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## Interaction of the Russian Far East and Asia-Pacific Countries: Assessment of Institutional and Tariff Barriers to Trade

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**Abstract**—Due to the considerable distances from the major sales markets of Russia, the Far East has close ties with markets of the countries in the Asian-Pacific region (APR). The current expansion of trade and economic interactions with these countries has a positive effect on the economic development of the Far East. Reducing various barriers to trade with the APR countries can increase the scale of bilateral trade, acting as a source of growth and development for the economy of the Far East. To determine the ranges for increasing trade, the potential for trade interactions arising from the leveling of various barriers was quantified. It is shown that for the Far East a gradual change in the intensity of foreign trade relations was observed in favor of geographically close foreign markets, the Asia-Pacific countries. Based on the constructed gravity dependence, trade barriers for interactions between the Far East and Asia-Pacific countries were estimated and decomposed into the ad valorem equivalent. It was determined that the major source of tariff barriers was the tariff burden on exports and imports, formed by the Russian side. The decomposition assessment showed that the comparative institutional barriers between the Far East and the Asia-Pacific countries were significantly greater than the comparative tariff barriers. This circumstance indicated the insufficiency of reducing tariff barriers for intensifying the bilateral trade between the Far East and the Asia-Pacific countries. The analysis made it possible to assume that the introduction of various types of weakly motivated trade restrictions by the Russian side led to a shift in the customs burden from tariff barriers to institutional ones. In addition to the Republic of Korea, a general vector of intensification of trade between the Far East and the Asia-Pacific countries was observed for China. The estimates obtained suggest that the comparative institutional barriers between the Far Eastern regions and China will continue to decline. It is shown that the leveling of comparative institutional barriers between the Far East and Japan can significantly increase trade interactions between the Russian macroregion and the APR market.

**Keywords:** foreign trade turnover, trade interactions, trade barriers, ad valorem equivalent, institutional barriers, tariff barriers, tariff burden, transport costs, gravity model, regional economy, Asia-Pacific region, the Big Three of Northeast Asia countries, United States, Southeast Asia, Far East, Russia

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### INTRODUCTION

Recently, the development prospects of the Russian Far East began to be seen in creating opportunities and conditions for using its potential. Indeed, the economy of this macroregion, despite a number of restrictions, has the potential for development based on existing rich natural resources and proximity to global economic centers located in the Asia-Pacific region (APR).

Due to the need to diversify foreign trade partners, the markets of the Asia-Pacific countries, with which regions of the Far East<sup>1</sup> have long land and sea borders, are becoming increasingly important for Russia.

The current contribution of Russia's economy to trade and economic interactions in the Asia-Pacific region is objectively modest, apparently having the potential for growth. Due to the considerable distances from the major Russian sales markets located in the western part of the country, the Far East over the past 25 years has had close ties with markets of Asia-Pacific countries. The current expansion of trade and economic interactions with these countries positively affects the economic development of the Far East. The reduction of various barriers to trade with the Asia-Pacific countries can increase the scale of bilateral trade, acting as a source of growth and development for the economy of the Far East. To determine the ranges for increasing the scale of trade, it is necessary to quantify the poten-

<sup>1</sup> Federal Subjects that were part of the Far Eastern Federal District until November 2018.

tial for trade interactions arising from the leveling of various barriers.

One of the most common methods for quantifying trade barriers is to estimate gravity models to determine the border effect [5, 20]. This effect is understood as a set of trade and economic costs that arise when goods cross borders [8, 24]. Gravity models describe one of the most stable empirical dependences in economic analysis, possessing a high explanatory power for the variables that form trade flows [19]. As a rule, this approach is used to assess the following: changes in the structure of trade interactions [25] and the potential of bilateral trade [10]; the effectiveness of various public policy measures, including those related to regulation [17] and maintaining competition in various commodity markets [21]; and various trade costs of bilateral interactions, determined by the border effect [11].

For Russia's economy, these models have been actively used to obtain estimates of trade integration with various countries [3, 4]. To date, there are studies that employ gravity modeling to examine relations of the intensity of trade interactions between Russian regions and various markets [1, 2]. Nevertheless, there have been no studies of the border effect aimed at obtaining comparative estimates of relationships between various elements of the border effect and using these results to investigate the dynamics of the intensity of trade of Russian regions with foreign countries.

Trade barriers, which in this study are synonymous with the border effect, can include two groups of restrictions. The first are formal tariff barriers, including transport tariffs and customs duties. The second are institutional barriers, which are usually implicit and determined by political decisions, features of the regimes of legal functioning and interaction of the parties, and risks of trade and economic activities. In the first case, the barriers are explicit and can be adjusted as part of the current trade and subsidiary policy. Reduction of informal institutional barriers requires comprehensive liberalization of trade and economic relations, reduction of various risks, etc. The relation of these groups of trade barriers makes it possible to determine the comparative potential for expanding bilateral trade in terms of implementing various trade and economic policy measures. Regarding trade interactions between the Far East and the Asia-Pacific countries, it is important to assess the sufficiency of reducing tariff barriers as compared to institutional barriers to ensure higher intensity of bilateral trade. The Asia-Pacific region comprises economies that differ in their development and potential and have close trade and economic interactions with each other, including the three world's largest (United States, China and Japan, excluding consideration of economic blocks in the Asia-Pacific region). The assessment of trade barriers will help determining the gen-

eral vector of the intensification of trade in the Far East within the geographical structure of trade interactions of this macroregion with the Asia-Pacific countries.

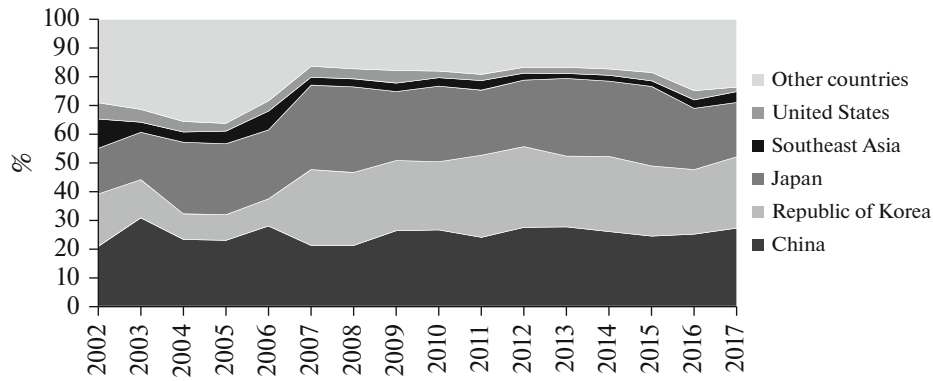
The aim of this study is to obtain comparative quantitative estimates of trade barriers that arise as a result of trade of the Far Eastern regions with Asia-Pacific countries. The study includes the following steps: (1) analysis of the dynamics of the structure of foreign trade of the Far Eastern regions to determine the trends in trade interactions of the macroregion with the Asia-Pacific countries, (2) design of a methodology for the decomposition of trade barriers between the Far East and the Asia-Pacific countries through a synthesis of existing gravity models used to estimate the border effect, (3) quantitative estimation of trade barriers between the Far East and the Asia-Pacific countries and comparative analysis of the contribution of institutional and tariff barriers to the border effect.

As the leading trade partners of the Far East in the APR, this study considers 15 countries: the Big Three of Northeast Asia—Republic of Korea, China, and Japan; United States; countries of Southeast Asia—Taiwan and ten ASEAN member states. The data used to obtain the estimates include statistics from the Rosstat and the Federal Customs Service of Russia, the World Bank, the UN, and other organizations for the period 2002–2017. This study is a follow-up to [1], which estimated trade barriers of the Russian Far East with domestic and foreign markets.

#### TRADE INTERACTIONS OF THE FAR EAST WITH ASIA-PACIFIC COUNTRIES

Over a decade and a half, the trade turnover of the Russian Far East (the macroregion) with the leading countries—trading partners of the APR increased almost sevenfold, from USD 3.2 bln in 2002 to USD 21.8 bln in 2017, accounting for about 80% of the total trade of this macroregion with foreign countries. In general, trade relations between the Far East and the Asia-Pacific countries were characterized by a positive trade balance. Despite periods of unfavorable market conditions for traditional Russian export goods, generally, there was a positive dynamic in the development of bilateral economic relations between the Far East and Asia-Pacific countries.

On average for 2002–2017, the value of trade between the Far East and the Asia-Pacific countries exceeded the turnover with the Russian market by more than a quarter. Since 2007, the volume of trade between the Far East and this group of countries has steadily exceeded the value of the macroregion's trade with the domestic market (according to statistics on import/export of products between Russian regions and customs statistics). The Far Eastern regions, characterized by a high share of mining in the economy, as



**Fig. 1.** The share of Asia-Pacific countries in trade of the Far East with foreign countries, %. Source: authors' calculations based on customs statistics of the Far Eastern regions.

well as isolation from the national land transport routes, were characterized by a gradual change in the intensity of foreign trade relations in favor of geographically close foreign markets.

Among the Asia-Pacific countries, due to their geographical proximity, the Big Three countries of Northeast Asia are the major markets for products of the Far East, as well as suppliers of investment and consumer products. Each of these countries accounted for an approximately equal share, amounting to about a quarter of the value of trade of the Far East with foreign countries (Fig. 1).

A large share of the three Northeast Asia countries in the foreign trade turnover of the Far East is explained by their territorial proximity and the leading position of these Asia-Pacific economies in products of manufacturing, which are massively supplied to the Russian market, and their capacious markets with demand for Russian products, primarily in the commodity sector. The first half of the 2000s was marked by a tendency towards a higher share of imports from Northeast Asia countries to the macroregion, which may be due to the supply of products accessible to Russian consumers, including various investment goods produced by global corporations in developing Asia-Pacific countries.

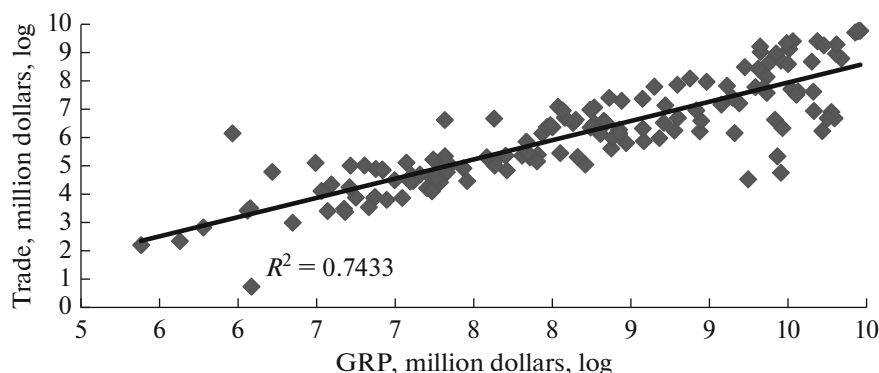
Trade with other Asia-Pacific countries is less intense. The United States and Southeast Asian countries, which are geographically remote from major economic centers of the Far East, accounted for approximately 3% of the total trade turnover of the macroregion with foreign countries, which was significantly inferior to trade with European countries (EU-28), whose share for the period under review was more than 13%.

On average for the period 2007–2017, the major share in the trade of the Far East with the Asia-Pacific countries belonged to Sakhalin oblast. This region provided more than 50% of the Far East's trade with the Asia-Pacific countries, mainly due to the increase in the value of exports of energy sector products due to

the design capacity commissioning of oil and gas projects carried out jointly with foreign capital. The economy of Sakhalin oblast, characterized by high export volumes, shaped a tendency for trade with foreign countries to exceed trade with the domestic market for the entire macroregion. When excluding Sakhalin oblast, the geographical structure of trade in the remaining regions of the Far East, on average for 2002–2017, looked as follows: China accounted for 35.8% of the turnover, the Republic of Korea 11.9%, Japan 13.2%, the United States 3%, Southeast Asian countries 3.9%, and other countries 32.3%.

In the first half of the 2010s, more than 90% of the value of Far East exports to the Asia-Pacific countries was accounted for by five aggregated groups of commodities: production of energy sector, precious metals, non-ferrous and ferrous metal ores and scrap, timber and wood products, and fish products. The regions of the Far East were characterized by different specializations in the supply of these goods to the APR. The export specialization of the Far East in a limited range of products with low added value, as well as that of the national economy as a whole, closely linked the economic growth of the macroregion with the dynamics of the external environment of pricing for commodities. External demand from foreign markets for Far Eastern products was mainly determined by the positive economic dynamics of the Asia-Pacific countries, which are the leading trading partners of the Far East.

Investment goods from the Asia-Pacific countries were imported by the regions of the Far East to maintain the functioning of traditional sectors of specialization of the economy: hydrocarbon production in Sakhalin oblast, mining and primary processing of metal ores, exploitation of natural gas fields in the Republic of Sakha (Yakutia), growing coal mining in Sakhalin oblast and Yakutia, creation of joint wood-working enterprises in the Jewish Autonomous Oblast and Khabarovsk krai, trade and commercial infrastructure in Primorsky krai, etc. Due to the close interaction between global corporations and national



**Fig. 2.** The ratio between the size of the economy and trade with Asia-Pacific countries for the Far Eastern regions in 2002–2017. Sources: authors' calculations based on customs statistics of the Far Eastern regions, Rosstat, and the Central Bank of Russia.

manufacturing sectors of the economy, the commodity structure of imports from the leading Asia-Pacific countries to the Far East is becoming more comparable. This intensifies competition between suppliers of products from the APR in the macroregion market. Nevertheless, the import of investment goods from the United States and Southeast Asian countries to the Far East does not act as a substitute in relation to deliveries from the Big Three of Northeast Asia countries but is rather their important complementary element. As a rule, the export from the Far East of those goods that for some reasons it is inexpedient to direct to the markets of the Big Three of Northeast Asia countries is oriented to the United States and Southeast Asian markets.

Therefore, trade interactions with foreign markets, primarily with the Asia-Pacific countries, contribute to the economic development of the macroregion. At the same time, between the regions of the Far East, the relative scales<sup>2</sup> of trade interactions with the APR are different. Due to the specifics of the functioning of regional economies, which is related to the orientation of their supplies to the domestic market and other countries, on average for 2002–2017, the smallest scale of interaction with Asia-Pacific countries was characteristic of Magadan oblast and Yakutia (4.7 and 8.2%, respectively) and the largest one was characteristic of Sakhalin oblast (66%) and Primorsky krai (42%).

Thus, for the Far East, the Asia-Pacific countries are the largest trading partners while having visible differences in the geographical and regional structure of trade. Despite the current slowdown in bilateral trade, the trend of increasing trade between the Far East and Asia-Pacific countries is likely to be long-term. In order to mitigate various risks, entrepreneurs in the macroregion are likely to seek to diversify trade, including in favor of various Asia-Pacific countries, while businesses from Asia-Pacific countries are inter-

ested in mass deliveries of their products to the Russian market, including the Far East. Bilateral rapprochement, in addition to mitigating the volatility of various economic parameters, could be facilitated by mutual reduction of various kinds of barriers, which can be quantified using gravity dependences.

#### METHODOLOGY FOR ESTIMATING TRADE BARRIERS BETWEEN THE FAR EAST AND ASIA-PACIFIC COUNTRIES

The construction of a dispersion chart for nine Far Eastern regions, which reflects the relationship between the value of trade with the Asia-Pacific market and the size of the economy, suggested a relationship between these two economic parameters, despite some regional differences in the ratio of indicators (Fig. 2).

The scatter plot shows a direct relationship between the size of the regional economy and the value of its trade, which is the main condition for the existence of a gravity dependence between these indicators, which makes it possible to analyze the intensity of trade interactions within the framework of the border effect assessment procedure.

The quantitative estimation of institutional barriers can be obtained as part of the decomposition of the so-called border effect, which refers to a combination of trade and economic barriers that inhibit trade interactions. The border effect, therefore, represents total economic costs incurred as a result of goods crossing borders. An increase/decrease in the border effect should be understood as a decrease/increase in the intensity of trade interactions between the analyzed economic systems.

The border effect is estimated using the following dependence [18]:

$$T_{ij} = O_i D_j R_{ij}, \quad (1)$$

where  $T_{ij}$  is the flow of goods between two countries ( $i$  and  $j$ ), which is nonlinearly dependent on characteris-

<sup>2</sup> The ratio of trade with Asia-Pacific countries to GRP.

tics of the exporting ( $O_i$ ) and importing ( $D_j$ ) parties, as well as various barriers between them ( $R_{ij}$ ).

Due to applied problems and based on accumulated statistical data, the following gravity equation was used as the main model for obtaining a quantitative estimate of the border effect [6]:

$$x_{ij} = \frac{y_i y_j}{y^W} \left( \frac{t_{ij}}{P_i P_j} \right)^{1-\sigma}, \quad (2)$$

where  $x_{ij}$  is the export from country  $i$  to country  $j$ ;  $y_i$  is the size of the economy of country  $i$ ;  $y_j$  is the size of the economy of country  $j$ ;  $y^W$  is the size of the global economy;  $P_i$  is the average value of trade costs/barriers between country  $i$  and its trading partners;  $P_j$  is the average value of trade costs/barriers between country  $j$  and its trading partners;  $t_{ij}$  are barriers to bilateral trade between countries  $i$  and  $j$ .

In model (2), bilateral trade barriers are estimated based on two parameters (physical distance and dummy variables):

$$t_{ij} = b_{ij} d_{ij}^p, \quad (3)$$

where  $b$  is a dummy variable that takes a value equal to one if countries participate in associations and  $d$  is the physical distance between trading countries.

Further, the parameters are taken in logs and evaluated using panel data with a fixed effect (2):

$$\ln x_{ij} = k + \ln y_i + \ln y_j + (1 - \sigma)\rho \ln d_{ij} + (1 - \sigma) \ln b_{ij} - (1 - \sigma) \ln P_i - (1 - \sigma) \ln P_j. \quad (4)$$

In the next step, the dependent variable is adjusted for the size of trading economies  $i$  and  $j$  at current prices [9] to solve the problem of endogeneity and reduce heteroskedasticity [22]:

$$\ln \left( \frac{x_{ij}}{y_i y_j} \right) = k + (1 - \sigma)\rho \ln d_{ij} + (1 - \sigma) \ln b_{ij} - (1 - \sigma) \ln P_i - (1 - \sigma) \ln P_j. \quad (5)$$

The tariff equivalent of border effect  $(1 - b)$  in the ad valorem equivalent is calculated as follows:<sup>3</sup>

$$\hat{\beta} = (1 - \sigma) \ln b_{ij} \Rightarrow 1 - b_{ij} = e^{((\hat{\beta}/(1-\sigma))-1)}. \quad (6)$$

Next, a benchmark is determined, which is the basis for obtaining a comparative estimate of the border effect [6, 23]; as such, the smallest values of trade barriers of the considered bilateral interactions are taken.

In this study, model (5) is represented in the following form:

$$\ln \left( \frac{x_{ijt}}{y_{it} y_{jt}} \right) = \beta_0 + \alpha_i \lambda_i + \alpha_j \lambda_j + \eta_t + \beta_1 \ln d_{ij} + \beta_2 CONT_{ij} + \beta_3 (RFE \times KOR) + \beta_4 (RFE \times CN) + \beta_5 (RFE \times JPN) + \beta_6 (RFE \times USA) + \beta_7 (RFE \times SASIA) + \varepsilon_{ijt}, \quad (7)$$

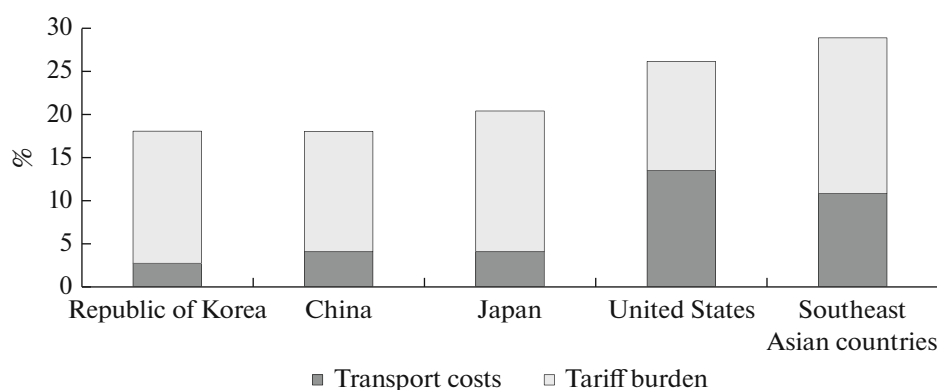
where  $x_{ij}$  is the export from country/region  $i$  to country/region  $j$ ;  $y_i$  is the GDP of country/GRP of region  $i$ ;  $y_j$  is the GDP of country/GRP of region  $j$ ;  $t$  is the time period. Independent variables are dummy variables for each exporter, importer, and year:  $d_{ij}$  is the distance in kilometers between  $i$  and  $j$ ;  $CONT_{ij}$  are the dummy variables for joint borders between  $i$  and  $j$ ;  $RFE$  are regions of the Russian Far East,  $KOR$  is the Republic of Korea,  $CN$  is China,  $JPN$  is Japan,  $USA$  is United States, and  $SASIA$  are countries of Southeast Asia. Dummy variables:  $RFE \times KOR$ , for trade between the Far East and the Republic of Korea;  $RFE \times CN$ , for trade between the Far East and China;  $RFE \times JPN$ , for trade between the Far East and Japan;  $RFE \times USA$ , for trade between the Far East and the United States;  $RFE \times SASIA$ , for trade between the Far East and the countries of Southeast Asia. Dummy variables for joint borders between the Far Eastern region and its trading partner take a value equal to one, and zero otherwise. Factors changing in time for territorial objects were controlled by including effects fixed in time ( $\eta_t$ ) and in countries/regions ( $\lambda$ ). Model (7) was estimated as panel data with fixed effects.

The estimates obtained for the interactions of the Far East with the Asia-Pacific countries are presented taking into account specific contributions of each Far Eastern region.

In this study, the benchmark is the bilateral trade of the Far East with one of the Asia-Pacific countries. For that, five alternative indicators were tested successively: trade of the macroregion with China, the Republic of Korea, Japan, the United States, and the countries of Southeast Asia. Since the domestic market is not used in the calculations, the resulting border effect for the macroregion and the rest of the Asia-Pacific countries will be comparative (hereinafter the comparative border effect), reflecting the fact that it is higher than the border effect for the Far East and one of the countries of the subglobal region.

Based on the fact that the border effect represents total costs in the trade interactions of countries/regions with each other, its estimated values can be decomposed into constituents. In the costs of trade interactions, at least two parameters can be directly quantified: the tariff burden on export and import goods flows, reflected by the dynamics of customs duties, and transportation costs. It is assumed that, having reduced the parameters to the ad valorem equivalent, a quantitative estimate of institutional barriers of bilateral interactions can be obtained in a general way by subtracting the tariff burden and transport

<sup>3</sup> To assess the tariff equivalent of the border effect, substitution elasticity ( $\sigma$ ) is selected in the range from 5 to 10 [7, 12].



**Fig. 3.** Tariff barriers between the Far East and Asia-Pacific countries, %. Tariff barriers given in the ad valorem equivalent include the tariff burden (weighted average customs duty of bilateral trade) and transport costs on average for 2002–2017. Source: authors' calculations.

costs from the border effect. Accordingly, the border effect can be decomposed into two constituents: institutional and tariff barriers. Tariff barriers, in turn, consist of a tariff burden and transport costs. It should be recognized that these barriers will be compared by analogy with the border effect described above.

As a result, the methodology for the decomposition of trade barriers of the Far East with the Asia-Pacific countries comes down to adapting existing gravity models and border effect estimation techniques, which, in turn, is directly disaggregated into institutional and tariff barriers to trade in the ad valorem equivalent. Estimates obtained within the framework of this methodology make it possible to determine, first, the comparative potential of expanding trade in the macroregion, and second, the sufficiency of lowering tariff barriers compared with institutional barriers to intensify bilateral trade. Estimation of trade barriers also reveals the general vector of intensification of trade in the Far East within the geographical structure of trade with the Asia-Pacific countries.

#### RESULTS OF ESTIMATING THE TRADING BARRIERS BETWEEN THE FAR EAST AND ASIA-PACIFIC COUNTRIES

*Estimation of tariff barriers.* For the purpose of decomposing the border effect, at the first stage we estimated the value of tariff barriers between the macroregion and the Asia-Pacific countries, consisting of transport costs and the tariff burden, which in this study is taken as the sum of the weighted average export and import customs duties.

Quantitative estimation of the tariff burden on exports and imports was obtained as follows. At the initial stage, the ad valorem equivalents of non-ad valorem customs duties were calculated, which covered specific and mixed duties for various product groups using six-digit and ten-digit codes for bilateral trade [15, 16]. As a result, the tariff burden was esti-

mated as the average weighted customs duties for each commodity group of the Commodity Nomenclature of Foreign Economic Activity (HS 2002) in the trade of the Far East with the Asia-Pacific countries for 2002–2017.

For import goods, we used import duties reflected in the Customs Tariff of Russia (2002–2009) and the Common Customs Tariff of the Eurasian Economic Union (from 2010 to the present). For goods delivered from the Far East abroad: first, we estimated export duties<sup>4</sup> whose values were indicated in the decrees of the Russian government, second, duties on Russian (Far Eastern) products imported into each of the Asia-Pacific countries under consideration. Thus, the tariff burden on Far Eastern products exported to foreign countries is the sum of the paid export duty in Russia and the import duty in the Asia-Pacific country. To estimate import duties on Far Eastern goods in the United States, Southeast Asian countries, and the Big Three of Northeast Asia countries, we used dynamic series of corresponding customs duty rates in the ad valorem equivalent within the framework of customs tariffs reflected in the WTO, World Bank, and Mac-Map databases, as well as in statistical books of the analyzed countries.

With regard to transportation costs, their conversion into the ad valorem equivalent can be done in two ways: their independent calculation or the use of existing indirect assessment procedures based on empirical evidence. In this study, the transfer of transportation costs to the ad valorem equivalent was carried out according to the second method [13, 14], based on existing matches. Every day of transporting a certain

<sup>4</sup> The export duty for various periods of time covered the following commodity groups of Far Eastern exports: crustaceans, soybeans, crude sulfur, molybdenum ores and concentrates, coke and semicoke, crude oil and petroleum products, rough timber, processed diamonds, waste and scrap of ferrous metals, other rails (used), as well as waste and scrap of various non-ferrous metals.

**Table 1.** Weighted average rates of customs duties (tariff burden) of trade interactions between the Far East and Asia-Pacific countries, %

Time period	Indicator	Republic of Korea	China	Japan	United States	Southeast Asian countries
2002–2009	Tariff burden on trade	12.66	13.20	13.00	14.33	15.42
	Import tariff burden	9.28	11.14	11.55	12.84	11.84
	Export tariff burden	14.86	14.79	13.80	17.42	16.48
2010–2017	Tariff burden on trade	18.01	14.76	20.12	11.01	20.53
	Import tariff burden	9.50	9.85	10.22	10.04	9.67
	Export tariff burden	22.64	18.98	21.57	16.81	25.29

This table presents absolute values of the weighted average rates of customs duties in the trade of the macroregion with the Asia-Pacific countries. The tariff burden on the import of goods to the Far East is the weighted average import duty imposed by the Russian side for the import of products from the APR. The tariff burden on the export of Far Eastern goods includes weighted average duties: on export from the Russian side, on import from Asia-Pacific countries. Source: authors' calculations.

**Table 2.** Regression coefficients of model (7) for alternative comparative values of the border effect in the trade of the Far East with Asia-Pacific countries

Regression coefficient	Benchmark, trade of the Far East with one of the Asia-Pacific countries/group of countries				
	<i>RFE</i> × <i>KOR</i>	<i>RFE</i> × <i>CN</i>	<i>RFE</i> × <i>JPN</i>	<i>RFE</i> × <i>USA</i>	<i>RFE</i> × <i>SASIA</i>
	I	II	III	IV	V
<i>RFE</i> × <i>KOR</i>	–	1.06*** (0.32) [–23.3]	1.87*** (0.28) [–37.3]	4.49*** (0.40) [–67.4]	3.16*** (0.41) [–54.6]
<i>RFE</i> × <i>CN</i>	–1.06*** (0.32) [30.3]	–	0.81** (0.32) [–18.3]	3.43*** (0.37) [–57.5]	2.10*** (0.38) [–40.8]
<i>RFE</i> × <i>JPN</i>	–1.86*** (0.27) [59.5]	–0.81** (0.32) [22.4]	–	2.62*** (0.39) [–48.0]	1.29*** (0.41) [–27.6]
<i>RFE</i> × <i>USA</i>	–4.48*** (0.39) [206.9]	–3.43*** (0.37) [135.4]	–2.62*** (0.39) [92.4]	–	–1.33*** (0.28) [39.4]
<i>RFE</i> × <i>SASIA</i>	–3.15*** (0.41) [120.2]	–2.10*** (0.38) [68.9]	–1.29*** (0.41) [38.1]	1.33*** (0.28) [–28.3]	–
<i>Ind</i> (distance)	–1.26*** (0.24)	–1.26*** (0.25)	–1.25*** (0.25)	–1.25*** (0.25)	–1.25*** (0.24)
<i>CONT</i> (shared border)	2.25*** (0.32)	2.24*** (0.31)	2.25*** (0.32)	2.25*** (0.33)	2.25*** (0.33)
Constant	–25.34*** (1.98)	–26.41*** (2.07)	–27.21*** (1.99)	–29.83*** (2.27)	–28.50*** (2.29)
<i>R</i> <sup>2</sup>	0.58	0.58	0.58	0.58	0.58

\*\*,  $p < 0.05$ ; \*\*\*,  $p < 0.01$ . Columns I–V present alternative models within the framework of regression dependence (7). The number of observations was 1440 for the period 2002–2017. Parentheses indicate robust values of standard errors; square brackets indicate alternative comparative values of the border effect. Alternative comparative border effects are calculated based on the value of substitution elasticity ( $\sigma$ ) equal to five and are given in the ad valorem equivalent (%). Coefficients of dummy variables for trade not related to the Far East are not provided.

**Table 3.** Regression coefficients of model (7) and the ad valorem equivalent of the comparative border effect for the Far East with the Asia-Pacific countries

Regression coefficient	2002–2017		2002–2009		2010–2017	
	I	II	I	II	I	II
<i>RFE</i> × <i>CN</i>	−1.061*** (0.321)	30.38	−1.550*** (0.452)	47.33	−0.572* (0.310)	15.37
<i>RFE</i> × <i>JPN</i>	−1.868*** (0.277)	59.52	−1.351*** (0.390)	40.18	−2.384*** (0.372)	81.49
<i>RFE</i> × <i>USA</i>	−4.486*** (0.399)	206.95	−3.828*** (0.561)	160.39	−5.144*** (0.534)	261.83
<i>RFE</i> × <i>SASIA</i>	−3.158*** (0.413)	120.23	−2.101*** (0.581)	69.09	−4.216*** (0.553)	186.91
<i>Ind</i> (distance)	−1.251*** (0.245)		−1.360*** (0.345)		−1.141*** (0.328)	
<i>CONT</i> (shared border)	2.250*** (0.325)		2.812*** (0.457)		1.687*** (0.435)	
Constant	−25.345*** (1.989)		−26.025*** (2.788)		−25.529*** (2.656)	
Number of observations	1440		720		720	
<i>R</i> <sup>2</sup>	0.58		0.57		0.63	

\*,  $p < 0.10$ ; \*\*\*,  $p < 0.01$ . Parentheses indicate robust values of standard errors. Coefficients of dummy variables for trade not related to the Far East are not provided. The tariff equivalent of the comparative border effect is calculated using the value of substitution elasticity ( $\sigma$ ) equal to five. I, characteristics of the obtained regression estimates; II, the border effect in trade between the Far East and the APR in relation to the trade barriers between the macroregion and the Republic of Korea, which are the baseline for comparative assessment (in ad valorem equivalent, %). Source: authors' calculations.

traded commodity corresponded to 0.6–2.1% of its value, that is, on average 1.35% per day. The following seaports of the Asia-Pacific region were selected for the end-point calculations of the commodity flow from the Far East (Vladivostok port) to the Asia-Pacific countries: Busan (Republic of Korea), Dalian (China), Toyama (Japan), Seattle (United States), and Singapore (Southeast Asian countries). As a result, based on information about the travel time of the goods transported, indirect estimates of transport costs for the trade between the Far East and the Asia-Pacific countries in the ad valorem equivalent were obtained.

Calculations showed that tariff barriers in the trade between the Far East and Northeast Asia countries were lower than with the United States and Southeast Asian countries (Fig. 3). Given the rather conditional comparability of the tariff burden on bilateral trade, transport costs as a whole were the determining reason for the apparent differentiation of tariff barriers in bilateral trade in the macroregion with two groups of countries: on the one hand, Northeast Asia, and on the other hand, Southeast Asia and the United States. In a certain way, this circumstance is confirmed by the much larger trade orientation of the Far Eastern mar-

ket to the nearby markets of the three Northeast Asia countries.

Indeed, calculations showed that for trade interactions in the Far East in 2002–2017 the tariff barriers were characterized by having high values for the countries of Southeast Asia and the United States, which are geographically remote from the macroregion. Nevertheless, a more detailed analysis showed that the specifics of the commodity structure of trade interactions, generating the corresponding tariff burden on exports and imports, can in some cases offset the difference in transport costs. In particular, in 2010–2017, the tariff barriers of the macroregion with Japan and the United States were approximately equal due to an increase in customs duties on the Russian side in relation to trade of the macroregion with the Japanese market. And this despite the fact that the transport costs for the delivery of American products to the Far East (and in the opposite direction) were higher compared with the delivery of Japanese goods. In this regard, it is important to take into account the dynamics of customs taxation or the tariff burden on the commodity turnover of the macroregion with the Asia-Pacific countries under consideration.



**Table 4.** Decomposition of the comparative border effect in trade interactions of the Far East with the Asia-Pacific countries, %

APR country/group of countries	2002–2017				2002–2009				2010–2017			
	I	II	IIa	IIb	I	II	IIa	IIb	I	II	IIa	IIb
China	100.1 [30.4]	–0.1	–4.5	4.4	96.0 [45.4]	4.0	1.1	2.9	112.3 [17.3]	–12.3	–21.1	8.8
Japan	96.1 [57.2]	3.9	1.7	2.3	95.8 [38.5]	4.2	0.8	3.4	95.7 [78.0]	4.3	2.6	1.7
United States	96.1 [198.8]	3.9	–1.3	5.2	92.2 [147.9]	7.8	1.0	6.7	98.5 [258.0]	1.5	–2.7	4.1
Southeast Asian countries	91.0 [109.4]	9.0	2.3	6.7	84.3 [58.2]	15.7	4.0	11.7	94.3 [176.3]	5.7	1.3	4.3

The comparative border effect = 100% and is given in relation to trade barriers between the Far East and the Republic of Korea. I, comparative institutional barriers; II, comparative tariff barriers; IIa, comparative tariff burden (weighted average customs duty on bilateral trade); IIb, comparative transportation costs. A negative sign before the contribution of tariff barriers to the border effect indicates relatively lower values of this indicator compared to barriers to trade in the macroregion with the Korean side. This explains the excess of 100% for comparative institutional barriers (I) of trade interactions between the Far East and China. Square brackets indicate values of comparative institutional barriers. Source: authors' calculations.

In accordance with the analysis of the dynamics of customs duties, it was determined that, despite the formal liberalization of foreign economic activity, export and import duties levied on the Russian side are the main source of the tariff burden on the trade of the Far East. Analysis of the dynamics of import duties levied on the Russian side, without taking into account non-tariff restrictions on foreign trade (through prohibitions, quotas, and other measures), indicated their slight decrease, which is not fair. Even if the value of imports for certain goods decreased due to the introduction of prohibitive duties on a certain group of goods, the total tariff burden on imports was also reduced, according to the assessment of the average weighted duty. This means that in fact there was a latent transfer of the customs burden from tariff barriers to institutional ones. Unlike imports, macroregion's export deliveries abroad were very rarely subject to any restrictions on the part of partner countries, and the dynamics of the burden on goods exported by the Russian side indicates a quite clear time periodization from the point of view of its changing magnitude in the context of transformation of Russia's customs politics.

Within the analyzed period, for a number of commodity groups of Far Eastern exports, the export duty was abolished in 2009 due to the general liberalization of foreign trade regulation of Russia, while there was an accentuated increase in the customs burden on a short list of goods exported abroad. Since 2010, compared with the 2000s, export duties for the two major commodity export groups of the Far East, crude oil and wood products, have grown significantly: on average more than four and two times, respectively. Subsequently, export duties were also paid on petroleum products and other goods with a relatively small share in the exported products of the macroregion (for

example, some grain crops, as well as ferrous and non-ferrous scrap). As a result, Far Eastern exports were characterized by the highest values of the weighted average customs duty payments made in Russia. In the considered time period, 2009 was a "turning point" in the dynamics of the average weighted customs duty. Chronologically, it also coincided with the global crisis and the subsequent adjustment of prices in global commodity markets.

Assessment of the tariff burden on bilateral trade showed that its major source in most cases was the tariff burden on exports. Since exports from the Far East are mainly represented by low-value-added products, the Asia-Pacific countries imposed a relatively low customs duty rate, whose contribution to the tariff burden of bilateral trade was relatively small. The weighted average customs duty on the export of goods from the Far East was changing as follows: with the Republic of Korea, 10.6% in 2002–2009 and 18% in 2010–2017; with China, 10.6 and 14.3%; with Japan, 12.4 and 20.8%; with the United States, 13 and 14%; with Southeast Asian countries, 14.9 and 23.5%. The increase in this duty was due to the macroregion exporting product groups with the highest customs taxation on the Russian side: crude oil and petroleum products (Table 1).

As a result, the tariff burden on trade between the Far East and most of the Asia-Pacific countries increased. The tariff burden on trade is the weighted average value of the tariff burden on exports and imports and is used further to decompose the comparative border effect. At the same time, the import duty reflected in the tariff burden on imports tended to decrease for the above reasons. Due to the increase in deliveries, the import duty began to make a slightly

larger contribution to the tariff burden on trade between the Far East and China only in 2010–2017.

In view of the above, the subsequent analysis of the dynamics of trade barriers will be based on the comparison of two equal periods in time: 2002–2009 and 2010–2017.

*Estimation of the comparative border effect.* The regression coefficients obtained in the framework of model (7)<sup>5</sup> showed that trade interactions between the Far East and the Republic of Korea were characterized by the smallest alternative values of the border effect (Table 2). For this reason, the bilateral trade of the Far East with the Republic of Korea will be the baseline in further estimations of the comparative border effect.

According to the calculations, the comparative border effect in the ad valorem equivalent for trade between the Far East and the Asia-Pacific countries was the largest for the United States (206.9% higher than for the Republic of Korea) and Southeast Asian countries (120.2% higher) and the smallest for China (30.4% higher) (column I in Table 2).

The estimates indicated the negative impact of the distance on trade interactions between the Far East and the Asia-Pacific countries, which explains the great trade orientation of its economy to the nearby countries—the Republic of Korea, China, and Japan (which together accounted for three quarters of the macroregion's foreign trade)—as compared to the geographically distant United States and Southeast Asian countries. There was also a relationship between distance and trade barriers: the greater the distance between the macroregion and its trading partner, the higher the border effect between them. For the Far East, the joint border with the Asia-Pacific countries, namely with China, contributed to an increase in their trade. In general for the macroregion, the positive impact of the joint border on bilateral trade with the Asia-Pacific countries was determined by the trade turnover between the southern Far Eastern regions and China, due to the borderline position of a territory that has check points with the Chinese side. It cannot be ruled out that the subsequent construction of infrastructure for interaction with the Chinese market (bridges across the Amur River) will contribute to an increase in the intensity of interaction between the regions of the Far East bordering China.

Assessment of the dynamics of the comparative border effect indicated the following trends. First, the comparative border effect in trade between the Far East and China tended to weaken, and that with Japan, the United States, and Southeast Asian countries tended to increase. From this point of view, the comparative intensity of trade interactions of the macroregion was converging in favor of China and diverg-

ing with regard to other Asia-Pacific countries (Table 3).

Second, there was a slight decrease in the negative/positive effect of the distance/joint border on the trade between the macroregion and the Asia-Pacific countries. This circumstance suggests that the bilateral trade interactions of the Far East began to be determined to a lesser extent by the factors of the geographical location, and this, in turn, may be due to the manifestation of tariff and institutional barriers.

*Decomposing the comparative border effect.* Since the border effect between the Far East and the Asia-Pacific countries is comparative, tariff barriers were also reduced to the baseline, the trade of the macroregion with the Republic of Korea, for the subsequent assessment of comparative institutional barriers in the ad valorem equivalent. As a result, the decomposition assessment showed that the contribution of comparative institutional barriers to the border effect was significantly greater than that of the comparative tariff barriers to trade between the macroregion and all the Asia-Pacific countries under consideration (Table 4).

The estimates indicated a clear insufficiency of reducing tariff barriers for intensifying the bilateral trade between the Far East and countries of the sub-global region. The analysis indicated that over the past decade, through the introduction of various kinds of prohibitions and restrictions by the Russian side, the customs burden has shifted from tariff barriers to institutional ones. Trade with China is an exception due to the special status of Russian-Chinese interactions. Nevertheless, on the whole, efforts are needed to reduce institutional barriers by mitigating various risks and liberalizing trade and economic relations. Trade barriers can be determined by the economic and institutional development of the Russian market as a common environment in which business structures of the macroregion develop appropriate motivation in terms of the extent of their interactions with the Asia-Pacific market.

The general vector of trade intensification of the Far East within the geographical structure of trade with the Asia-Pacific countries, in addition to the Republic of Korea as a starting point for obtaining a comparative assessment, was observed in the interaction of the macroregion with the Chinese economy. In this regard, the anomalous decrease in the intensity of trade between the Far East and the geographically close Japanese market due to an increase in comparative institutional barriers is very significant. If in 2002–2009 comparative institutional barriers to trade of the macroregion with Japan were slightly lower than with China (almost five times in the ad valorem equivalent), they subsequently increased significantly in relation to China. In view of the large share of Japan in the Far East's trade with foreign countries, efforts are needed to reduce institutional barriers for the macroregion to interact with the Japanese market. Per-

<sup>5</sup> Evaluation of the considered dependence by the Poisson method of quasi-maximum likelihood showed approximately the same results as in Table 2, which indicates that the estimates are unbiased.

haps, in addition to the equity participation of the Japanese side in the oil and gas project of Sakhalin oblast, it is necessary to attract investment from Japan to other sectors of the economy of the Far East. In this case, the trade interactions of the macroregion with foreign countries can significantly intensify.

As a result, during the period under review, the comparative institutional barriers to trade between the Far East and China nearly halved, while for Japan and Southeast Asian countries they almost doubled, and for the United States tripled. The reasons for the increase in institutional barriers to trade in the Far East could be: reduction in the previous volumes of export of timber products due to the lack of a balanced policy on localization of timber processing in the Far Eastern regions, which caused the reorientation of the Japanese market to other suppliers and Far Eastern exporters to other countries; tightening the rules for importing cars from Japan to Russia; the presence of the shadow sector in the supply of fish products; Russia's ban on the import of agricultural products from the United States; the episodic character of Far Eastern exports to Southeast Asian countries; and the negative impact of the exchange rate policy of Russia (2014–2017) on the purchasing power of the population in relation to imported goods of a high price category.

## CONCLUSIONS

Trade interactions with foreign markets contribute to the development of the Far Eastern economy. For the Far East, the intensity of foreign trade relations has gradually changed in favor of geographically close foreign markets, the Asia-Pacific countries. For a long time, the countries of the subglobal region have been the largest trading partners for the Far East. Due to the geographical proximity, the main markets for the products of the macroregion, as well as suppliers of investment and consumer products are the countries of the Big Three of Northeast Asia. In the macroregion's trade with the Asia-Pacific countries, more than half of the commodity turnover was accounted for Sakhalin oblast, mainly due to the increase in the value of hydrocarbon exports. Despite the current slowdown in bilateral trade, the trend of increasing trade between the Far East and Asia-Pacific countries is likely to be long-term.

Evaluation of the gravity model showed that the lowest alternative values of the border effect were characteristic of the trade between the Far East and the Republic of Korea, which made it possible to take this indicator as the baseline for assessing the comparative border effect in the tariff equivalent for trade interactions of the macroregion with the Asia-Pacific countries. The assessment of the comparative border effect indicated a convergence in the comparative intensity of trade interactions of the macroregion in favor of China and a divergence with other Asia-

Pacific countries. The estimates indicated the negative impact of the distance on trade between the Far East and the Asia-Pacific countries, which explains the large trade orientation of the economy to the three close countries of Northeast Asia, in contrast to the territorially remote United States and Southeast Asian countries. The positive impact of the joint border on the bilateral trade of the Far East with the Asia-Pacific countries was determined by the scale of trade between the southern Far Eastern regions and China. Bilateral trade interactions of the Far East began to be determined to a lesser extent by factors of geographical location, which, in turn, could be associated with the effect of tariff and institutional barriers.

The main source of tariff barriers between the Far East and the Asia-Pacific countries was the tariff burden on exports and imports, formed by the Russian side. The highest customs duties in Russia are payments from Far Eastern exports, which, in turn, the Asia-Pacific countries impose at a relatively low customs duty rate. Given the conditional comparability of the tariff burden on trade, transport costs were generally the reason for the apparent differentiation of tariff barriers in bilateral trade of the macroregion with the Asia-Pacific countries. However, the specifics of the commodity structure of trade interactions, which determines the total tariff burden on exports and imports, can offset the difference in transport costs.

The decomposition of the border effect showed that comparative institutional barriers significantly exceeded the comparative tariff barriers in relation to trade between the Far East and all Asia-Pacific countries. This circumstance indicated the insufficiency of reducing tariff barriers for intensifying the bilateral trade between the macroregion and the countries under consideration. Over the past decade, through the introduction of various kinds of prohibitions and restrictions by the Russian side, the customs burden has shifted from tariff barriers to institutional ones. Therefore, for the large-scale intensification of foreign trade of the macroregion, it is necessary to reduce institutional barriers through the liberalization of trade and economic relations and the leveling of various risks.

The assessment showed that in addition to the Republic of Korea, comparative institutional barriers to trade of the macroregion with China were decreasing and with other Asia-Pacific countries were increasing, which indicates a general convergence of the macroregion's economy with the Chinese market. It is possible that comparative institutional barriers with China will continue to decline, since industrial enterprises with capital and technology from other countries, including developed Asia-Pacific economies, are concentrated in China. Efforts are also needed to reduce the institutional barriers for the macroregion to interact with the geographically close Japanese market; these efforts can also be associated with

attracting investments from Japan to key sectors of the Far East economy. In this case, the scale of trade interactions between the Far East and the Asia-Pacific countries can increase markedly.

### CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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