NEA4 is subset of REG;
10. XSET CJK #ChinaJapanKorea#
11. (China, Japan, ROK);
12. XSUBSET CJK is subset of NEA4;
13. XSET RCEP #RCEP regions#
14. (China, Japan, ROK, ASEAN9, ANZI);
15. XSUBSET RCEP is subset of REG;

Source: GTAP Model

**Box 3: Shock Statements in NEA FTA Scenario**

Shock tms(TRAD\_COMM,NEA4,NEA4) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,NEA4,"Russia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Russia",NEA4) = target % 0 from file tms.shk;

Source: GTAP Model

**Box 4: Shock Statements in NEA+EAEU FTA Scenario**

Shock tms(TRAD\_COMM,NEA4,NEA4) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,NEA4,"Russia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Russia",NEA4) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Russia","EAEU") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"EAEU","Russia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"EAEU",NEA4) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,NEA4,"EAEU") = target % 0 from file tms.shk;

Source: GTAP Model

**Box 5: Shock Statements in NEA+RCEP+EAEU FTA Scenario**

Shock tms(TRAD\_COMM,RCEP,RCEP) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,RCEP,"EAEU") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"EAEU",RCEP) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"EAEU","EAEU") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,RCEP,"Mongolia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,RCEP,"Russia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Mongolia",RCEP) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Russia",RCEP) = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Russia","EAEU") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Mongolia","EAEU") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Mongolia","Russia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"Russia","Mongolia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"EAEU","Russia") = target % 0 from file tms.shk;  
 Shock tms(TRAD\_COMM,"EAEU","Mongolia") = target % 0 from file tms.shk;

Source: GTAP Model

**3. The Results****a) China–Japan–Korea Trilateral Free Trade Agreement (CJK FTA)**

In terms of the equivalent variation (EV), which is an indicator for measuring the effect on public welfare, the simulation results demonstrated that all three countries, China, Japan and the ROK, would benefit from the CJK FTA regardless of the investment allocation decisions, while other countries and regions, including those in the NEA region, would experience welfare losses and real GDP contractions.

In Experiment 1, with international capital mobility, Japan would have the largest welfare gain of US\$21.4 billion, while those for the ROK and China equaled US\$11.2 billion and US\$1.9 billion, respectively. Most of Japan's welfare gain was associated with gains in terms of trade in goods and services equaling US\$15.2 billion, while the ROK had relatively equal gains in terms of allocative efficiency (US\$5.6 billion) and terms of trade in goods and services (US\$5.8 billion). However, the ROK may experience a slight loss in its terms of trade in investment and savings equaling US\$237 million. At the same time, China's allocative efficiency and terms of trade in investment and savings were improved by US\$4.46 billion and US\$475 million, respectively, while the country's terms of trade in goods and services would worsen by US\$3.05 billion. However, the net effect was positive, equaling US\$1.88 billion, as the allocative efficiency and terms of trade in investment and savings gains were larger than the terms of trade losses in goods and services. Although Russia was not a part of the CJK FTA, the country may benefit by having a welfare gain of US\$43 million, when the capital is not mobile across regions (Table 2).

In addition, the simulation results indicated that the CJK FTA would result in positive changes in all the three countries' real GDP (expressed in the GDP quantity index) regardless of the investment allocation decisions. The ROK's real GDP change was the highest, equaling 0.467% and 0.356% depending on the investment allocation decisions, while those for Japan were 0.1% and 0.096%, and for China 0.061% and 0.054%. Higher values were observed when

capital is internationally mobile (Table 3).

### **b) Northeast Asia Preferential Free Trade Area (NEA FTA)**

As expected, all members of the NEA region had welfare gains in the case of the NEA FTA, regardless of investment allocation decisions, while other regions would experience welfare losses and real GDP contractions. Welfare gains for Japan were the highest among the FTA members, equaling US\$23.5 billion, followed by the ROK's US\$12.4 billion and China's US\$5.1 billion, when capital is internationally mobile. The other members of this FTA, Russia and Mongolia, had welfare gains of US\$1.97 billion and US\$58 million, respectively. These values were lower when capital is internationally immobile (Table 2).

When capital is internationally mobile (Experiment 3), most of the welfare gains were associated with allocative efficiency gains as well as improvements in terms of trade in goods and services for all NEA countries, except Russia. Russia would have a loss of US\$785 million in its terms of trade in goods and services, but due to its gains of US\$1.5 billion in its terms of trade in investment and savings and US\$1.2 billion gains in allocative efficiency, the country's total welfare gain from this FTA was positive, equaling US\$1.92 billion (Appendix Table V).

Moreover, all members of the NEA FTA would expect positive changes in their real GDP regardless of investment allocation decisions. The gains were higher when capital is internationally mobile. The ROK would benefit most from the formation of the NEA FTA, with its real GDP increasing by 0.482% when capital is internationally mobile and 0.363% when capital is internationally immobile. In addition, the foreign trade activities of all NEA countries would increase as a result of this agreement and the increase for merchandise exports ranged between 1.12% (the lowest) for Japan and 4.374% (the highest) for the ROK, depending on international capital mobility, while the increase for merchandise imports would range between 1.049% (the lowest) for Mongolia and 5.274% (the highest) for the ROK. However, Mongolia's merchandise exports would decline by 0.401% when international capital is mobile (Tables 3, 5 and 6).

In terms of nominal GDP (expressed in the value of GDP), Russia may be affected negatively in both the cases of international capital mobility due to drops in its aggregate prices. Russia's GDP price index dropped respectively by 0.883% and 1.145%, when capital is internationally mobile and immobile. In addition, the prices of Russia's merchandise exports declined in both cases and the price index of its merchandise exports were 0.264% and 0.347% lower, respectively, when capital is internationally mobile and immobile. Mongolia would also experience a drop in its nominal GDP of 0.313% without international capital mobility, due to the 0.334% reduction in its aggregate prices (Table 4 and Appendix Tables VII and VIII).

### **c) Northeast Asia plus the Eurasian Economic Union (EAEU) Preferential Free Trade Area (NEA+EAEU FTA)**

All countries in the NEA region would benefit from the formation of this FTA regardless of investment allocation decisions, while other countries and regions would experience welfare losses and real GDP contractions. The magnitude of these benefits were larger for all the NEA countries, except Russia, in the NEA+EAEU FTA scenario compared to the previous two FTA scenarios. The welfare gains ranged between US\$61 million for Mongolia and US\$23.5 billion for Japan, while Russia's welfare gain became slightly lower than the NEA FTA scenario, equaling US\$1.958 billion when capital is internationally mobile. At the same time, real GDP

expansion ranged between 0.062% (the lowest) for Russia and 0.484% (the highest) for the ROK when capital is internationally mobile. The gains were lower without international capital mobility and welfare gains ranged between US\$21 million (the lowest) for Mongolia and US\$20.4 billion (the highest) for Japan, while real GDP changes were 0.029% (the lowest) for Mongolia and 0.364% (the highest) for the ROK. Changes in nominal GDP had a similar pattern with the NEA FTA (Tables 3 and 4).

However, despite being a part of this FTA, the other four members of the EAEU (EAEU4) may experience welfare losses as a result of the formation of this FTA, along with contractions of their real and nominal GDP due to losses in their allocation efficiency and worsening of the terms of trade in goods and services. EAEU4's terms of trade in goods and services worsened by US\$194 when capital is internationally mobile. Russia's nominal GDP may also contract by 0.85% and 1.12% depending on international investment allocation decisions. This was associated with price drops of their merchandise exports. Price decline of merchandise exports in the EAEU area would range between 0.282% and 0.421% depending on international capital mobility (Table 3 and Appendix Table VIII).

#### **d) Northeast Asia plus RCEP plus the EAEU Preferential Free Trade Area (NEA+RCEP+EAEU FTA)**

All countries in the NEA, RCEP and EAEU areas, except the EAEU4, would benefit from formation of this FTA by having welfare gains and real GDP expansions regardless of investment allocation decisions, while other countries and regions would experience welfare losses and real GDP contractions. The magnitude of these gains were larger for all the NEA countries in this scenario than in the previous three FTA scenarios. Welfare gains ranged between US\$70 million for Mongolia and US\$31.8 billion for Japan and real GDP expansions were between 0.012% (the lowest) for the EAEU4 and 0.534% (the highest) for the ROK, when capital is internationally mobile. Without international capital mobility, the gains were lower and the welfare gains ranged between US\$19 million for Mongolia and US\$28 billion for Japan, while the ROK's real GDP expansion was also the highest, equaling 0.394%. Similar to the previous FTA scenario, although being a part of this FTA, the EAEU4 members would experience welfare losses regardless of investment allocation decisions and may see no impacts on their real GDP when capital is not internationally mobile (Tables 2 and 3).

Impacts on nominal GDP had a similar pattern as in the NEA+EAEU FTA scenario. Mongolia's aggregate level of prices became 1.083% lower when capital is not internationally mobile. Also, Russia, the EAEU4 and the ANZI members may experience reductions in their nominal GDP in both the cases of international capital mobility decisions due to drops of their aggregate price indices. At the same time, prices of merchandise exports of these countries would decline in a range of 0.098% to 0.439% (Table 4 and Appendix Tables VII, VIII).

**Table 2: Equivalent Variations (EVs) via the FTAs**

(2011 US\$ million)

Regions	No international capital mobility				International capital mobility			
	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA
China	93	2,831	3,456	7,845	1,883	5,130	5,841	10,623
Japan	18,421	20,309	20,376	27,977	21,446	23,485	23,544	31,801
ROK	7,758	8,701	8,821	11,150	11,194	12,384	12,521	14,040
Mongolia	-13	19	21	19	-26	58	61	70
Russia	43	1,824	1,817	2,492	-314	1,969	1,958	2,518
EAEU4	-15	-141	-185	-68	-78	-205	-111	-18
ASEAN9	-3,051	-3,458	-3,482	3,781	-3,800	-4,255	-4,290	6,207
ANZI	-1,014	-1,178	-1,210	5,142	-1,765	-2,053	-2,109	7,904
Rest of Asia	-2,753	-2,788	-2,796	-4,321	-3,048	-3,131	-3,145	-4,995
USA	-2,753	-3,178	-3,266	-7,445	-5,139	-6,307	-6,495	-13,924
EU_28	-3,098	-6,066	-6,339	-10,724	-3,670	-7,364	-7,724	-13,753
Rest of World	-1,687	-4,838	-5,142	-6,554	-4,272	-7,090	-7,385	-10,840

Source: GTAP Model, simulation results

**Table 3: Real GDP Changes via the FTAs (*qgdp* = GDP quantity index)**

(% change)

Regions	No international capital mobility				International capital mobility			
	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA
China	0.054	0.062	0.064	0.101	0.061	0.070	0.072	0.112
Japan	0.096	0.100	0.100	0.161	0.100	0.104	0.104	0.166
ROK	0.356	0.363	0.364	0.394	0.467	0.482	0.484	0.534
Mongolia	-0.006	0.021	0.029	0.062	-0.034	0.177	0.187	0.243
Russia	0.005	0.055	0.057	0.076	-0.001	0.062	0.062	0.081
EAEU4	-0.004	-0.031	-0.015	0.000	-0.008	-0.035	-0.001	0.012
ASEAN9	-0.018	-0.021	-0.021	0.110	-0.027	-0.031	-0.031	0.137
ANZI	-0.006	-0.007	-0.007	0.213	-0.013	-0.016	-0.016	0.239
Rest of Asia	-0.013	-0.013	-0.013	-0.022	-0.015	-0.016	-0.016	-0.029
USA	-0.001	-0.002	-0.002	-0.003	-0.003	-0.004	-0.004	-0.007
EU_28	-0.003	-0.008	-0.008	-0.013	-0.002	-0.008	-0.008	-0.013
Rest of World	-0.003	-0.007	-0.008	-0.012	-0.009	-0.014	-0.014	-0.024

Source: GTAP Model, simulation results

**Table 4: Changes in Nominal GDP (*vgdp* = change in value of GDP)**

(% change)

Regions	No international capital mobility				International capital mobility			
	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA
China	-0.214	0.002	0.041	0.234	-0.086	0.147	0.191	0.429
Japan	1.502	1.726	1.735	2.179	1.875	2.122	2.131	2.682
ROK	1.047	1.372	1.407	1.346	1.818	2.199	2.239	2.316
Mongolia	-0.416	-0.313	-0.301	-1.021	-0.685	0.914	0.957	0.541
Russia	-0.157	-1.091	-1.118	-1.261	-0.273	-0.820	-0.850	-1.052
EAEU4	-0.184	-0.401	-1.161	-1.192	-0.282	-0.512	-0.932	-1.007
ASEAN9	-0.441	-0.458	-0.459	0.076	-0.504	-0.532	-0.534	0.485
ANZI	-0.263	-0.281	-0.287	-0.558	-0.366	-0.406	-0.415	-0.179
Rest of Asia	-0.654	-0.639	-0.639	-0.976	-0.695	-0.690	-0.691	-1.054
USA	-0.222	-0.243	-0.248	-0.510	-0.321	-0.372	-0.380	-0.772
EU_28	-0.227	-0.323	-0.334	-0.560	-0.268	-0.384	-0.397	-0.681
Rest of World	-0.201	-0.278	-0.289	-0.498	-0.276	-0.362	-0.374	-0.655

Source: GTAP Model, simulation results

**Table 5: Changes in Real Exports (*qxwreg* = change in volume of merchandise exports)**

(% change)

Regions	No international capital mobility				International capital mobility			
	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA
China	3.223	3.452	3.520	4.446	2.679	2.830	2.878	3.674
Japan	2.614	2.676	2.671	3.833	1.151	1.120	1.118	2.019
ROK	4.192	4.374	4.374	5.712	2.167	2.205	2.196	3.221
Mongolia	0.036	1.273	1.283	1.400	0.282	-0.401	-0.430	-0.524
Russia	-0.043	1.882	1.854	2.179	0.089	1.277	1.264	1.664
EAEU4	-0.101	-0.300	1.583	1.646	0.005	-0.137	1.096	1.227
ASEAN9	-0.199	-0.196	-0.196	4.022	0.040	0.069	0.072	2.939
ANZI	-0.103	-0.148	-0.157	6.079	0.125	0.131	0.130	4.920
Rest of Asia	-0.498	-0.506	-0.510	-0.730	-0.237	-0.224	-0.225	-0.294
USA	-0.192	-0.240	-0.249	-0.556	0.248	0.313	0.319	0.584
EU_28	-0.046	-0.091	-0.096	-0.175	0.070	0.078	0.079	0.144
Rest of World	-0.066	-0.089	-0.093	-0.261	0.055	0.065	0.065	0.046

Source: GTAP Model, simulation results

**Table 6: Changes in Real Imports (*qiwreg* = change in volume of merchandise imports)**  
(% change)

Regions	No international capital mobility				International capital mobility			
	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA
China	3.366	3.702	3.793	5.040	3.414	3.767	3.862	5.105
Japan	3.825	4.051	4.053	5.639	4.235	4.492	4.494	6.162
ROK	4.635	4.940	4.955	6.551	4.943	5.274	5.290	6.925
Mongolia	-0.033	1.049	1.063	1.167	-0.346	3.163	3.230	3.572
Russia	-0.044	2.948	2.901	3.499	-0.288	3.742	3.676	4.172
EAEU4	-0.093	-0.340	1.839	2.002	-0.184	-0.484	2.145	2.268
ASEAN9	-0.324	-0.332	-0.331	4.128	-0.393	-0.413	-0.415	4.543
ANZI	-0.088	-0.121	-0.128	4.738	-0.226	-0.282	-0.293	5.187
Rest of Asia	-0.817	-0.821	-0.824	-1.209	-0.920	-0.935	-0.940	-1.421
USA	-0.208	-0.250	-0.258	-0.579	-0.423	-0.520	-0.536	-1.133
EU_28	-0.066	-0.133	-0.140	-0.245	-0.091	-0.174	-0.183	-0.339
Rest of World	-0.062	-0.125	-0.133	-0.290	-0.148	-0.232	-0.243	-0.503

Source: GTAP Model, simulation results

#### 4. Conclusions

CGE analysis of the economic impacts of the four prospective free trade agreements covering the NEA region using GTAP Model and Data Base 9.0a have demonstrated that removing tariff barriers will benefit all parties of a free trade agreement, due to increased trade and economic activities. Specifically, in the cases of:

- a) **CJK Trilateral Free Trade Agreement:** All three countries, China, Japan and the ROK, will benefit as a result of this agreement having positive EV values and real GDP expansions regardless of whether capital is internationally mobile or not. The ROK would benefit most in terms of real GDP change. All other regions would experience welfare losses, including those in the NEA region, except Russia when capital is not internationally mobile.
- b) **NEA Preferential Free Trade Area:** All five countries in the NEA region would benefit from formation of an NEA FTA, having welfare gains and increases of real GDP regardless of the investment allocation decisions. The ROK was the largest winner in terms of its real GDP expansion. The other countries and regions in the model experienced welfare losses and contractions of their real GDP as well.
- c) **NEA+EAEU Preferential Free Trade Area:** All countries in the NEA region would benefit from formation of this FTA regardless of investment allocation decisions, while other countries and regions would experience welfare losses and real GDP contractions. The magnitude of these benefits were larger for all the NEA countries, except Russia, in this scenario compared to the previous two FTA cases. Japan was the largest winner in terms of welfare gains, while the ROK would be the top beneficiary in terms of real GDP expansion.

However, despite being a part of this FTA, the EAEU4 members may experience welfare losses along with drops in their real and nominal GDP due to their allocative efficiency losses and worsening of terms of trade in goods and services.

**d) NEA+RCEP+EAEU Preferential Free Trade Area:** Similar to the previous scenario, all countries in the NEA region would benefit from this agreement by having welfare gains and expansions of real GDP regardless of international capital mobility decisions. All countries in the NEA region were better off under this scenario than the previous three FTA cases, whereas Japan was the largest winner in terms of welfare gains and nominal GDP expansion, while the ROK would benefit most in terms of its real GDP expansion. The other members of the RCEP region would also benefit from this FTA by experiencing welfare gains and real GDP expansions. However, in both cases of international capital mobility, Russia, the EAEU4 and ANZI would experience reductions in terms of nominal GDP due to drops in their aggregate price indices.

Accordingly, for the NEA region as a whole, the NEA+ FTA is preferable to CJK FTA only, and would be even better off in formation of a wider coverage of free trade agreement partners, such as RCEP and the EAEU, where all the countries in the region would benefit from larger welfare gains and real GDP expansions regardless of the investment allocation decisions.

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<sup>1</sup> For more details on the GTAP model and database, refer to Hertel, T. (ed.), 1997.

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**Appendix Table I: Classification of Regions in the Model**

The Model (12 regions)	GTAP 9.0a (140 regions)
China	China
Japan	Japan
ROK	Republic of Korea
Mongolia	Mongolia
Russia	Russian Federation
EAEU4	Kazakhstan, Kyrgyzstan, Armenia, Belarus
ASEAN9	ASEAN9 members, except Myanmar: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Philippines, Singapore, Thailand, Vietnam
ANZI	Australia, New Zealand, India
Rest of Asia	Hong Kong, Taiwan, Rest of East Asia, Rest of Southeast Asia, Bangladesh, Nepal, Pakistan, Sri Lanka, Rest of South Asia
USA	United States of America
EU_28	Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Bulgaria, Romania, Croatia
Rest of World	Rest of Oceania, Canada, Mexico, Rest of North America, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela, Rest of South America, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador, Rest of Central America, Dominican Republic, Jamaica, Puerto Rico, Trinidad and Tobago, Caribbean, Switzerland, Norway, Rest of EFTA, Albania, Ukraine, Rest of Eastern Europe, Rest of Europe, Rest of Former Soviet Union, Azerbaijan, Georgia, Bahrain, Islamic Republic of Iran, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Turkey, United Arab Emirates, Rest of Western Asia, Egypt, Morocco, Tunisia, Rest of North Africa, Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Guinea, Nigeria, Senegal, Togo, Rest of Western Africa, Central Africa, South Central Africa, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Tanzania, Uganda, Zambia, Zimbabwe, Rest of Eastern Africa, Botswana, Namibia, South Africa, Rest of South African Customs, Rest of the World

Source: GTAP 9.0a Data Base

**Appendix Table II: Classification of Sectors in the Model**

No.	Code	Description
1	pdr	Paddy rice
2	wht	Wheat
3	gro	Cereal grains nec.
4	v_f	Vegetables, fruit, nuts
5	osd	Oil seeds
6	c_b	Sugar cane, sugar beet
7	pfb	Plant-based fibers
8	ocr	Crops nec.
9	ctl	Cattle, sheep, goats, horses
10	oap	Animal products nec.
11	rmk	Raw milk
12	wol	Wool, silk-worm cocoons
13	frs	Forestry
14	fsh	Fishing
15	coa	Coal
16	oil	Oil
17	gas	Gas
18	omn	Minerals nec.
19	cmt	Meat: cattle, sheep, goats, horse
20	omt	Meat products nec.
21	vol	Vegetable oils and fats
22	mil	Dairy products
23	pcr	Processed rice
24	sgr	Sugar
25	ofd	Food products nec.
26	b_t	Beverages and tobacco products
27	tex	Textiles
28	wap	Wearing apparel
29	lea	Leather products
30	lum	Wood products
31	ppp	Paper products, publishing
32	p_c	Petroleum, coal products
33	crp	Chemical, rubber, plastic products
34	nmm	Mineral products nec.
35	i_s	Ferrous metals
36	nfm	Metals nec.
37	fmp	Metal products
38	mvh	Motor vehicles and parts
39	otn	Transport equipment nec.

**Appendix Table II: Classification of Sectors in the Model (continued)**

No.	Code	Description
40	ele	Electronic equipment
41	ome	Machinery and equipment nec.
42	omf	Manufactures nec.
43	ely	Electricity
44	gdt	Gas manufacture, distribution
45	wtr	Water
46	cns	Construction
47	trd	Trade
48	otp	Transport nec.
49	wtp	Sea transport
50	atp	Air transport
51	cmn	Communication
52	ofi	Financial services nec.
53	isr	Insurance
54	obs	Business services nec.
55	ros	Recreation and other services
56	osg	Public administration, Defense, Health, Education
57	dwe	Dwellings

Source: GTAP 9.0a Data Base

**Appendix Table III: Classification of Production Factors in the Model**

Old factor			New factor		
No.	Code	Description	No.	Code	Description
1	Land	Land	1	Land	-1
2	tech_aspros	Technicians/Associates, Professional	2	Labor	mobile
3	clerks	Clerks	2	Labor	mobile
4	service_shop	Service/Shop workers	2	Labor	mobile
5	off_mgr_pros	Officials and Managers	2	Labor	mobile
6	ag_othlowsk	Agricultural and Unskilled	2	Labor	mobile
7	Capital	Capital	3	Capital	mobile
8	NatlRes	Natural Resources	4	NatRes	-0.001

Source: GTAP 9.0a Data Base

**Appendix Table IV: CJK FTA Welfare Effects: EV Decomposition Summary  
(Experiment 1: International Capital Mobility)**

(2011 US\$ million)

Regions	Allocative Efficiency	Terms of Trade in Goods and Services	Terms of Trade in Investment and Savings	Total Welfare
China	4,459	-3,051	475	1,883
Japan	5,894	15,160	337	21,391
ROK	5,611	5,819	-237	11,194
Mongolia	-3	-22	-1	-26
Russia	-14	-495	195	-314
EAEU4	-21	-77	19	-78
ASEAN9	-583	-3,262	46	-3,799
ANZI	-451	-1,150	-165	-1,765
Rest of Asia	-187	-2,915	54	-3,048
USA	-413	-3,769	-957	-5,139
EU_28	-413	-3,128	-166	-3,707
Rest of World	-1,312	-3,357	396	-4,272
Total	12,568	-246	-4	12,319

Source: GTAP Model, simulation results

**Appendix Table V: NEA FTA Welfare Effects: EV Decomposition Summary  
(Experiment 3: International capital mobility)**

(2011 US\$ million)

Regions	Allocative Efficiency	Terms of Trade in Goods and Services	Terms of Trade in Investment and Savings	Total Welfare
China	5,121	364	-374	5,111
Japan	6,161	16,914	356	23,431
ROK	5,800	6,888	-304	12,384
Mongolia	16	46	-3	58
Russia	1,174	-785	1,529	1,918
EAEU4	-93	-154	42	-205
ASEAN9	-660	-3,578	-16	-4,254
ANZI	-547	-1,290	-216	-2,053
Rest of Asia	-199	-2,954	22	-3,131
USA	-588	-4,674	-1,045	-6,307
EU_28	-1,391	-5,651	-356	-7,398
Rest of World	-2,029	-5,429	367	-7,090
Total	12,765	-303	2	12,464

Source: GTAP Model, simulation results

**Appendix Table VI: NEA+EAEU FTA Welfare Effects: EV Decomposition  
Summary  
(Experiment 5: International capital mobility)**

(2011 US\$ million)

Regions	Allocative Efficiency	Terms of Trade in Goods and Services	Terms of Trade in Investment and Savings	Total Welfare
China	5,291	999	-467	5,823
Japan	6,164	16,966	359	23,490
ROK	5,821	7,007	-308	12,521
Mongolia	16	47	-3	61
Russia	1,190	-859	1,577	1,908
EAEU4	-2	-194	85	-111
ASEAN9	-667	-3,605	-18	-4,289
ANZI	-565	-1,326	-217	-2,109
Rest of Asia	-202	-2,963	21	-3,145
USA	-617	-4,817	-1,060	-6,495
EU_28	-1,484	-5,912	-363	-7,758
Rest of World	-2,129	-5,652	396	-7,385
Total	12,816	-309	2	12,509

Source: GTAP Model, simulation results

**Appendix Table VII: Aggregate Price Changes by Region: GDP Price Index (pgdp (REG))**  
(% change)

Regions	No international capital mobility		International capital mobility	
	NEA FTA	NEA+EAEU+RCEP FTA	NEA FTA	NEA+EAEU+RCEP FTA
China	-0.06	0.133	0.077	0.319
Japan	1.624	2.015	2.016	2.512
ROK	1.005	0.949	1.709	1.781
Mongolia	-0.334	-1.083	0.736	0.297
Russia	-1.145	-1.336	-0.883	-1.133
EAEU4	-0.37	-1.193	-0.477	-1.020
ASEAN9	-0.437	-0.034	-0.501	0.348
ANZI	-0.274	-0.770	-0.391	-0.417
Rest of Asia	-0.624	-0.954	-0.674	-1.025
USA	-0.242	-0.507	-0.368	-0.765
EU_28	-0.315	-0.547	-0.375	-0.668
Rest of World	-0.271	-0.487	-0.349	-0.631

Source: GTAP Model, simulation results

**Appendix Table VIII: Price Index of Merchandise Exports by Region (pxwreg (REG))**  
(% change)

Regions	No international capital mobility				International capital mobility			
	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA	CJK FTA	NEA FTA	NEA +EAEU FTA	NEA +RCEP +EAEU FTA
China	-0.237	-0.081	-0.055	0.023	-0.141	0.03	0.06	0.185
Japan	1.153	1.313	1.32	1.674	1.434	1.615	1.622	2.062
ROK	0.56	0.709	0.726	0.821	0.916	1.096	1.115	1.282
Mongolia	-0.347	0.241	0.253	0.173	-0.457	0.683	0.709	0.784
Russia	-0.141	-0.347	-0.366	-0.439	-0.218	-0.264	-0.282	-0.391
EAEU4	-0.146	-0.27	-0.421	-0.47	-0.218	-0.327	-0.349	-0.43
ASEAN9	-0.274	-0.291	-0.292	0.061	-0.302	-0.32	-0.321	0.311
ANZI	-0.226	-0.257	-0.263	-0.308	-0.308	-0.348	-0.354	-0.098
Rest of Asia	-0.409	-0.396	-0.396	-0.601	-0.42	-0.409	-0.409	-0.614
USA	-0.205	-0.233	-0.238	-0.462	-0.286	-0.333	-0.34	-0.664
EU_28	-0.203	-0.284	-0.294	-0.485	-0.245	-0.335	-0.346	-0.585
Rest of World	-0.164	-0.248	-0.258	-0.408	-0.228	-0.305	-0.314	-0.514

Source: GTAP Model, simulation results

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