Economic Development, Geography, and Trade:

Evidence from Russian Regions, 2000-2012

Kazuhiro Kumo • Irina Korgun

Abstract This paper deals with the problem of economic growth and spatial development in Russia. It follows a theoretical framework of economic geography in terms of factors of the first and the second nature. According to economic geography, natural resource endowment, transportation costs, distance to markets and population distribution among other factors produce strong influence on economic performance of countries and regions. Using data for Russian regions, we test the effect of these factors on the level of economic development in Russian regions during 2000-2012, when they achieved high rates of growth. Our results support earlier theoretical and empirical findings in several aspects. First, we observe a positive effect of trade on economic growth in Russian regions during the period under review. Second, the first nature factors included as a distance to two main trading partners, Berlin and Beijing, were significant determinants of improvements in the levels of economic development across Russian regions. This work differs from others by the fact that we control for natural resource endowment in order to minimize the resource rent effect on regional economic growth in Russia.

1. Introduction

Resource-dependent nature of economic growth in Russia following the post-Soviet transformation in 1990-2000's is well researched in empirical literature (Cooper, 2006;

Kazuhiro Kumo[1] • Irina Korgun[2] (✉)

[1] Institute of Economic Research, Hitotsubashi University, Japan
  e-mail: kumo@ier.hit-u.ac.jp

[2] Hankuk University of Foreign Studies, Republic of Korea
  e-mail: irinakorgun@gmail.com

Kuboniwa, 2012; 2014). High world oil prices during years preceding the financial crisis of 2008 have positively affected aggregate rates of economic growth on the macro-level (Benedictow et al., 2013; Hofman et al., 2012). There were mainly two sources of this effect. Firstly, proceeds from exports received by Russian firms stimulated higher investments and growth of wages. Secondly, rents in forms of various resource-related tariffs and levies increased budgetary gains of the federal government (Kuboniwa, 2012). This produced a multiplicative effect on business, government and consumer spending and in the end led to growing prosperity reflected in growing incomes.

The mainstream literature on economic dynamics in Russia in 2000's predominantly focused on the macro-perspective of foreign trade rather than on its regional impact. However, region-wide effect of export and import deserves more attention due to several considerations of both global and country-level character. First of all, research into regional impact of foreign trade is necessitated by growing international awareness about role and place of regions in the economic development of countries and, more broadly, in the world economy (Storper, 2008). This trend towards the reinforcement of economic activity at the subnational or regional level somewhat countervailed a progressive transfer of certain economic and political functions upward to the plurinational and global levels (Scott, 1999).

Therefore, it is important to understand what connection to global markets Russian regions have by means of their foreign trade. Of special interest is the question whether foreign trade has any impact on economic development in Russian regions which for several decades did not have free access to world markets under a planned system.
Unlike European countries which started reinforcement of economic and political life at regional level since the end of the 1970's (Scott, 1999), Russia witnessed this transformation, albeit rapid, almost two decades later. The empirical research could not keep up with the pace of changes because studies on impact of foreign on regional development levels are not numerous though there were some for the country-level. Thus, more empirical research is necessary for investigating the impact of foreign trade on regional development to support related policy- and decision making.

Aggregated macro-level data and research do not always suit for such purposes because they fail to emphasize regional differences in foreign trade intensity. In a country like Russia characterized by uneven spatial organisation, regions reveal deep variations in their geographic and market characteristics, natural resource endowment, transport infrastructure, etc. (World Bank, 2004). Even for resource abundant regions, resource endowment itself represents no more than one of the factors contributing to higher levels of development rather than being a single source of growth. Also, experience of other countries shows that economic growth is possible in resource-scare countries like Japan, Germany and South Korea well. Therefore, a research question about the relationship between changes in levels of economic development and non-resource factors emerges from this point.

As mentioned above, research into problems of trade and economic development in Russian regions is meaningful from the point of policy making. To be more specific, it can give ideas on how to manage trade patterns in development process under a

situation when economic activity is geographically dispersed. 'Lumpiness' of economic development (Rodrick, 2003), which is the case in Russia, could result in competitive and collaborative relations of regions with their trade partners becoming more significant for their economic life.

This paper attempts to address some of these issues by investigating pattern of regional economic development in Russia from the point of its relations with foreign trade and geography. The emphasis is on the period of 2000-2012 when Russian witnessed improvements in the levels of economic development in all its 83 regions. We run a series of empirical tests in order to investigate whether trade plays critical role in determining the level of economic development in Russian regions. If so, to what extent the effect of trade on economic growth can be changed when spatiality is accounted for. With the term "spatiality" we mean distance to major economic partners of Russia, namely, the European Union and East Asia. These would be substituted by the distance from Beijing and Berlin.

After reviewing regional economic conditions and trade development patterns in Russia in section 2, the paper proceeds to discussion on some theoretical issues and factors explaining dynamics of regional development. Section 4 introduced data and methodology to be utilized and presents analytical results and their interpretation. Section 5 discusses some policy implications, and the final section concludes major findings. Our analysis shows that trade and population distribution critically affect regional economies in Russia, the finding being consistent with theoretical works. Geography too seems to be a significant determinant of development levels across regions and account for some part of the variation in gross regional product (GRP) per capita. When distance to main trading partners, namely, distance from Berlin or that from Beijing, is included into analysis, regions that locate closer to Beijing tend to grow faster.

2. Regional Economic Space and Trade Performance in Russia in 2000-2012

Russian regions differ substantially between each other in level of economic development. In 2011, ten regions out of total 83 accounted for more than 50% of Russia's sum of GRP, while 20 regions accounted for almost 70% of nominal sum of GRP[1]. Top contributing regions include cities of Moscow and Saint-Petersburg, the Moscow regions, Khanty-Mansiysk Autonomous District, Krasnoyarsk and Sverdlovsk region. Size of country's geographic space leads to scattered economic activity: areas of concentration are divided by enormous expanse of "dead space"' (Carluer and Sharipova 2004; Dienes, 2002). Territorial differences in Russia are very deep-rooted (UNDP, 2007) and were initially set by advantageous resource endowments. But variations in levels of regional economic development had become even more pronounced. This is illustrated well enough in Figure 1. Regions marked by dark colours are usually the ones characterized by higher levels of GRP per capita, while lighter ones are those with lower levels of GRP.

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1 Unified Interdepartmental Statistical Information System Website, <http://www.fedstat.ru/ indicator/ data.do>.

Figure 1 Gross Regional Products per capita, 2010 (in roubles)
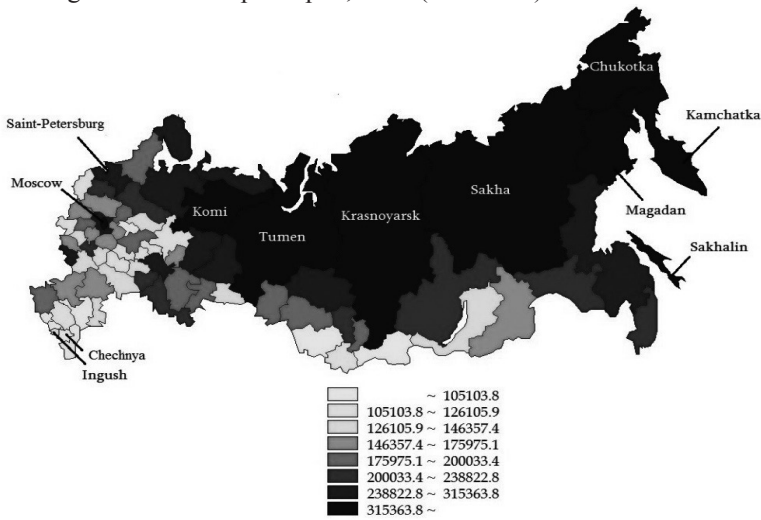
Note: All the data in this paper were derived from Regiony Rossii, various years, by FSSS, if not noted. All the figures and tables were prepared by the authors.

As seen from the Figure 1, variations in levels of GRP per capita were quite pronounced in 2010, and the situation did not change much for these ten years up to 2012. And in some cases, for example, between Nothern Tumen and Caucasian Ingush, the difference reached around twenty to thirty times[2]. Exports too are dispersed unevenly across Russian regions. Here Western regions are doing better than the rest of the country[3].

Increase in inequality in the level of economic development among regions can be largely attributed to two factors. The first is the fact that practices of massive re-distribution of resources by the state were abandoned in the 1990's. Even though they often lead to distortions and misallocations, they sustained economic activities in 'disadvantaged' regions like the ones in the North (Hill and Gaddy, 2003). The other factor could be summed up as an uneven access to economic benefits of growth realized in the 2000's.

There is one quite uncommon thing that becomes quite obvious from Figure 1. Regions with higher levels of GRP are located inland while economically less successful regions are usually the ones located closer to capital region and state borders. Such

2 Unified Interdepartmental Statistical Information System Website, http://www.fedstat.ru/ indicator/ data. do.

3 It should, however, be born in mind that to a certain extent this concentration is a result of data extortion: headquarters of big companies are often registered in Moscow or other big cities while their production base, and consequently export base, locates in regions. This fact could also explain why Moscow and Saint-Petersburg are among top oil and gas exporting regions. In 2011 they exported mineral fuels worth 167.4 billion US dollars and 16.1 billion dollars respectively. It is more than export volumes of net oil producers Tatarstan or Sakhalin for the same year which stands at 16 billion USD and 15 billion USD respectively (Federal State Statistical Service of the Russian Federation (FSSS), 2014). Such data extortion makes an additional reason to account for resource factor when estimating the effect of export on regional economic growth in Russia.

dispersion of GRP across country is strikingly different from what is found in other countries. For example, in China inland regions are less developed than the coastal ones (Li and Xu, 2008; Kwan, 2014). In addition, this type of dispersion of economic activity contradicts to the postulates of theoretical underpinnings of economic geography that says that border regions are more likely to grow faster (Fujita and Mori, 1996). Therefore, in case of Russia we might observe a peculiar type of relations between geography and economic growth. Such relations may result from various reasons including uneven resource endowment and degree of involvement into international trade.

Evidently, increased openness to international trade account for a certain degree of growing regional disparities between Russian regions (Fujita, Kumo and Zubarevich, 2006). After state monopoly for foreign trade was terminated with adoption of trade liberalization act in 1992[4], foreign trade emerged as one of factors of economic growth. Trade's contribution became especially significant in 2000s when Russia saw an accelerated growth of its foreign trade backed by resource exports (Berkowitz and DeJong 2010; Korgun, 2014). In 2000-2010 the volume of export grew at an average rate 17.69% with pre-crisis levels reaching 22.98% during 2000-2008. Growth rates of import over similar periods seem to be unaffected by geographic positioning of the regions. Also, this may mean that remoteness of some regions does not seem to be a problem for certain regions. However, whether it is so or not needs to be tested empirically.

Peculiarities of Russia's spatial development may result from factors of the first nature (Krugman, 1991), namely, exogenous geographic conditions and resource endowment. The second nature, which is man-made, also must have affected the pattern of Russian economic growth. The first and the second nature of economic geography would be discussed more detail in the section of previous literature, but it should be mentioned here as well. Setting aside a pace of historic process and the fact that there were big time gaps in exploration of regions, which are hard to account for statistically, migration patterns seem to intensify economic differences between the Russian regions too. In the absence of state control for movement of population and depopulation of northern regions, varying levels of population distribution influences such aspects of economic activity as agglomeration, infrastructure, involvement in foreign trade and many others (Zubarevich, 2012). In context of given study this means that population could also contribute to the observed differences in relations between regional economic development level and trade.

One more point that deserves consideration is the variation in direction of trade flows. When it comes to national level, Russia's principle trading partner is EU, followed by China. In 2012 four European countries – Germany, Italy, Netherlands and Poland – accounted for 36% of Russian exports; China's share was around 8%, equal to that of Germany (FSSS, 2013). However, Far Eastern regions tend to be more oriented towards China and Asia on the whole due to geographic proximity of Asian countries. Up to 70-80% of export of Primorsky, Khabarovsky and Amursky regions, three biggest non-oil

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4 The presidential decree "About Liberalization of Foreign Economic Activity" N 629 as of 14.05.92 and N 1306 as of 27.10.92.

producing regions in the Far East, goes to Asia and up to 30-40% to China alone[5]. It could be the case that dominating trade partner influences intensity of foreign trade in particular regions and resulting difference of observed economic growth.

So, taking feature of spatial economic development in Russia into account, we would like to address several points in this study. In the first place we are interested in relations between trade and regional economic growth in the presence of such factors as differences in geographic location, direction of trade flows and distance to economic partners. With this we also aim to answer such questions as: Do regions that locate closer to main economic partners grow faster or not? How does main trading partner (Germany or China effects observed) affect the Russian regional economy? And lastly, Does population level changes relations between trade and growth? To the best of our knowledge, such disaggregation was not done in previous empirical works on trade and economic growth in Russia regions.

3. Previous Studies

Spatiality and its role in economic growth and trade is one of the most prolific area of study in the field of economic geography. Works of Fujita, Krugman and Venables (2001), Rodrick (2002), Venables (2003), to name a few, established strong relations between spatial characteristics of an economy, which they refer to as factors of the 'first nature', trade and economic growth. According to them, such forces as closeness to border with economically strong partners, differences in access to ports and transport infrastructure - all influence the trajectory of regional economic growth and often lead to unbalanced pattern of growth with high concentration of economic activity and trade in regions that have better 'first nature' characteristics and low economic growth and sluggish foreign trade in regions that are characterized by relatively unfavourable 'first nature conditions'. This is what Venables (2003) called 'lumpiness' in economic development. Divergent trajectories of growth, though it was set by geography initially, can be intensified in a situation of growing openness to exchanges across national borders. In the presence of intensive trade with foreign partners, agglomeration effect 'within' regions may decrease. This lead us to the question of the 'second nature factors', as defined by Krugman and Fujita (2004). The 'second nature factors' are often 'man-made' and can either help to overcome unfavourable first nature characteristics or, on the contrary, induce larger discrepancies. The latter is due to increasing return to scale, which is presented in the second nature geography and which causes regions with initially advantageous factor endowment grow faster, thus, causing more divergence in level of economic development between the regions of the same country. However certain 'second nature' characteristics may induce faster economic growth and in this regard foreign trade and transportation conditions are of special importance. As Rodrick (2002) points out, foreign trade in conjunction with transportation can be seen as a 'deeper' factor of economic and social development. Regional geography is important for trade because it means distance to markets which in its turn determines income (Redding and Venables, 2003a; 2003b). Sharing a border is believed to have a considerable positive

5 Website of Dalnovostochnoe tamozhennoe upravlenie, URL: <http://dvtu.customs.ru/>.

effect on bilateral trade (Frankel and Romer, 1999) while remoteness was usually perceived as a disadvantage because it meant higher transportation and transaction costs. Crozet and Koenig-Soubeyran (2004) constructed a model for two regions, a border and an interior region, trading with a country and their results showed that a border region had more advantages and was, thus, growing faster. Works that explore problems of regional growth and trade in Russia are not numerous. One of the most recent ones were Ledyaeva and Linden (2008), Lugovoy et al., (2007). These works analysed relations between initial level and prospects of economic growth (Ledyaeva and Linden, 2008), export and regional inequality, growth and convergence, geography and economic development. But issues of geography, growth and trade taken together remain largely unexplored. In this respect our work represents a different piece of research that potentially can contribute to the study of designated problems. Empirical studies established positive and consistent relationship between export of manufactures and economic growth both at a macro and regional levels (Balassa, 1978; Bhagwati, 1978; Krugman, 1987, 1991; Sala-i-Martin, 1994; Frankel and Romer, 1999; Redding and Venables, 2003a). However, in Russia's case the biggest contributor to export is resource sector. Currently, in the year of 2012, oil, gas, minerals account for more than 70% of Russia's total foreign shipments (FSSS, 2013). But the nature of relations between non-resource exports and economic growth remains unclear for Russia. Mainstream research on the problems of economic growth in Russia focused largely on resource rent, including some of the recent works like Cooper (2006) and Kuboniwa (2012). Research on relations between non-resource export and regional growth is important from a point of view of policy making for sustainable and balanced economic growth, which is promoted loudly by the Russian government (Institut sovremennogo razvitia, 2010). To do this, control for resource export is needed. Investigation on the effects of non-resource export is also important for other considerations. High resource rent is among the reasons for large disparities in development levels among Russian regions when judged by levels of GRP per capita. As Figure 2 shows, there are several regions (two in 2000 and four in 2010) that outperform the rest. These regions in 2000 were represented by Tumen (#59 in Figure 2), Moscow city (#18) and in 2010 they were joined by a gas and oil producer Sakhalin (#81) and very sparsely-inhabited Chukotka (83). An interesting thing is that over ten years regions with minimal level of GRP grew more rapidly than those with maximum level of GRP. Considering the fact that generally resource-producing regions have higher GRP per capita levels, difference in the magnitude of increase may suggest that non-resource regions were growing faster. Thus, control for resource exports in the analysis may help to reveal the difference in economic growth rates depending on the dominating type of trade patterns found among Russian regions. In accordance with the neoliberal economic theory, the scale of labour pool and the distance to trading partners are important factors that determine trade, both export and import, and influence economic growth (Krugman, 1991). Studies have found positive relations between level of economic development of Russian regions and size of population residing in or migrating to them (Andrienko and Guriev, 2004; Kumo, 2007).

Figure 2 GRP per capita vs Export per capita for Russian regions, 2000 and 2010.
(GRP per capita: in rubles; Export per capita: in thousand rubles)
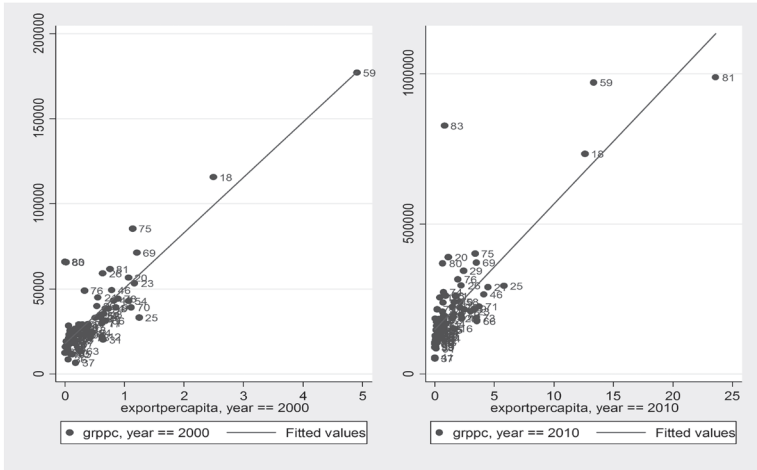
Source: Prepared by the authors based on FSSS, various years.

Generally, more populous regions have higher income per capita. Because economic networks found in them are more dense, the speed of economic processes is higher. Additionally, they are more likely to export and get more dividends from foreign markets. But there are several exceptions among Russian regions. Some scarcely populated regions achieve higher levels of GRP per capita due to resource rents. These are mostly northern regions of Yamalo-Nenets and Khanty-Mansy that contribute to high GRP per capita levels in Tumen[6] (#59 in Figure 2). Here, GRP per capita in 2010 is far more than that of Moscow city (#18), the political and economic centre of Russia. Thus, it follows that relations between labor pool and trade in case of Russian regions is not straightforward in the presence of large natural resources. This makes another reason to control for resources export in analysis.

Impact of geography on regional economic development level in Russia remains relatively under-researched. Previous studies were dominated by theories of distribution of production forces under a planned economy. There are studies that introduce spatial characteristics of interactions among Russian regions (Ivanova, 2007; Lugovoy et al., 2007; Mikhailova, 2004), but very few works considered distance as a factor of economic growth in conjunction with trade and economic growth. Due to large variations in geographic location, regions in Russia developed different trade patterns. As mentioned in more detail previously, Western regions are more oriented towards the EU while the Russian Far Eastern regions share more intensive ties with East Asia and especially with China.

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6 The GRP data for Khanty-Mansy and Yamalo-Nenets are involved in data for Tumen, and they cannot be seen individually.

4. Analysis

In this section we conduct statistical analysis on the relationship between economic development level and trade, and analysis on factors other than resource-mining effects, and those that influence trade activity of regions and are thought to induce economic growth in Russian regions. The analysis employs statistical data for the period of 2000 to 2012 taken from official statistics compiled by FSSS, Regiony Rossii, various years. Data to be utilized and the approaches to be selected are described here.

4.1 Data

Explaining variables to be introduced are as follows. The volume of export per capita and that of import per capita are involved, in order to examine the effect of trade on regional economic growth. Geographical factors to be utilized are the followings. First, a dummy variable for regions which take lead in resource mining, namely, 10 leading regions in natural resource mining, is introduced. This variable denotes the first nature of economic geography (Fujita, Krugman and Venables, 2001). Second, in accordance with the suggestion from empirics of trade and economic growth studies as described in previous studies, the distance from the trade partners should be taken into consideration. A variable used is a distance from Berlin or that from Beijing, the main trading partners of Russia in Europe and that in East Asia. It seems to be natural to assume that proximity to trade partners would have positive effect on regional growth[7][8].

The so-called second nature factor, which could be generated by human activity, is partially grasped by the average number of working population in the economy of each region. This will be taken as a proxy for the market size of the region, and this is also an indicator of agglomeration effect. Other control variables introduced should be mentioned. Investment by the federal government per capita and that by the private sector per capita would be used individually. The former may be invested in less-developed regions in order to support peripheries, and the latter may be conducted in advanced regions for its sector's own sake.

As for the explained variable, one may be able to introduce several specifications in order to examine positive or negative effects of regional trade volume on regional economy. One may assume it seems to be better to employ per capita income in order to check the effect of trade on income. Income redistribution, however, reduces regional disparity in income level of Russian regions apparently (Kumo, 2007; Belov, 2010) and it may lead to ambiguous results. If we check (1) the relationship between export and income and (2) that of export and gross regional products, the latter seems to be more efficient for the analysis (Figure 3a, 3b).

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7 Volume of freight by rail, railroad density, motorway density, aggregated indicators of transport conditions obtained through the application of principal factor analyses on these data, or volume of freight by sea port were examined in preliminary analysis, but none of these data gave us significant results.
8 Additionally, interaction terms between trade and the distance from major trade partners would be involved and their effects were tested. They gave, however, ambiguous results and were not used in the analyses.

Figure 3a Volume of Export (2000-2009) and Income per capita (2001-2010), one-year lag was given to export (all the data were pooled).

Income per capita

$$y = 0.2743x + 8231.9$$
$$R^2 = 0.1976$$

$$y = 1957.3x^{0.1965}$$
$$R^2 = 0.202$$

$$y = 1691.7\ln(x) - 1811.9$$
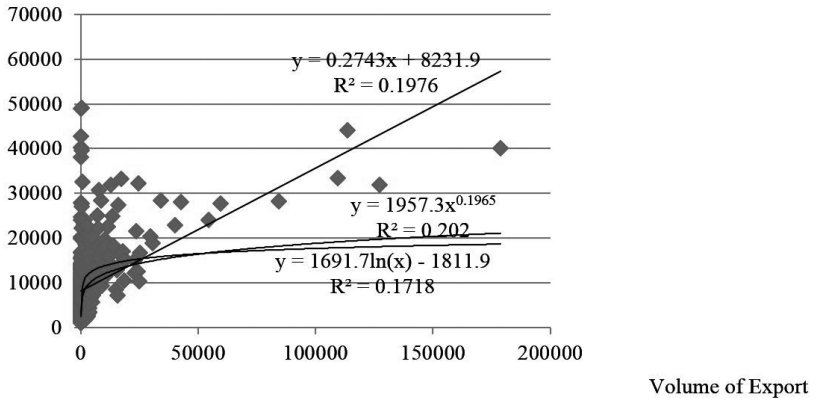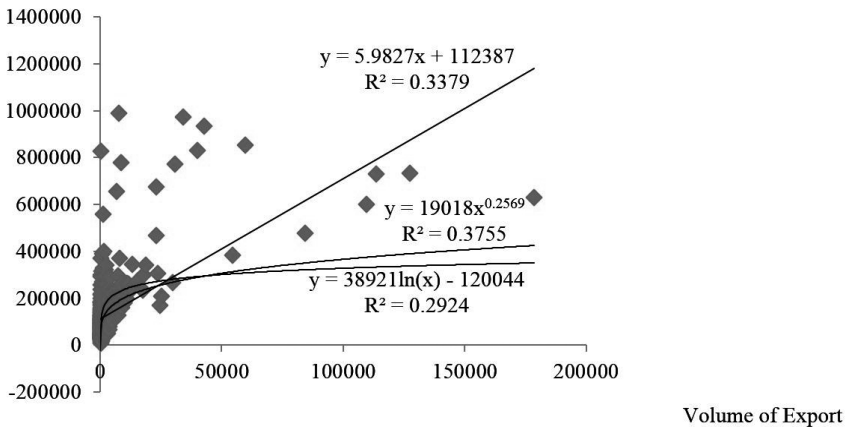$$R^2 = 0.1718$$

Volume of Export

Figure 3b Volume of Export (2000-2009) and Gross Regional Products (GRP) per capita (2001-2010), one-year lag was given to export (all the data were pooled).

GRP per capita

$$y = 5.9827x + 112387$$
$$R^2 = 0.3379$$

$$y = 19018x^{0.2569}$$
$$R^2 = 0.3755$$

$$y = 38921\ln(x) - 120044$$
$$R^2 = 0.2924$$

Volume of Export

Source: Prepared by the Authors based on FSSS, various years.

Data were collected by region, namely, by federal subject of Russia. Considering the unsettled economic situations and widely-spread non-monetized economic systems during the 1990s (Avdasheva et al., 2007), the period to be investigated is from 2001 to 2012. The data on autonomous okrugs (regions) is, however, very limited and they are not available in some cases especially in the early period. The definition and descriptive statistics of the data utilized are described in Table 1.

Table 1 Definition and Descriptive Statistics of the Data

Variable	Variable Name	Observation	Mean	Standard Deviation	Min.	Max.	Unit	Definition
GRP per capita	-	1044	119986.2	122498.2	6667.9	987417.7	in Rubles	Gross Regioal Products per capita in Current Prices.
Export per capita	ExpCap	961	1.27	2.75	0	32.29	in 1000 Rubles	Volume of Regional Export per capita in Current Prices.
Import per capita	ImpCap	970	0.54	1.17	0	10.98	in 1000 Rubles	Volume of Regional Import per capita in Current Prices.
Labor Power in the Economy	Labor	989	824.8	835.2	20.9	6593.2	in Thousand	Yearly Average Number of Labours in the Eocnomy.
Governmental Investment per capita	GovInves	996	0.05	0.16	0.0011	1.85	in 100 thousand rubles	Yearly Volume of Governmental Investment per capita.
Private Investment per capita	PriInves	989	0.06	0.11	0.0018	1.55	in 100 thousand rubles	Yearly Volume of Private Investment per capita.
Dummy for Resource Mining Regions	ResDummy	996	0.12	0.33	0	1	-	Unity for top 10 resource mining regions, zero for others.
Distance from Berlin	Berlin	996	3085.8	1870.0	530	7953	in Kilometers	Distance of regional capital from Berlin.
Distance from Beijing	Beijing	996	4710.9	1476.7	1345	6829	in Kilometers	Distance of regional capital from Beijing.

4.2 Methods

For estimating the regional development patterns across Russian regions, we follow the theoretical framework of the augmented Solow model (Mankiw, Romer and Weil, 1992), which is extensively used for analysis of variations in income levels and growth patterns among countries. According to the augmented version of the model which represents an extension of production function, output is a function of physical capital, labour and the level of technology. Our specification does not include technology because we assume that in the regions of the same country technology levels are roughly the same. But it includes trade and geography components as discussed earlier. The final specification takes the following form:

Log GRP per capita = ExpCap+ImpCap+Labor+GovInves+PriInves
+ResDummy+Geography (Either Berlin or Beijing)

We take gross regional product per capita in the logarithmic form, taking into consideration about the decreasing effects of explaining variables to scale, and give one-year lag to explaining variables in the right-hand side of equation except for the time invariant geography factors and resource dummy.
The approach to be utilized is panel data regression analysis and pooled ordinary least squares (OLS). Each region is regarded as a panel sample in panel regression analysis. Variables constant with respect to time (distance from Berlin and that from Beijing) would be introduced, therefore not fixed effect models but panel random effect models should be taken as the first selected specification. Pooled ordinary least squares

estimation was not chosen by statistical tests involved, but the results of OLS will be presented for reference and robustness check. The effects of mining sectors on Russian regions are apparent (Kuboniwa, 2012) and they are not the main targets of this analysis. Rather, we aim to check the effect of factors other than mining sectors on levels of economic development in Russian regions. Consistent with the discussion above, our main target relates to the roles of trade and geography. Introduction of a dummy variable for resource-mining regions would allow us to control for the effects of the resource mining sector[9]. Thus, our first hypothesis is that trade influences regional economies in Russia and accounts for the difference in levels of GRP.

The other hypothesis deals with the role of geography. Namely, we verify the hypothesis that regions which locate close to trade partners may grow faster. For this purpose we would introduce the distance from Berlin and that from Beijing, the largest trade counterparts with Russia in recent years. By doing so, we also aim to check which trading partner has potentially larger effect on the levels of economic development. Lastly, the period to be examined by this study concerns years of economic boom in 2000's including recession that ensued after the financial crisis of 2008. It is widely believed that during boom years growth was based on exports of resources. While there is a great deal of truth to it, with this analysis we also try to check whether or not factors other than resource producing sectors have also provided solid foundations for positive dynamics.

4.3 Results and Interpretation

Results that were obtained are shown in Table 2. GRP per capita was chosen to be a dependent variable as it should be the most relevant indicator[10]. Qualitatively results of random effect model panel regression and those of the pooled OLS are in the same direction. Inclusion of variables constant with respect to time requires that we should use random effect models in estimating panel regression models, as mentioned earlier. Qualitatively the results are almost the same in whatever specification of the estimated equation. Hence, from here the discussion will be made basically in accordance with the results identified as Specification (5) or (6) in Table 2a. Almost all the regression coefficients obtained expected results, and the results seem to be stable. Especially we would like to mention about the robustness of the positive effect of per capita export volume and import volume on GRP per capita. The variable always obtained significant and positive coefficient in any of the specifications. The implication of this result is clear-cut and the volume of export and import per capita definitely increase the volume of gross regional products per capita in Russian regions.

As for controlling variables, both governmental investment per capita and private

9 A possible explaining variable which denotes the effects of resource mining sectors may be the volume of export from mining sectors. However, correlation between the total export and that of mining sectors is very strong because more than 70 % of export from Russia is composed by natural resources.

10 In the preliminary analyses the authors tried to use income per capita or expenditure per capita. In both cases the resource-mining region dummy variable and distance neither from Berlin nor from Beijing obtained significant results. Income redistribution must affect regional economic conditions and GRP per capita should be regarded as more adequate indicator in this case.

investment per capita show expected and significant results. The governmental investment was made in comparatively poorer regions, and this may be the compensation for the poorness of the regions. On the contrary, the private investment was made in comparatively richer regions.

Table 2a Estimation Results by Random Effect Panel Regression Analysis Explained variable Log (GRP per capita)

VARIABLES	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5	Specification 6
ExpCap	0.0986***	0.0976***	0.102***	0.0922***	0.0924***	0.0922***
	(0.0104)	(0.0105)	(0.0101)	(0.0104)	(0.0104)	(0.0103)
ImpCap	0.265***	0.262***	0.236***	0.243***	0.243***	0.245***
	(0.0237)	(0.0243)	(0.0230)	(0.0229)	(0.0229)	(0.0229)
Labor		3.72e-05	0.000159**	8.31e-05	0.000108*	0.000106*
		(6.06e-05)	(6.20e-05)	(6.33e-05)	(6.41e-05)	(6.35e-05)
GovInves			-0.982***	-0.891***	-1.037***	-0.938***
			(0.292)	(0.288)	(0.296)	(0.287)
PriInves			5.235***	5.229***	5.057***	5.153***
			(0.507)	(0.502)	(0.507)	(0.501)
ResDummy				0.670***	0.570***	0.562***
				(0.160)	(0.166)	(0.165)
Berlin					5.53e-05**	
					(2.71e-05)	
Beijing						-7.29e-05**
						(3.26e-05)
Constant	11.33***	11.30***	10.99***	10.98***	10.82***	11.32***
	(0.0512)	(0.0693)	(0.0799)	(0.0783)	(0.113)	(0.171)
Wald chi2(2)	315.86	315.58	481.30	507.95	514.12	515.64
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00
R-sq within	0.23	0.23	0.33	0.33	0.33	0.33
R-sq between	0.43	0.42	0.44	0.55	0.56	0.56
R-sq overall	0.31	0.32	0.36	0.39	0.40	0.40
Observations	935	935	934	934	934	934
Number of id	82	82	82	82	82	82

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The dummy variable for resource abundant regions obtained a significant and positive coefficient. Although this result could be expected, the following needs to be mentioned here. That is, even when one controls the effect of resource-mining regions, still there are several factors that affect strongly regional economic development level in Russia. These results other than for resource–mining regions are obtained under the condition that the effect of resource mining regions is controlled; hence, one can interpret that all the variables which obtained significant coefficients are effective on regional economic growth even if resource-mining sectors do not work.

What should be mentioned about one of the results in examining the agglomeration effect is that the volume of labour resources in regions obtained significant coefficient in three of the five specifications which involved the size of labour power. Among which included all the explaining variables into the regression model in Table 2a, and in all the specifications for OLS in Table 2b. In this regard the overall results show that not

only the first-nature factors, namely, resource endowment or other time-indifferent factors, but also the second-nature, man-made, factor, namely, population distribution or agglomeration positively affects regional economy.

Table 2b Estimation Results by Ordinary Least Squares. Explained variable: Log (GRP per capita)

VARIABLES	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5	Specification 6
ExpCap	0.148***	0.144***	0.153***	0.132***	0.130***	0.131***
	(0.00914)	(0.00934)	(0.00915)	(0.0101)	(0.0100)	(0.0100)
ImpCap	0.160***	0.148***	0.126***	0.137***	0.148***	0.151***
	(0.0200)	(0.0209)	(0.0202)	(0.0202)	(0.0200)	(0.0201)
Labor		5.49e-05*	0.000120***	8.83e-05***	0.000110***	0.000105***
		(2.89e-05)	(3.08e-05)	(3.13e-05)	(3.12e-05)	(3.11e-05)
GovInves			-1.270***	-1.152***	-1.377***	-1.250***
			(0.227)	(0.226)	(0.227)	(0.223)
PriInves			3.745***	3.717***	3.404***	3.590***
			(0.443)	(0.439)	(0.437)	(0.434)
ResDummy				0.371***	0.257***	0.261***
				(0.0813)	(0.0833)	(0.0830)
Berlin					6.31e-05***	
					(1.24e-05)	
Beijing						-7.57e-05***
						(1.48e-05)
Constant	11.30***	11.27***	11.08***	11.08***	10.91***	11.44***
	(0.0252)	(0.0315)	(0.0423)	(0.0419)	(0.0540)	(0.0817)
Observations	935	935	934	934	934	934
R-squared	0.343	0.346	0.400	0.413	0.429	0.429

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

More attention should be paid to the results for distance from Berlin or that from Beijing. The former obtained positive and significant coefficient and the latter variable obtained negative and significant coefficient. This means that the closer the region is to Beijing, the higher the gross regional product per capita of the region, and vice versa. In preliminary analysis we tried to include distance from Moscow, Russia's capital, in order to check how proximity to the capital region affects regional variations in development levels. However, the results obtained were same as those for distance from Berlin: hence, we do not include them here. On the contrary, the distance from Berlin, the second leading trade partner of Russia in 2012 (following Netherland, see FSSS, 2013) and the most important economic partner for many Western regions did not obtain comparable coefficients with the distance from Beijing. Thus, our hypothesis regarding the positive effect of proximity to China or East Asia on trade and growth in Russian regions received statistical evidence. Moreover, the result shows comparative importance of the direction of trade flows.

5. Discussion and Policy Implications

Two main discussion points emerge from the results obtained. First, international trade plays an important role in economic development in Russian regions. This fact

should deserve more attention in the Russian context because transition towards greater openness to trade has not been long in time and is far from complete. The significance of trade does not change whether or not the first nature geography is taken as a distance to main trading partners (Table 2a). This result is somewhat surprising because effect of trade could be intensified, or lessened, by geography since geographic distance also means economic distance due to its connection to trade costs. Thus, international trade has enough explanatory power to account for difference in income levels and growth patterns of the Russian regions.

Second, geography is an additional and important determinant of regional economic growth, understood here as the level of GDP per capita[11]. Higher coefficients for Beijing were not expected because, historically, Germany has always played an important role as a major trade partner, based on the role which was supported by long-term investment and technology cooperation in bi-lateral (Russia-Germany) and multilateral (Russia-EU) mode. Statistical importance of Beijing may be seen as an evidence of shift in Russia's development pattern from Europe-oriented towards Asia-oriented, which was actually declared officially in 2008[12]. Several assumptions could be offered to possibly explain this phenomenon. The fact that a large part of Russia's territory lies in Asia makes China as the closest economic partner for many Russian regions. Consistent with the previous discussion, geography becomes an important factor in determining directions of trade flows in a more open economy. On the other hand, bigger role of China could be explained by complementarity of industrial complexes between regions of the two countries[13] (Kang, Ch. 2014). Plausibility of these assumptions still needs to be verified empirically since the extent of contribution of exports to China was not fully covered. Nevertheless these findings may be in favour of growing importance of Asia for the Russian economy, or at least they may be the signs that a more balanced export-driven growth pattern is a possible development scenario for Russian regions.

With regard to policy implications, the following could be suggested based on the results of this research. Since international trade, both export and import, has stable and positive effect on the regional economy, it is important to introduce various support programs for international trade. These programs need to consider the effect of proximity to foreign trade partners and provide enough opportunities to develop trade in both European and Asian directions. More support for non-resource trade can aid economic growth in resource-poor regions. Considering the strength of the first nature factors,

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11 The order of magnitude of the impact of distance to trading partners, Beijing and Berlin, should also be taken into account. When checked for, standardized Beta coefficients, that show the relative strengths of the variables used, distance turns out to have stronger impact than population and resource abundance. For details see Appendix Table 1

12 The necessity to pay more attention to Asia-Pacific was mentioned in the Concept of the Foreign Strategy of the Russian Federation 2008, and was strongly advocated in the new version of the document in 2013. See "Concept of the Foreign Policy of the Russian Federation as of July 12, 2008", available at: <http://www.mid.ru/brp_4.nsf/0/357798BF3C69E1EAC3257487004AB10C> and Concept of the Foreign Policy of the Russian Federation as of February 12, 2013, Available at: <http://www.mid.ru/bdomp/nsosndoc.ns-f/e2f289bea62097f9c325787a0034c255/0f474e63a426b7 c344257b2e003c945f!OpenDocument>

13 Certain similarity in production forces created under planned communist system has been rapidly changing lately due to rapid structural shifts in Chinese economy (Kwan, 2013).

infrastructure development is an essential part of improvements in the fundamentals of regional economic growth and of integration into the world trade by Russian regions.

6. Concluding Remarks

The second-nature factor, population distribution, must have effects on regional economy as indicated in theoretical studies and the analytical results for Russia in this paper have shown as well. What we have to emphasize here is, however, it is apparent that regions which locate closer to main economic partners grow faster. Although the direct effects of economic performances of trading partners were not examined, geography does matter much in defining levels of regional development in Russia.

In this paper we explored the problem of trade and economic growth in Russia. Our discussion deals with relationship between regional economic growth and trade in connection with other factors that induce growth, namely, geography and population agglomeration. The results that were obtained here are consistent with previous studies in the aspect that they provide evidence for significant impact of trade, geography and agglomeration on economic development. In the case of Russian regions proximity to trade partners seems to be important factors determining economic dynamics in regions. Results obtained through analyses also show that there are important changes in Russian trade patterns. They tend to be directed more towards China than Berlin that used to be the main partner for Russia in both industrial and trade aspects. In the coming years orientation towards China, or more precisely, East Asia on the whole, may intensify due to government policies aimed at development of the Russian Far East and the current political situations induced by Ukrainian/Crimean incidence.

Analytical results by this study are robust but still there are certain limitations. Government policies for regional development were not taken into account though some of them must influence level of gross regional product per capita. Also, the analysis did not include possible effect of exchange rate as well as changes in the rates for transportation, though what is important is not physical distance but economic distance. Potential effect of these factors could be, however, explored in future studies.

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Appendix

Table 1 Estimation of Standardized Beta-Coefficients (by OLS only)

VARIABLES	(1)	(2)
ExpCap	0.41***	0.41***
	(0.01)	(0.01)
ImpCap	0.21***	0.22***
	(0.02)	(0.02)
Labor	0.11***	0.11***
	(0.00003)	(0.00003)
GovInves	-0.17***	-0.15***
	(0.23)	(0.22)
PriInves	0.22***	0.24***
	(0.44)	(0.43)
ResDummy	0.096***	0.097***
	(0.08)	(0.08)
Berlin	0.14***	
	(0.00001)	
Beijing		-0.14***
		(0.00001)
Constant	-	-
Observations	934	934
R-squared	0.429	0.429

Source: Prepared by the Authors.

Source: Prepared by the Authors.