Forecast of Inter-Regional and Cross-Border Interaction Development Between Orenburg and Aktobe Regions

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Abstract—The national interests including the international relations between the regions of different countries is of primary importance for any country while building external economic relations. International relations between the regions, especially in the framework of cross-border and inter-territorial cooperation, contribute to the development and expansion of modern states integration. The regions located on the border of two states have always been and will be interested in close mutual cooperation, since the border position is a geopolitical factor that cannot be changed, but must always be carefully taken into account when developing a strategy for relations with neighboring countries. Border territories have always contributed to the development of trade, economic, scientific, technical, cultural and humanitarian relations between their countries, as well as the improvement of friendly relations between them. The article presents a statistical analysis of the foreign trade turnover between the Aktobe and Orenburg regions for the period 2012-2018, suggests a forecast for its development and identifies priority areas for further cooperation between the border regions.

Keywords—region, interregional and cross-border cooperation, Orenburg region, Aktobe region, commodity turnover, statistic analysis, development forecast.

I. INTRODUCTION

Considering the development of Russian-Kazakhstan cross-border cooperation, it is important to note that in recent years it has become an indicator of improving Eurasian cooperation. The main prerequisite for the cross-border international cooperation prospects is the territorial and geographical factor, but one can highlight several specific features. Firstly, the development strategy of the bordering regions is the basis of the geo-economic and geopolitical security of the state, and its instability can negatively affect the geopolitical interests as a whole.

The second specific feature is that most of the border regions are located at the junction of civilizations; this fact necessitates the observance of higher legal and political standards, which is a necessary condition for the integration of the state into the world system, but this also leads to an increased perception of identity problems.

The most important is the third specificity: the peculiar features of the border territories, which boost the development of new models of international interaction.

II. RESEARCH METHODOLOGY

We should take into consideration that the great number of border territories are removed from their national markets and are close to the markets of neighboring countries, it is the peculiarity of their economic activity. Moreover, stable inter-regional relations of neighboring countries are essential for the production, investment and labour resources usage.

A.G. Granberg [1], A.S. Makarychev, V.E. Rybalkin, A. Libman [2], B. Kheifets, Yu.A. Shcherbanin, E.G. Animica [3] considered the matters of social and economic interaction between the regions and the degree of their international and national localization. The degree and level of interaction can be measured with the help of statistical tools including the Box-Jenkins method [4].

S.A. Nikolayev analyzed the agenda and decisions of the I-VII Forums devoted to inter-regional cooperation of the Russian Federation and the Republic of Kazakhstan in detail.

The important condition for cross-border cooperation is to preserve and maintain the community of regions located on both sides of the state border. This is substantiated by the fact that the territories separated within the framework of the legal field are combined in a natural ratio, which leads to the necessity for these states to cooperate in the utilization of natural (water, mineral, biological, land) resources and their universal protection. In addition, the fact, that the borders quite often divide people sharing the same ethno-cultural customs, simplifies cultural cooperation. The border regions enable their states to carry on mutual trade and to develop economic and social ties.

The cross-border cooperation includes various aspects such as mail and telecommunications, provision of electricity, gas, infrastructure (mainly transport), communications and water supply at the regional level, industrial cooperation (taking into account management of enterprises in the age of digitalization [5]), agricultural production, trade, finance and banking, construction, environmental protection and the use of suburban resources; science and education, health care (including the mutual assistance in the event of environmental and natural disasters), culture, tourism and fight against crime.

We`ve mentioned the areas which are of mutual interest for the states.

Within the framework of the inter-governmental commission on interaction between the Russian Federation and the Republic of Kazakhstan, intensive development of regional cooperation is carried out [6]. Among its main areas we can distinguish fuel and energy complex (FEC), nuclear energy, industry, agriculture and transport. The traditionally established models of industrial cooperation have become the groundwork for regional cooperation between Russia and Kazakhstan. Moreover, more than 300 agreements have been concluded in various trade and economic sectors between the regions of these countries [7].

Russia and Kazakhstan have a wealth of experience working together in the agro-industrial complex. Serious attention is paid to the production of mineral fertilizers [8] and food. Promising is the expansion of mutual food supplies, and one should take into account the experience gained in managing agricultural enterprises [9].

III. RESULTS

Relations between the regions located on the border between Russia and Kazakhstan are characterized by the traditional model of cross-border cooperation based on the maintenance of foreign economic relations and trade. The price difference in products and services on both sides is the driving force of cross-border trade, and the economic effect is due to the gradual expansion of the borders of the sales market for some customers and the production of cheaper goods for other consumers. It is worth noting that this model is often developed in the countries that have rather a modest level of per capita income, and to a large extent the success of its application largely depends on the ratio between the number of contacts and barriers.

Due to the analysis of the cooperation results between Russia and Kazakhstan, we argue the fact that the traditional model is seriously contributing to the revitalization of the border territories` economy.

Aktobe and Orenburg regions are strategic partners, having a joint border of 1030 kilometers. The border zone of the regions is formed by 5 districts of the Aktobe region (Aitekebi, Kargalinsky, Khromtau, Martuk, Kobdinsky districts) and 9 districts of the Orenburg region (Svetlinsky, Yasnensky, Dombarovsky, Novoorsky, Gaysky, Kuvandyksky, Belyaevsky, Akbulaksky, Sol-Iletsky). Moreover, almost all spheres of life are involved in their cooperation: trade and economic relations, agriculture, culture, sports and education.

2015 saw the decline in trade, which was due to the fall of the ruble rate, the political component of our country. In general, the turnover of the Aktobe region with the Russian Federation showed its minimum value in 2015 and 2016 and amounted to 862.5 and 862.6 million US dollars, respectively. In 2016, the foreign trade turnover of the Orenburg region with the Republic of Kazakhstan also experienced a maximum drop and amounted to $ 733.7 million. However, over the past 2 years, mutual trade between regions has begun to gain momentum.

The main share of Aktobe region's exported goods to the Orenburg region is made up of chromium, copper and zinc ores and concentrates (about 76%), ferrochrome (about 10%). Waste and scrap of ferrous metals, oil products, aluminum waste and scrap, etc., various types of agricultural products are also exported. The major export articles are raw materials [5].

The major exported goods from the Orenburg region are semi-finished products from other alloy steels, coke and semi-coke from coal, lignite or peat (agglomerated or non-agglomerated), other distillates and oil products, disodium carbonate, sunflower or safflower crude oil, pipes, Portland cement.

Table 1 presents the data on foreign trade turnover between Aktobe and Orenburg regions for 2012-2018.

TABLE I.   DYNAMICS OF MUTUAL TRADE BETWEEN AKTOBE AND ORENBURG REGIONS, (MLN. US DOLLARS)

Index	Year							Ratio of 2017 to 2018 in %	Ratio of 2012 to 2018 in %
	2012	2013	2014	2015	2016	2017	2018		
Foreign trade	110.1	117.8	109.1	81.9	77.6	89.5	93.2	104.1	84.7

According to the data in table 1, it is clear that until 2016 there was a fall in trade, and then a positive trend emerged. Close and mutually beneficial cooperation has been established in the field of large, medium and small businesses [6]. However, with the strengthening of foreign economic relations and trade near the border, various problems inevitably arise for each of the parties. So, Orenburg entrepreneurs were challenged now and then by unexpected restrictions and prohibitions on the import of products into Kazakhstan, which implies the necessity to specify the mechanism for coordinating restrictions and timely notifying entrepreneurs.

The Aktobe manufacturers face challenges to enter the Orenburg market of products as well therefore it is necessary to identify and clearly spell out the opportunities and restrictions for entering the regional market at the official level.

Problems with the development of inter-regional cooperation are natural, but at the same time, Russian-Kazakhstan relations are developing rapidly, so it is possible to make a forecast for trade and economic cooperation between the Aktobe and Orenburg regions [10].

Based on the trade volume data for 2012-2018 (presented in the table 1), the forecast for the next period was suggested using the Box-Jenkins approach [4].

At the initial stage of the analysis of trade dynamics, it is necessary to determine the component composition of the schedule-based time series. For statistical data processing and obtaining a development forecast, we are going to use the Statistica software product. The graph is presented in the figure 1.
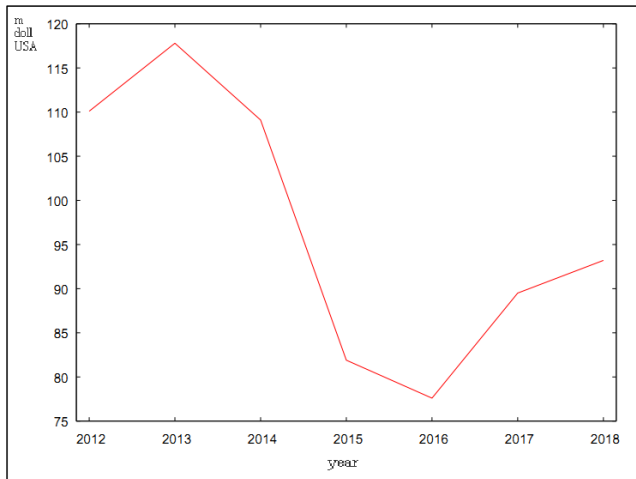
Fig. 1.   The result of plotting a time series graph.

According to the trade dynamics schedule of 2012-2018 we state the improvement of trade between the two regions at the end of the period under review.

2013 witnessed the maximum amount of inter-regional interaction. From 2013 to 2015 there was a sharp decline in turnover of all categories of goods, services and communications. Since 2016 there have been a sharp increase in turnover. In 2017-2018 there was a growth rate slowdown in commodity circulation.

A weaker Russian ruble resulted in the commodity circulation decline. The situation was aggravated by economic sanctions against Russia and the rapid decline in world oil prices (oil export produces revenue for the Russian budget).

We can assume the absence of seasonality and trend (or periodicity). The conclusion can be verified by constructing a graph of sample autocorrelation (SA/ACF in fig.) and partial autocorrelation functions (PAF/PACF in fig.) of the series, which are presented in Figure 2.
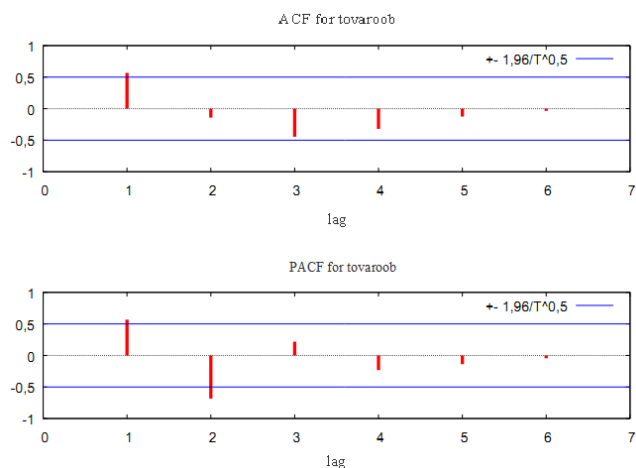

Fig. 2. Graph of sample autocorrelation and partial autocorrelation functions.

Based on the data in Figure 2, we can conclude that the series under study is stationary since the autocorrelation function tends to attenuation.

Next, we construct the autoregression model (AR (1)) for the dynamics of commodity circulation (the results of model evaluation are presented in Figure 3).

Fig. 3.   Results of AR (1) model evaluation.

According to Figure 3, both coefficients (constant and autoregression parameter) are significant ($p = 0.00 < 0.05$ and $p = 0.0463 < 0.05$). Next, you need to check the adequacy of the model, that is, make sure that model residuals are correctly distributed.

To check the normal probability of residuals we use the Lilliefor`s test. Figure 4 shows the result of checking the residuals of the AP model (1). According to the figure the p-value of 0.73 is greater than 0.05, which indicates that the residuals are distributed according to the normal law.

Fig. 4.   Results of AP (1) model residuals test with the help of Lilliefor`s test.

It is necessary to study the residual non-correlation with the help of sample ACFs and PACFs to check the model adequacy (Figure 5).
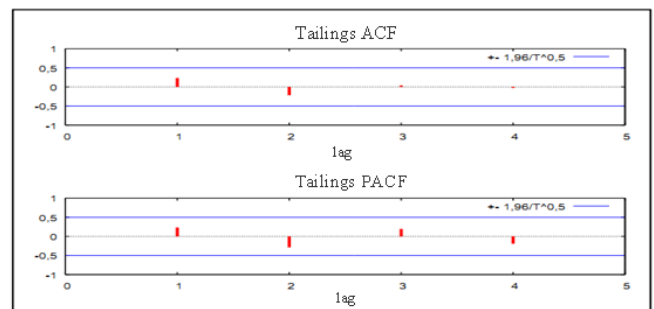

Fig. 5.   Graphs of samples ACFs and PACFs of AP (1) model residuals.

According to Figure 5 the residuals are not correlated since the values of sample autocorrelation coefficients and partial autocorrelation coefficients do not go beyond confidence intervals.

Thus, the model can be considered adequate, since the residuals of the model are uncorrelated and distributed according to the normal law.

We proceed immediately to forecasting. Figure 6 shows a graph of turnover values forecast.
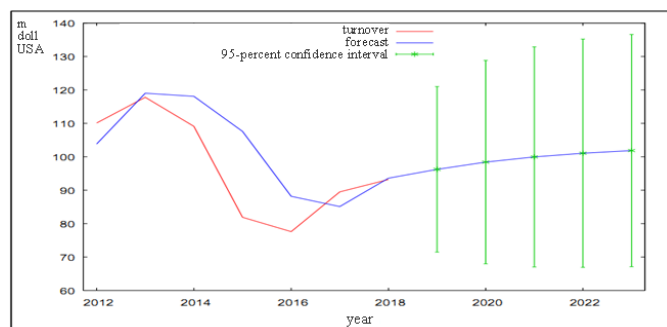
Fig. 6. Turnover forcasting result according to the model.

Figure 6 shows an upward trend in trade between the regions. The numerical values of the forecast according to the AR model (1) are presented in Figure 7.

For 95 % confidence intervals,	z(0,025) = 1, 96			
	tovaroob	prediction	statistical error	95 % confidence interval
2012	110,1	103,8		
2013	117,8	119,0		
2014	109,1	118,1		
2015	81,9	107,6		
2016	77,6	88,2		
2017	89,5	85,1		
2018	93,2	93,6		
2019		96,2	12,63	71,5 – 121,0
2020		98,4	15,52	68,0 – 128,8
2021		100,0	16,80	67,0 – 132,9
2022		101,1	17,42	66,9 – 135,2
2023		101,9	17,72	67,1 – 136,6

Fig. 7. Numerical values of AP (1) model original and forecasting data.

According to Figures 6 and 7, the entire forecast period continues to increase. Taking into consideration reliability and statistical significance of the forecast values, it can be stated that in 2019 the turnover of the Aktobe and Orenburg regions will amount to $ 96.2 million, and in 2020 – to 98.4 million US $. Moreover each subsequent year suggests growth, that will range from 67.1 to 136.6 million US dollars [11].

IV. Conclusions

Thus, the cross-border cooperation between the Aktobe and Orenburg regions is to gain momentum according to forecasting data. Government participation in the development of cooperation will boost the process aimed at improving the investment attractiveness of the regions. Moreover, the successful development of relations will be facilitated by inter-regional cooperation, the prospects of which are indicated in the basic macro level documents (federal laws, development programs, as well as various kinds of agreements on mutual cooperation concluded between the Government of the Orenburg region of the Russian Federation and the Akimat of the Aktobe region of the Republic of Kazakhstan) [12]

The purpose of all documents is the development of inter-regional cross-border cooperation between regions to improve the welfare of the population, which is the main goal of both socially-oriented Russia and Kazakhstan.

The following interaction methods and conditions are supposed to develop the cross-border cooperation [13]. We suggest grouping them into three modules:

1) Organizational module:
- meetings, consultations and other events with representatives of state-territorial, administrative-territorial and municipal entities;

- the creation of cross-border cooperation bodies and their further participation in their cooperation activity in accordance with international treaties between two countries;

- the development and implementation of international programs and projects on cross-border cooperation;

- federal authorities support to local authorities in the area of cross-border cooperation.

2) Law module:
- conclusion of agreements on cross-border cooperation by the state-territorial and administrative-territorial bodies of the Parties;

- establishment of new bodies to stimulate and control the activities of international organizations in the area of cross-border cooperation;

- permanent coordination of municipal draft agreements within the framework of cross-border cooperation;

- adjustment of other areas and powers of cross-border cooperation in accordance with international treaties between the Russian Federation and the Republic of Kazakhstan.

3) Information Module:
- creating a list of agreements between regions and municipalities on cross-border cooperation;

- collecting and processing all information about cross-border cooperation and the results of international and foreign economic relations between the border subjects of Russia and their municipalities and the subjects of cross-border cooperation of neighboring states.

The joint application of all these methods will encourage the efficient development of interregional and cross-border cooperation between the Orenburg and Aktobe regions. It`s worth noting that the parties are to pay attention to implementing joint programs and projects in the indicated priority areas and areas of cooperation and provide (as agreed by the Parties) systematic support to these areas at the state, region and local administrations` level.

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