SPECIAL REPORT.
MICROECONOMICS OF THE EURASIAN GEOGRAPHY

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In our special report Economic Geography of the Eurasian Countries on the importance of countries’ geographic position, we noted that the continentality of the region has significant consequences for economic development, including GDP and turnover growth.

The key factor in the imbalances between the continental and coastal regions is the significant difference in transportation costs. In EDB countries, high transport expenses are driven by the particular regional location of key production facilities and the higher cost of carriage by land than by sea.

If goods are exported, their transportation expenses within the exporting country are sustained primarily by the producer. Therefore, the profit gained by the companies differs significantly depending on their remoteness from the ocean. For EDB countries, that is manifestly illustrated when the transport expenses of large regional exporting companies are compared with those of producers from oceanic states. In this report, we briefly identify the key geographic factors impacting economic development both at the country level and at the micro-level of industries and companies.

TRANSPORT COSTS: DIFFERENCES BETWEEN THE COUNTRIES

Transportation distance is significant for a country’s competitiveness. That is evidenced by an OECD study [2008], which shows that despite the progress of transport and communications technology in trade-related industries, which has resulted in a considerable reduction in transport costs, the distance factor still plays a significant role. The study confirms that an increase in the transportation distance by 10% results in a reduction of trading volumes by about 10%. According to estimates contained in the work, access to global markets has a significant impact.
on economic activity and makes an important contribution to the GDP per capita level. Thus, Australia and New Zealand bear the greatest losses from their geographic position – about 10% of GDP per capita compared with the average level of the OECD countries. The greatest positive contribution to GDP from access to global markets is noted in Belgium and the Netherlands – about 6%. We came up with our own estimates for Russia and Kazakhstan using the same calculation methodology [Herve Boulhol et al, 2008]. As the results show, the losses for Russia and Kazakhstan from their geographic location are significantly greater than the average for the European countries and the USA.

Table 1. Contribution of geography to GDP per capita*, difference in %

<table>
<thead>
<tr>
<th>Country</th>
<th>Deviation in %</th>
<th>Country</th>
<th>Deviation in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-10.6</td>
<td>Ireland</td>
<td>0.6</td>
</tr>
<tr>
<td>New Zealand</td>
<td>-10.1</td>
<td>Italy</td>
<td>1.3</td>
</tr>
<tr>
<td>Kazakhstan**</td>
<td>-7.4</td>
<td>Austria</td>
<td>1.8</td>
</tr>
<tr>
<td>Russia**</td>
<td>-4.6</td>
<td>Canada</td>
<td>2.1</td>
</tr>
<tr>
<td>Greece</td>
<td>-3.7</td>
<td>Denmark</td>
<td>2.2</td>
</tr>
<tr>
<td>Portugal</td>
<td>-2.7</td>
<td>Japan</td>
<td>3</td>
</tr>
<tr>
<td>Finland</td>
<td>-2.4</td>
<td>Switzerland</td>
<td>3.3</td>
</tr>
<tr>
<td>Norway</td>
<td>-1.5</td>
<td>France</td>
<td>3.4</td>
</tr>
<tr>
<td>Sweden</td>
<td>-1.4</td>
<td>UK</td>
<td>3.8</td>
</tr>
<tr>
<td>Spain</td>
<td>-1.2</td>
<td>The Netherlands</td>
<td>5.6</td>
</tr>
<tr>
<td>USA</td>
<td>-0.3</td>
<td>Belgium</td>
<td>6.7</td>
</tr>
</tbody>
</table>

* Taking Australia as an example, the table should be read as follows: the degree of access of Australia to global markets results in a reduction of GDP per capita by 11.8% compared with the average value of the countries considered in this example.

** EDB estimates

Source: OECD, authors’ calculations

Railway transportation has the greatest share of EAEU countries’ cargo turnover. In Russia, its share in 2015 excluding pipeline transport was 87%. Domestic transportation accounts for more than 60% of overall cargo turnover, while export shipping accounts for about 30% and transit traffic accounts for about 2%. By contrast, sea transport accounts for the highest share in oceanic countries.
Therefore, an important criterion when comparing producers’ transport costs from continental and oceanic countries is the cost of transportation per unit of product by sea or land. For example: the freight price from Australia to China is USD 9 / ton, and that from Brazil to China is USD 22 / ton. The cost of transshipment at ports is USD 2-4 / ton. The railway tariff for coal and ore transportation from Siberia to Far-Eastern ports was over USD 35 / ton in 2014, while for steel it was over USD 100 / ton. The cost of transshipment in Russian ports is USD 12-18 / ton.

The significant difference between the cost of sea and land transportation given the already highlighted dominance of land transport in the cargo turnover of the EDB countries versus the high importance of sea transport for the coastal states demonstrates that domestic producers face worse conditions when competing in the global market. Thus, according to World Bank data, Tajikistan faced the highest shipping cost of export cargo in the world in 2014, at USD 9,050 per container. The ten countries with the highest transportation costs per container also included Kazakhstan (USD 5,285 per container), and Kyrgyzstan (USD 4,760 per container). The cost of delivering exports in five of the six EDB countries exceeds the average global level of USD 1,650 per container.

8  http://carnegie.ru/commentary/2015/10/13/ru-61592/jpy
PRODUCTION LOCALIZATION AND CARGO TURNOVER STRUCTURE BY INDUSTRY

The significance of the transport costs factor differs depending on the industry, and largely depends on the specific weight of the costlier types of cargo, including railway transport. In Russia, railway is mainly used by the fuel industry, metallurgy, and the construction materials industry (fig. 3).

Source: World Bank estimates taken from the Doing Business survey

Fig. 2. Export delivery cost, USD per container in 2014

Source: Federal Statistics Service of the Russian Federation, authors’ calculations
Coal accounts for the single greatest share of railway cargo transportation (26%)\textsuperscript{9}, with more than half of extracted coal exported. Russia was the world’s third-largest coal exporter in 2014 with 11\%\textsuperscript{10}. Power station coal dominates Russian coal exports – its share accounts for 87\%\textsuperscript{11}. About 80\% of power station coal reserves in Russia are located in Western and Eastern Siberia. Therefore, most Russian coal deposits are located far from sea access (the distance to the nearest port is 3.5 - 4.5 thousand km).

In the second half of the XX century, many countries moved their key production facilities from the continental part of the mainland to the coastal zone. At the same time, Russia (the USSR) saw a massive move into deep mainland regions, driven by the relative isolation of the economy from the outer world and the need to explore natural resources in Siberia and the Urals. In doing so, most republics, including Russia, lost access to key ice-free ports following the USSR’s collapse (Bezrukov, 2006).

Russia’s mining complexes are located in the continental part of Eurasia, far from the large ocean ports. Exports from the Mikhailovsky mining and processing facility, which belongs to Russian metals and mining company Metalloinvest, are dispatched through the ports of the Black and Baltic seas (over 900 km by rail and ca. 1,200 km by rail, respectively).

**Fig. 4. Location of the key coal and iron ore mining complexes**

![Location of the key coal and iron ore mining complexes](image)

**Source:** Authors, based on L.A. Bezrukov’s work, annual reports of mining and processing facilities.

\textsuperscript{9} Transport and communications in Russia, 2016. Federal State Statistics Service


At the same time, Australia’s ore deposits are located about 500 km from the Indian Ocean, while the distance from Brazilian mines to the Atlantic Ocean is 500 - 900 km by rail.

The distances Russian coal covers by rail are among the longest in the world, and the longest in respect of exports. At the same time, Russia’s direct competitors (Australia, South Africa, South America, and Indonesia) export by sea. In Australia, for example, no coal mining is more than 300 km from the port. By contrast, the main export volumes in Russia are supplied from the Kuzbass, the transportation leg exceeding 3.5 thousand km. Even the commissioning of the East Siberian and Yakut deposits will not change the disadvantage in transport costs significantly. Therefore, transport is high in the structure of the industry’s costs: it accounts for 50-60% of the power station coal price and 30-40% or more of the coking coal price. For comparison: transport costs in the oil industry account for less than 10% of the price, while in the aluminum industry the share is 10-20%, and that in metallurgy is slightly less than 20%12.

Therefore, coal transportation within Russia is unique in terms of its scale, is a fairly inflexible direct cost, and cannot be changed in the near future. As a result, according to Kuzbass Fuel Company data for 2016, at the lowest export price of USD 49 per ton the producer earns USD 8-9 net of costs13.

**TRANSPORT INTENSITY OF COMPANIES**

The above difference in transport expenses significantly impacts the structure of expenses and competitiveness of companies. Thus, Metalloinvest is the world’s second-largest company in terms of iron ore reserves after Brazilian Vale. Kazakhstani ERG is seventh, after Australian BHP Billiton and Rio Tinto, and North-American Cliffs Natural Resources and FMG. The metals and iron ore markets are mainly focused on China. Currently, that country consumes almost half of global iron ore exports. Russia and Kazakhstan share a common border with the main global consumer, but their aggregate weight in Chinese imports of iron ore barely reaches 1%. Australia’s share in the overall volume of Chinese iron ore imports is 42%, while Brazil accounts for 14%14.

If the ore is supplied to the Chinese border from the Kursk magnetic anomaly’s mining facilities by rail, it travels 4-7 thousand km, depending on the chosen route. Australian ore has to cross the ocean and travel more than 9 thousand km, while Brazilian ore travels almost 22 thousand km to reach a sea port in China. Despite their geographic remoteness from the global iron ore consumption centers, four companies – Vale, BHP Billiton, Rio Tinto, and FMG – account for 72% of the global iron ore trade. Russian company Metalloinvest supplies 66% of the extracted ore to the domestic market, while it exports just 19% to European countries and 10% to Asia15.

13 [EDB industry review](#)
14 The calculations were based on UN comtrade database statistics
15 Annual report of Metalloinvest for 2015
Despite Russia and Kazakhstan’s competitive advantage – continentally neighbouring the largest target market – the absence of an effective transportation and logistics system together with dependence on land transportation means that Russia and Kazakhstan face limitations to their mining enterprises’ export potential. Due to a number of factors, rail transportation is not profitable, so sea carriage is preferred. According to JOC.com calculations, the cost of transportation of a 40’ container by rail is about USD 8 thousand. Transportation of the same container by sea would cost about USD 3 thousand\textsuperscript{16}.

**Table 2. Calculation model for determining the export prices and profit of iron ore producers (sellers) exporting to China in FY 2013/2014, USD/ton\textsuperscript{17}**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Russia</th>
<th>Brazil</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aggregate costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Production cost</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>2. Cost of railway transportation to the exporter’s border</td>
<td>40</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>3. Total costs (3 = 1+2)</td>
<td>62</td>
<td>32</td>
<td>39</td>
</tr>
<tr>
<td><strong>Export price FOB</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Global price</td>
<td>116</td>
<td>116</td>
<td>116</td>
</tr>
<tr>
<td>5. Cost of railway transportation to the exporter’s border</td>
<td>0</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>6. Export price (FOB) (6=4-5)</td>
<td>116</td>
<td>97</td>
<td>106</td>
</tr>
<tr>
<td><strong>Profit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Profit from export (7=6-3)</td>
<td>54</td>
<td>65</td>
<td>67</td>
</tr>
<tr>
<td>8. Total expenses (8=3+5)</td>
<td>62</td>
<td>51</td>
<td>49</td>
</tr>
</tbody>
</table>

Source: the table represents the authors’ expert estimates based on materials from information agencies and statements by mining company executives published in the press. The global price for iron ore is the average for 2013 - 2014 according to WB data.

Note: The iron ore extraction cost in Russia does not take account of ore quality (the need to enrich it to ore concentrate with 65-70% Fe content).

\textsuperscript{16} http://www.rbc.ru/politics/15/12/2015/56703a6d9a794788a89ae7d

\textsuperscript{17} The table is built using the methodology contained in Continental-oceanic dichotomy in international and regional development [L.A. Bezrukov, 2006]
While there is a surplus of iron ore in the Russian market (about 25%)\(^{18}\), and the export price exceeds the prices of competitors from Brazil and Australia, its integration into the global market will be limited by the high transport costs. Sharing a common border with China, Russian producers can supply that country by land, while Chinese importers do not incur expenses paying for sea freight. When setting the export price, the Brazilian and Australian companies exporting ore to China must take into account the additional sea freight expenses. On the other hand, relying only on expensive railway transportation, Russian producers have to bear high expenses. The aggregate transport expenses per ton for Brazilian and Australian producers resulting from railway and sea carriage are around 30% lower than those incurred by Russian iron ore exporters. Therefore, although the export price of Russian suppliers when delivering to China is higher than that of competitors from Australia and Brazil, expenses incurred by Russian mining and metallurgy exporters were USD 62 per ton of iron ore in 2013/2014, while for oceanic producers they were USD 50 (Table 2).

**WAYS TO OVERCOME THE DISTANCE DISADVANTAGE**

Development of transport infrastructure is of paramount importance for the economy of the EDB countries in light of their territory and the location of the main facilities. Development of the domestic railway and port infrastructure, the creation of transcontinental Eurasian transport corridors, and a reduction in the average transportation distance by optimizing the added value chain may make a positive contribution to reducing producers’ transport expenses.

In addition, measures aimed at increased added value of the output are among the possible strategies for changing export infrastructure from a raw materials focus towards high-tech and science-intensive products, which are relatively less dependent on the transport component in the price structure.

One of the economic measures to address transport costs could be to launch companies with government support and significant capital in countries with lower production and product turnover costs\(^{19}\).

The creation of logistics corridors between EDB countries will help reduce transport costs thanks to economies of scale and will contribute to a transition from inter-industry to intra-industry trade, the development of which, in its turn, will be a key factor in overcoming the distance disadvantages. The role of transport distances and costs in the global natural resources trade is empirically significant [World Bank, 2008]; moreover, their role intensifies with time. Research by the World Bank and other international organizations evidences that transportation distance remains a significant factor in global trade, and that its effect on global trade has not just declined in a number of cases in recent decades, but is actually growing\(^{20}\). That, in its turn, requires developing competitiveness-building strategies at the levels of national economies and separate businesses, which would take into account the importance of the geographic factor and distance disadvantages.

\(^{18}\) [https://www.metalbulletin.ru/analytics/ores/628/]

\(^{19}\) L.A. Bezrukov. Continental-oceanic dichotomy in international and regional development, page 46

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