

**SCTMG 2020****International Scientific Conference «Social and Cultural Transformations in the  
Context of Modern Globalism»****INFLUENCE OF FOREIGN TRADE ON THE ECONOMICS OF  
THE NORTH CAUCASIAN MACROREGION**

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***Abstract***

There are various academic assessments of the main growth forces of Russian gross domestic product, many of which show that the overall growth of production factors is of paramount importance. However, many studies analyze the relationship between foreign trade and economic growth, i.e., causes of expanding trade and economic growth. Moreover, the regional projection of economic growth, determined by exogenous factors, is an understudied research area. These issues are acute in the border regions of the North Caucasus macroregion of the Russian Federation. We reconstructed the growth dynamics of the economy of the North Caucasian macroregion of Russia for 1995–2017 and compared the results with two time series of foreign trade and the foreign trade index, using the R. Solow's growth model. The terms of trade depend on exogenous shocks and are an important factor in the development of gross fixed capital and the GDP growth. The article consists of several blocks: theoretical and methodological, statistical and economic and mathematical. The study determines the relationship of the economic growth of the North Caucasus Federal District with exogenous factors, including an index of foreign trade conditions, presents a multifactorial growth model for the North Caucasus macroregion and short-term growth forecasts taking into account exogenous factors. The results confirm the hypothesis about the determinism of economic growth by exogenous factors: the index of foreign trade conditions, the level of openness of the regional economy which should be taken into account when developing a growth strategy for the North Caucasus macroregion.

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**Keywords:** Economic growth, foreign trade, econometric model.



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## 1. Introduction

In Russia, the structure of driving forces of economic growth is different from the determinants of development in Central and Eastern Europe or China. The raw material growth model of the Russian economy depends on world market conditions and trade terms, that is, the ratio of export prices to import prices increases domestic investment and consumer spending, and helps increase public finances.

It should be noted that the ratio of investment to gross domestic product (GDP) is low, economic institutions are poorly developed. The Organization for Economic Cooperation and Development emphasized the importance of improving the business climate in Russia to accelerate economic growth (EBRD, 2013). It is necessary to neutralize the influence of negative factors that are not taken into account when analyzing the conditions affecting economic growth, such as slow or negative reformation progress, international sanctions and uncertainty about future changes in export prices.

It is important to understand that the commodity model of economic growth will continue to support the Russian economy as it did between 1998 and 2008: real oil prices and other commodity export positions will not recover to the level of 2013. Nevertheless, the raw material model of the Russian economy has not exhausted its potential and the importance of case studies of the relationship between the index of foreign trade conditions and the index of economic openness remains relevant.

This article studies trade and economic growth in the border North-Caucasian macro-region (SCM). The first section reviews literature on the theory and methodology of economic growth. The next part carries out a statistical analysis of the time series of indicators of the gross domestic product of SCM and its foreign trade, and calculates openness indices and indices of the foreign trade conditions. The third part discusses how foreign trade conditions and other indicators depend on external shocks, and evaluate SCM GDP, measured by the purchasing power parity. The multivariate regression equation is built and the medium-term forecast for the economic growth of the SCM economy taking into account the influence of exogenous factors is developed.

## 2. Problem Statement

The article suggests several research hypotheses: the foreign trade openness of the regional economy depends on global shocks; foreign trade is associated with the economic growth of the region; the improvement of foreign trade conditions is positively correlated with the economic growth of the macroregion.

The importance of this problem arises from the need to assess the impact of global shocks on the dynamics of economic growth of the border North Caucasian macroregion. Without taking into account exogenous conditions, it is difficult to verify the short-term forecast of the economic growth trajectory.

## 3. Research Questions

International economic integration is a multi-faceted process associated with globalization and economic (trade, capital flows, financial development); technological (technology export, research and development, information society); social (population migration, education and health systems, poverty, discrimination); cultural (freedom, acceptance, tolerance); and political (international and multilateral

global cooperation, global stability and security) factors (Bari, 2005; Huidumac-Petrescu et al., 2011; Murariu, 2011).

The article studies an ability of foreign trade to generate economic growth (Irwin, 1996). Therefore, it is not surprising that achievements of econometrics (Johansen, 1988; Johansen & Juselius, 1990; Toda & Yamamoto, 1995) caused great interest.

Most studies dealing with foreign trade and economic growth, as well as the effects of exogenous shocks, focus on short-term sampling periods. Therefore, they give an incomplete idea of how the multidimensional causal relationship changed over time in accordance with various historical or political stages. The recent works by Pistori and Rinaldi (2012), which consider cause-effect relationships in various historical subperiods, are of thematic interest. An analysis of regional aspects of the influence of exogenous factors, including foreign trade, on the economic growth of the North Caucasus Federal District, has been studied by many Russian economists (Gichiyev, 2012; Gimbatov et al., 2019).

#### **4. Purpose of the Study**

The main purpose of the article is to study short-term and long-term consequences of an increase in the index of foreign trade conditions, the openness of trade to economic growth under the influence of exogenous shocks. The article examines whether the dynamics of the index of openness and the index of foreign trade conditions are associated with global crises of the world economy and international sanctions.

Section 5 describes the research method, data and a dynamic model. Section 6 presents empirical data, discusses the main results, and describes the results of a model reliability test. The final section provides conclusions based on key empirical findings.

#### **5. Research Methods**

Statistical data for 7 Russian regions that are part of the North Caucasian macroregion for the period from 1995 to 2017 were used. The econometric VAR model was used as the main approach to data analysis. Data on the trade openness index, the foreign trade conditions index and the economic growth index (measured in per capita GDP in US dollars by the purchasing power parity as the best indicator for economic growth) were collected from statistical indicators. All values of were taken in real time.

To calculate the dynamics of the gross regional product under the influence of independent variables, the following indicators were used: foreign trade, net exports, personal consumption, investment, government spending:

$$\text{GNP} = \text{C} + \text{I} + \text{G} + \text{NX} \quad (1),$$

where GNP is gross national product, C is personal consumption, I is investment, G is government spending,  $\text{NX} = (\text{X} - \text{M})$ , X is exports, and M is imports.

Formula (1) shows that by increasing the positive terms of the right side of the equation, including net exports, we can achieve GDP growth. However, studies show that the situation is far from unambiguous, because in the dynamic environment, growth is enhanced by exports and changes in

imports or foreign trade. Export growth increases economic productivity for two reasons: the better use of comparative advantages; an increasing level of specialization in the export sector.

It should be noted that certain aspects of the regional projection of the impact of the oil prices and the exchange rate, the openness index, and the index of foreign trade conditions on economic growth are understudied.

Quantitative assessment of the dynamics of the level of integration of the North Caucasian macroregion is based on many indicators. The formula for calculating the openness index is as follows:

$$I_o = \frac{X+M}{GDP} * 100 \quad (2),$$

where X is exports of the macroregion (\$ million), M is imports of the macroregion (\$ million), GDP is the gross regional product (\$ million).

The index has values in the range from 0 to 100 percent and shows the role of a particular trading partner in the foreign trade of a country (region). The share of intraregional trade of an integration association is a special case of this index. The growth of this indicator is considered an indicator of an increase in the degree of integration of a country or region.

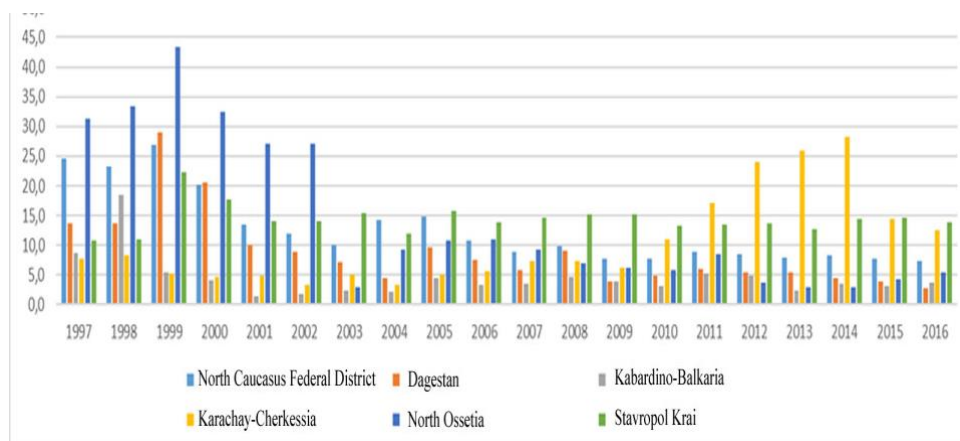
Another important indicator characterizing the level of favorable conditions for expanding the external integration of the macroregion through foreign trade channels in order to ensure its economic growth is the indicator is the index of foreign trade conditions. We assessed the conditions using the method below:

$$I_{ftc} = \left( \frac{I_e}{I_i} \right) * 100 \quad (3)$$

where  $I_{ftc}$  – the index of trade conditions,  $I_e$  – the index of average export prices,  $I_i$  – the index of average import prices

## 6. Findings

Based on the calculations, the following conclusion can be drawn: the level of economic integration of the North Caucasus macroregion into the system of world economic relations through foreign trade channels decreases during global shocks. The last period began in 2014 (Figure 1).



**Figure 01.** Openness Index for the North Caucasus Macroregion, 1997–2016

Based on the data presented in Table 1, we can conclude that periods of a sharp drop in the level of the index of foreign trade conditions as well as the index of trade conditions coincide with the periods of exogenous shocks. In 2009, the decline in 2009 was due to the international financial crisis of 2008–2009. In 2013–2016, deterioration of the foreign trade conditions was a result of anti-Russian sanctions. In 2017–2018, favorable trade conditions increased the efficiency of foreign trade in the North Caucasus Federal District (NCFD).

**Table 01.** Dynamics of the NCM Foreign Trade Conditions Index, 2005–2018

	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Trade Conditions Index (avg. Prices)- $I_{ftc}$	119,2	103,1	118,3	67,1	121,0	135,1	106,8	93,4	96,0	76,5	81,5	105,0	111,5
Index of trade conditions (physical volume)- $I_{ftf}$	85,5	78,3	84,2	153,2	79,3	85,2	95,1	108,4	108,4	142,8	102,4	108,3	101,6

Source: author's calculations

Note:  $I_{ftc}$  – Trade Conditions Index (Prices);  $I_{ftf}$  – Index of trade conditions (physical volume)

The comparative statistical analysis confirming the relationship between gross regional product and foreign trade is presented on the example of two macroregions of the South of Russia – the North Caucasus Federal District (NCFD) and the Southern Federal District (SFD). An integrated assessment of the close connection between economic growth and foreign trade is presented in Table 2.

**Table 02.** Regression assessment of the relationship between the foreign trade conditions and the gross regional product of the North Caucasus Federal District and the Southern Federal District (based on the foreign trade price index).

No	Macroregion	Regression model	R	R <sup>2</sup>	Normal R <sup>2</sup>	F	Value F
1	RF	$Y=0,18091 X_1 + 84,206$	0,820	0,672	0,631	16,369	0,0037
2	CFD	$Y=0,21624 X_1 + 80,44$	0,769	0,591	0,540	11,566	0,00934
3	NCFD	$Y= 0,10434 X_1 + 94,15$	0,655	0,430	0,358	6,0231	0,0396
4	D	$Y=0,06065 X_1 +101,19$	0,254	0,065	0,052	0,5537	0,47809
5	I	$Y=0,17282 X_1 + 87,93$	0,334	0,112	0,001	1,0073	0,34492
6	KB	$Y=0,06810 X_1 + 97,17$	0,506	0,256	0,163	2,7548	0,13553
7	KC	$Y=0,13939 X_1 + 87,92$	0,713	0,508	0,446	8,2513	0,02074
8	NO	$Y=0,05575 X_1 + 96,99$	0,426	0,181	0,079	1,7689	0,22017
9	SK	$Y=0,13221 X_1+90,12$	0,826	0,682	0,643	17,17933	0,003232
10	SFD	$Y=0,18622 X_1 + 84,566$	0,795	0,631	0,585	13,6956	0,00603
11	A	$Y=0,07246 X_1 + 99,209$	0,317	0,101	0,012	0,89665	0,3714
12	K	$Y=0,03504 X_1 + 97,927$	0,217	0,047	0,072	0,39689	0,54626
13	KK	$Y=0,16041 X_1 + 87,76$	0,803	0,644	0,600	14,4925	0,00518
14	AO	$Y=0,18925 X_1 + 85,21$	0,534	0,285	0,196	3,19498	0,11167
15	VO	$Y= 0,23315 X_1 + 77,29$	0,786	0,618	0,570	12,9415	0,0070
16	RO	$Y=0,20414 X_1 + 83,28$	0,687	0,472	0,406	7,16373	0,02808

Source: authors' calculations according to the Federal State Statistics Service of the Russian Federation and the Federal Customs Service of the Russian Federation.

RF – Russian Federation; CFD – Central Federal District; NCFD – North Caucasian Federal District; D – Dagestan; I – Ingushetia; KB – Kabardino-Balkaria; KC – Karachay-Cherkessia; NO – North Ossetia; SK – Stavropol Krai; SFD – Southern Federal District; A – Adygea; K – Kalmykia; KK – Krasnodar Krai; AO – Astrakhan oblast; VO – Volgograd oblast; RO – Rostov oblast.

The level of correlation of exogenous conditions (the index of foreign trade conditions and oil prices) with the economic growth of the North Caucasus macroregion (2008-2015) can be represented as follows:

$$Y = 1204,985 + 2026,32 X_1 + 21,63 X_2 \quad (4),$$

where  $X_1$  is the index of foreign trade conditions in the North Caucasian macroregion;  $X_2$  – the cost of Brent oil.  $R = 0.7$ ;  $R_2 = 0.49$ .

Equation (4) shows the relationship between the index of foreign trade conditions and oil prices and the economic growth of the North Caucasus macroregion. The density of the correlation between exogenous conditions and economic growth is high. The systemic effect on improving exogenous conditions contributes to the economic growth of the North Caucasian macroregion.

The analysis allowed us to build regression equations of economic growth for the North Caucasus macroregion for the period up to 2024 (Figure 2).

The econometric growth model of the North Caucasus macroregion until 2020 has the following form:

$$Y = 1123,77 - 0,48X_1 + 1,76X_2 + 3,78X_3 - 1,37X_4 + \varepsilon \quad (5),$$

where

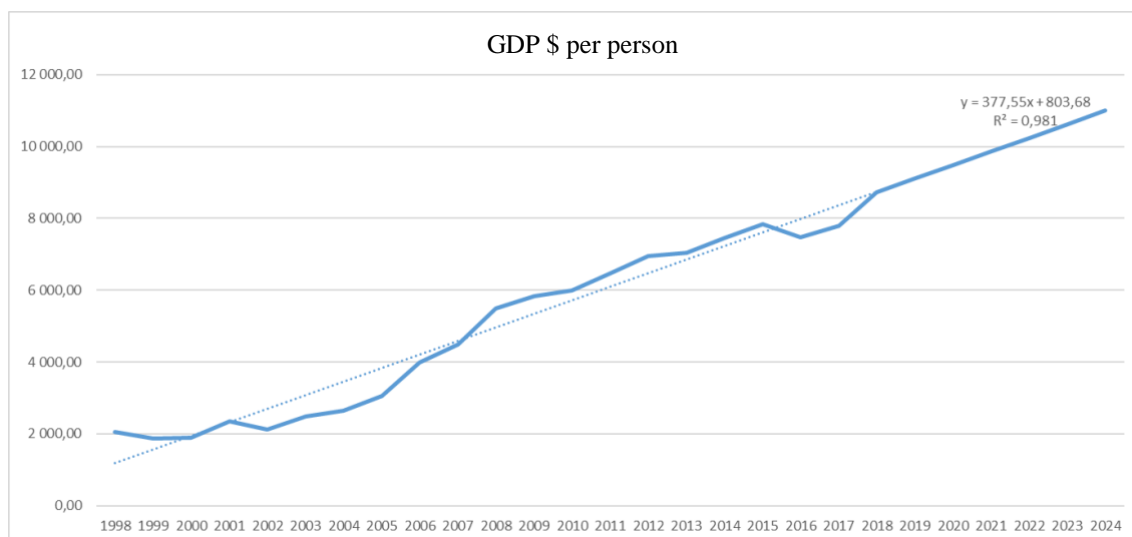
$Y$  – Gross regional product of the North Caucasian macroregion per capita by PPP;

$X_1$  – Budget expenses per capita by PPP;

$X_2$  – Investment per capita by PPP;

$X_3$  – Consumer spending per capita by PPP;

$X_4$  – NX (net exports) in \$.



**Figure 02.** Dynamics and forecast of economic growth of the North Caucasus macro-region, 1998-2024

According to the forecast, based on the econometric growth model (4), GRP of the North Caucasus Federal District will increase by 20.7 % from 2017 to 2024, if there is an increase in budget spending by 20.4 %, investment by 22.5 %, and consumer spending by 23.9 %. This confirms the hypothesis that the growth rate of GRP in the North Caucasus Federal District lags behind the planned average Russian by 4 % per year.

## 7. Conclusion

The article addressed the issue of the dynamics of economic growth and the openness of foreign trade under the influence of global shocks in the North Caucasus macro-region. An analysis of data and analytical methods was carried out. The results obtained are relevant and of practical value for developing a socio-economic development strategy for the North Caucasian macroregion. We found that the foreign trade conditions index, the openness index and economic growth are subject to exogenous shocks.

The main results of econometric modeling and short-term forecasting indicate that the economic growth rate of the North Caucasus macroregion in the period up to 2024 will not be sufficient to reduce the 4 % growth rate lag. This is due to the insufficient rate of projected growth in government spending, final consumption, investment in fixed assets and net exports of the North Caucasus macroregion.

The following conclusions can be drawn: the economic development of the North Caucasus macroregion is determined by exogenous conditions; the economic growth of the North Caucasus macroregion and the terms of foreign trade are interconnected; an increase in the period of volatility of foreign trade decreases the real gross regional product per capita; an econometric analysis identified a strong correlation between foreign trade and economic growth in the regions of the North Caucasus Federal District and the Southern Federal District (Krasnodar Krai, Astrakhan, Volgograd, Rostov Oblasts, the Republic of Dagestan and Karachaevo-Circassian Republic). The results of econometric modeling and short-term forecasting can be used for developing a new Strategy for the socio-economic development of the North Caucasus macroregion, aimed at reducing its level of economic polarization.

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