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## Analysis of Forecasting Documents for the Socio-Economic Development of the Russian Arctic \*

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**Abstract.** The tasks of forecasting the development of Russian territories, in particular the territory of the Arctic, are the most problematic due to the urgent need of the economy and management for a reliable forecast, the uncertainty of the near future caused by the turbulence of geopolitics, and the ongoing impact of the COVID-19 pandemic on socio-economic processes, which are also not fully measurable. The purpose of the article is to present the initial grounds and forecast of the socio-economic development of the regions of the Russian Arctic with a lead time up to 2023. The methodological peculiarity of the research is to take into account geopolitical, national, regional, industrial factors and development trends on the basis of using: 1) the analysis results of real and perspective global trends recorded in statistical indicators, forecast documents of the IMF, WTO, Central Bank, Ministry of Economic Development of Russia; 2) generalizations, comparisons of official forecasts and development plans of the AZRF adopted at the federal, regional levels, as well as forecasts, plans of corporations operating in the AZRF; 3) analysis of real statistical data using the author's econometric models. Given the considerable amount of analytical information received, the aspects and factors that have a key influence on the prospects of socio-economic development of the Arctic are outlined and classified according to the following levels: global, national, regional. Forecasts are made for the regions entirely located in the Arctic zone — Yamalo-Nenets, Nenets and Chukotka Autonomous okrugs, the Murmansk Oblast with an anticipation period up to 2021–2023. The importance of scientific forecasting in modern conditions is emphasized, encouraging reflection, new hypotheses, discussions.

**Keywords:** *Russian Arctic, forecast, social and economic development, COVID-19 pandemic, special operation in Ukraine*

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### *Introduction*

The issues of forecasting the development of territories of the Russian Federation are currently the most problematic, due to the urgent need of the economy and management for a reliable forecast, the uncertainty of the future due to the turbulence of the geopolitical environment, as well as the continuing impact of the consequences of the COVID-19 pandemic on the socio-economic processes that are also not fully evaluated.

The Arctic Zone of the Russian Federation (AZRF) is of particular importance for at least four reasons. Firstly, the special geo-political and economic significance of this territory for the Russian Federation, confirmed by a series of strategic documents [1, Kryukov V.A., Kryukov Ya.V., pp. 27–29; 2, Kudryashova E.V., Lipina S.A., Zaikov K.S., Bocharova L.K., p. 445; 3, Gagiev N.N., Goncharenko L.P., Sybachin S.A., Shestakova A.A., p. 113; 4, Skufina T.P., Mitroshina M.N., pp. 94–96]. Secondly, the increased costs of the functioning of the economy and the social sphere, which means increased risks and potential economic losses, including those caused by shortcomings in forecasting and planning [1, Kryukov V.A., Kryukov Ya.V., p. 28; 5, Volkov A.D., Tishkov S.V., pp. 16–21; 6, Minakir P.A., Krasnopolskiy B.Kh., pp. 12–20]. Thirdly, economic and managerial specifics, including an increased presence of the state and corporations in the economy of the Arctic, greater economic stability during periods of crisis due to the relative simplicity of the economy and extractive specifics [4, Skufina T.P., Mitroshina M.N., pp. 98–100; 7, Skufina T.P., Korchak E.A., Baranov S.V., pp. 57–66; 8, Pavlov K., Selin V.]. Fourthly, the high vulnerability of demographic processes and the low level of medical and demographic reserves, manifested, among other things, during the COVID-19 pandemic [7, Skufina T.P., Korchak E.A., Baranov S.V., pp. 67–69; 9, Toropushina E.E., pp. 620–626; 10, Skufina T.P., Korchak E.A., pp. 51–61].

The specificity of the presented forecast is in the fact that we consider the projected dynamics mainly from the standpoint of the impact of the COVID-19 pandemic. At the same time, the factor of the military special operation (MSO) in Ukraine and its consequences for the Russian economy was taken into account; however, it is not possible to reliably assess the impact of this factor on the socio-economic processes in the regions of the Russian Arctic at the present stage. This is due to the following reasons. Firstly, the MSO in Ukraine is still in progress, there is no information on its final results. Namely, it determines the consequences for the geopolitical position of the country, which means the specifics and scale of sanctions pressure and the associated impact on the regions of the Russian Arctic. Secondly, the scale and long-term nature of new projects being implemented in the Russian Arctic, as well as the long-term and sustainable functioning of existing industries in the extraction and processing of natural Arctic resources, which traditionally ensures greater stability of economic processes in crisis years and a certain resistance to sanctions pressure, demonstrated in practice, despite the special focus of sanctions on the Arctic projects [8, Pavlov K., Selin V., pp. 59–66; 7, Skufina T.P., Korchak E.A., Baranov S.V., pp. 63–64; 10, Skufina T.P., Korchak E.A., pp. 64–93]. Thirdly, our studies indicate that the quantitative ratios of the main

factors of GRP production in the regions of the Russian Arctic are preserved even during periods of crisis, which allows us to use the model and the ratio of the influence of regional factors during the modern crisis, caused not only by restrictive measures, to predict the model and the ratio of the influence of regional factors — a reaction to the COVID-19 pandemic, but also sanctions pressure [11, Skufina T.P., Baranov S.V., pp. 53–54; 12, Skufina T.P., Baranov S.V., Korchak E.A., pp. 27–33]. In this context, rather sharp changes in the forecasts of world analytical agencies for Russia, which are connected precisely with political factors, and not with objective ones, purely economic trends of the world, regional, national economies, are of particular interest. For example, according to the updated forecast of the IMF<sup>1</sup> in March 2022, the Russian economy will decrease by 8.5% in 2022 and by another 2.1% in 2023; according to the previous forecast of the IMF, the Russian economy was projected to grow by 2.8% in 2022, and by 2.1% in 2023 [14]. However, the accuracy of this forecast in the context of continuing high level of geopolitical uncertainty and incompleteness of the MSO in Ukraine raises reasonable doubts.

### *Data used and methodological features of the forecast*

The forecast is made on the basis of the following initial data. Firstly, it is based on an analysis of real and prospective global trends recorded in statistical indicators (including social, demographic, economic indicators, indices and market prices for primary commodities according to the IMF) and forecast documents of the IMF, WTO, Central Bank of the Russian Federation, Ministry of Economic Development of Russia. In order to identify the impact of the pandemic and the consequences of the MSO in Ukraine on the prospective dynamics of indicators of the development of the global and national economy, forecast data for both 2021 and 2022 are used for comparison.

Secondly, it is based on generalization, comparison of official forecasts and plans for the development of the Russian Arctic, adopted at the federal, regional levels, as well as forecasts, plans of corporations operating in the Russian Arctic.

Thirdly, it is based on the analysis of real statistical data for the Russian Federation, subjects of the Russian Arctic, statistics of municipalities, including the use of author's econometric models. It should be noted that a number of regional forecast indicators of the subjects of the Russian Arctic have been adjusted taking into account the author's econometric models [11, Skufina T.P., Baranov S.V., pp. 53–54; 12, Skufina T.P., Baranov S.V., Korchak E.A., pp. 27–33], taking into account the latest monthly dynamics indicators for 2021–2022, including indicators of industrial production, unemployment, inflation, and demographic indicators.

The object of the study is the socio-economic situation in regions located entirely in the Russian Arctic (Murmansk Oblast, Nenets Autonomous Okrug, Chukotka Autonomous Okrug, Yamalo-Nenets Autonomous Okrug).

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<sup>1</sup> International Monetary Fund. World Economic Outlook. Washington, DC, April., 2022. URL: [mf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022](https://mf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022) (accessed 10 April 2022).

Forecasting time is up to and including 2023. Let us note the main factors limiting the prediction of the forecast for a longer period:

- lack of most indicators and accumulated dynamics of the “covid stage” (which also explains 2021 as a forecast year);
- frequent and often significant adjustments to official forecast values of indicators, including at the level of the Russian Arctic regions;
- instability of the current geopolitical, macroeconomic situations that limit the long-term forecast estimates;
- on the one hand — medical and economic imperatives that level the current impact of the COVID-19 pandemic on social development in the world and at the national level, on the other hand — the preservation of unprecedented uncertainty and significant economic risks caused by the pandemic, which provides a high degree of probability of change global, as well as national, regional, corporate situations beyond 2023, etc.

Given the significant amount of analytical information received, we paid special attention to precisely those aspects that have a key impact on the prospects for the socio-economic development of the Russian Arctic, placing them by levels for convenience.

### *Global and national level*

According to the IMF<sup>2</sup> (October–December 2021 database):

- The global economic recovery in 2022–2023 will continue despite the new pandemic waves: global economic growth of 5.9% in 2021, 4.9% in 2022, 3.3% in 2023, which falls within the range of estimates of leading analytical agencies and recognized experts, is confirmed by current world statistics and the World Economic Forum 2021 estimates, is reflected in the Forecast for the Social and Economic Development of the Russian Federation for 2022 and for the planning period 2023 and 2024;
- Russia’s GDP decreased by 3% in 2020 compared to 2019, it is expected to grow by 4.7% in 2021, by 2.9% — in 2022, that is close to the forecasts of the Central Bank of the Russian Federation, which estimated GDP growth to 4–4.5% in 2021, lowered growth estimates in 2022 to 2–3%, leaving 2–3% in 2023 (the actual figures for 2021 were 4.6%, while the estimate made by the Ministry of Economic Development before the MSO in Ukraine was 3% in 2022 and 2023).

However, the global economy in 2022 turned out to be in a worse situation than expected, which is usually associated with the spread of a new strain of COVID-19 “omicron”, causing the return of restrictive measures [14]. Turning to the major drivers of global economic development, we argue that the lowered growth forecast for the global economy (relative to previous forecasts) by early 2022 has been caused not only by the impact of the new waves of the COVID-19 pandem-

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<sup>2</sup> IMF website. URL: <https://blogs.imf.org/> (accessed 10 April 2022).

ic but also by problems in the economies of the developed world caused by disruption to supplies of resources and components. Among the fundamental causes of these problems, we have identified the main ones affecting the dynamics in the Russian Arctic: 1) the energy crisis (largely caused by management shortcomings, for example, liberalization of the European gas market, etc.); 2) focus on “green” energy, the switch to electric vehicles, etc., which caused a sharp increase in demand and prices for silicon, aluminum, magnesium, lithium, cobalt, nickel, and other elements, indicating an increase in prices for minerals in general; 3) inflation caused, among other things, by anti-epidemic measures and the associated financial and fiscal supporting regulators of developed economies. However, these factors increase the forecasts for GDP growth in 2022 for resource based economies, in particular for the Russian Federation.

These fundamental reasons and current global trends coincide with the well-known hypothesis of the cyclical nature of the world economy, according to which the world economy has entered a new commodity cycle since mid-2020, the growth phase begins (duration 5-7 years) since mid-2020, accompanied by rising prices for raw materials, high global inflation (indeed, the analysis of behavior of the Bloomberg Commodity Index, a key indicator of the raw materials market (reflects the cost of 23 commodities, of which 30% are energy products, 35% are agricultural products and 35% are metals), USD Index (weighted average ratio of US dollar to a basket of 6 major currencies) clearly demonstrates not only the objective existence of commodity cycles lasting for about 20 years, but also the fact that the global economy is entering a phase of raw materials price growth, which traditionally is in the phase of the US dollar strength)<sup>3</sup>. It is important that the indicated phase of the growth of the raw material cycle also indicates the opportunities for economic and associated social development for the regions of the Russian Arctic, significantly reducing the risks for the main export items of the extractive regions, providing conditions for economic growth. If we ignore the fact of escalating geopolitical tension caused by the events in Ukraine, it allows us to expect industrial production growth in 2021–2022 in the AZRF regions.

The assertion is confirmed for the majority of the AZRF regions on real statistical data: monthly dynamics of industrial production of the regions of the Russian Arctic, unemployment rates, as well as industrial production indicators in Russia as a whole are considered. The indicators used are the index of industrial production, the index of officially registered unemployed, which ensures a comparable type of indicators. In order to eliminate seasonal fluctuations, as well as the possibility of comparison with the “pre-pandemic” period (2019), we calculated the indicators in a comparable form, in % to the corresponding month of the previous year, which eliminates the problem of seasonality. The calculation results and the technique used are given in [7, Skufina T.P., Korchak E.A., Baranov S.V., pp. 63–66]. The analysis of the obtained results indicates that the behavior of the indices in 2020 for most regions of the Russian Arctic has specific features — for

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<sup>3</sup> Bloomberg Commodity Index. URL: <https://www.bloomberg.com/quote/BCOM:IND> (accessed 10 April 2022).

most points of the dynamic series, there is a smaller reduction in production than in the Russian Federation as a whole, as well as a smaller rate of growth of unemployment.

Typical and new reasons for economic sustainability under restrictive measures, lower prices and demand for the basic items of industrial production of the Russian Arctic in 2020 are the following: a significant proportion of large industrial enterprises (which did not interrupt work during the period of restrictive measures); low level of development of small and medium-sized businesses; low level of consumer market development; high costs of the Russian Arctic regions to combat the consequences of the COVID-19 pandemic for the economy, labor market, and social sphere.

However, the dynamics of demographic indicators during the pandemic in most subjects of the Russian Arctic turned out to be worse than the Russian average, which is mainly explained by the low medical and demographic reserves of the Arctic regions, the lack of medical care, which could not be fully compensated by the increased infusions of the state and business into medicine of the Russian Arctic regions, prevention, social support during the pandemic [9, Toropushina E.E., pp. 620–627; 13, Kryukov V.A., Kryukov Ya.V., pp. 140–148; 14, Fauser V.V., Smirnov A.V., Lytkina T.S., Fauzer G.N., Klimenko V.A., pp. 229–235].

Statistical data confirm that in 2021, the recovery of production began in the Russian Federation, including in most regions of the Russian Arctic. According to the data of the Federal State Statistics Service, industrial production increased by 8.6% in January 2022 compared to the same period in 2021 (Table 1). An analysis of the statistical data of all four sectors of the economy taken into account in the calculation of the index of industrial production (heat and gas supply, extractive industries, manufacturing industries, and the energy sector) indicates that such a significant growth was ensured due to the growth of extractive industries (growth in January 2022 by 9.1% compared to January 2021), as well as manufacturing industries (growth in January 2022 by 10.1% compared to January 2021). The growth of industrial production in the Russian Federation (January 2022 to January 2019) at the beginning of 2022 (compared to the period before the pandemic) amounted to 7.8% due to an increase in the volume of manufacturing by 14.0% (analysis by sector shows that it was primarily the manufacturing industries servicing the extractive industries), as well as a direct increase in the production of the raw materials industry by 1.6%, the energy sector by 3.2%. In 2021–early 2022, most regions of the Russian Arctic show an increase in industrial production, and at a rate greater than in the whole of the Russian Federation (the exception is the Chukotka Autonomous Okrug) (Table 1).

Table 1

*Index of industrial production in the AZRF regions, in % of the corresponding month of previous year*<sup>4</sup>

Subject of the Russian Arctic	2021		2022		
	January	December	January	February	March
Murmansk Oblast	102.2	125.1	116.0	109.5	106.5

<sup>4</sup> Compiled by the authors according to the Federal State Statistics Service. URL: <https://www.gks.ru/> (accessed 10 April 2022).

Nenets Autonomous Okrug	86.7	111.2	121.9	124.2	123.6
Chukotka Autonomous Okrug	90.6	97.0	87.3	94.2	92.7
Yamalo-Nenets Autonomous Okrug	105.6	125.9	105.1	104.7	105.2
Russian Federation	97.7	106.1	108.6	106.3	103.0

However, it is possible to expect a gradual compensation of growth caused by the fundamental reason in 2022–2023 — the raw material cycle of the global economy, in the Russian Federation as a whole, due to a whole range of factors, including inflation, but most importantly — due to the sanctions pressure caused by the MSO in Ukraine.

The impact factor of high geopolitical tensions is taken into account in the IMF's April 2022 global economic outlook as the main reason for the decline in previously expected stronger global economic growth<sup>5</sup> (Table 2). The widespread sanctions against Russia have led to increased global inflation, disrupted supply chains, increased financial deficits in a number of countries, reduced industrial and energy security, increased financial risks and tighter financial conditions for private businesses, etc. In the latest global economic outlook, these factors are reflected in the expectation of a decline in global growth from 5.9% in 2021 to 3.6% in 2022 and 2023, which is 0.8 and 0.2 percentage points below the January forecast 2022 (Table 2)<sup>6,7</sup>.

Table 2

*World economic growth forecast by IMF, April 2022, January 2022 (January forecast data are given in brackets)<sup>8</sup>*

Real GDP, annual change, %	2021	2022	2023
Worldwide production	6.1 (5.9)	3.6 (4.4)	3.6 (3.8)
Advanced economies	5.2 (5.0)	3.3 (3.9)	2.4 (2.6)
USA	5.7 (5.6)	3.7 (4.0)	2.3 (2.6)
Euro area	5.3 (5.2)	2.8 (3.9)	2.3 (2.5)
Germany	2.8 (2.7)	2.1 (3.8)	2.7 (2.5)
France	7.0 (6.7)	2.9 (3.5)	1.4 (1.8)
Italy	6.6 (6.2)	2.3 (3.8)	1.7 (2.2)
Spain	5.1 (4.9)	4.8 (5.8)	3.3 (3.8)
Japan	1.6 (1.6)	2.4 (3.3)	2.3 (1.8)
United Kingdom	7.4 (7.2)	3.7 (4.7)	1.2 (2.3)
Canada	4.6 (4.7)	3.9 (4.1)	2.8 (2.8)
Other advanced economies	5.0 (4.7)	3.1 (3.6)	3.0 (2.9)
Emerging and developing	6.8 (6.5)	3.8 (4.8)	4.4 (4.7)

<sup>5</sup> In the IMF forecast, the factor of geopolitical tensions caused by the SMO in Ukraine is considered as more significant than the slowdown (relative to those expected at the end of 2021) in the pace of economic recovery of the world's largest economies — the United States and China.

<sup>6</sup> International Monetary Fund. World Economic Outlook. Washington, DC, April, 2022. URL: [mf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022](https://www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022) (accessed 10 April 2022).

<sup>7</sup> International Monetary Fund. World Economic Outlook. Washington, DC, Jan., 2022. URL: <https://www.imf.org/ru/Publications/WEO/Issues/2022/01/25/world-economic-outlook-update-january-2022#Overview> (accessed 10 April 2022).

<sup>8</sup> Compiled by the authors based on IMF data: April 2022. URL: [mf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022](https://www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022) (accessed 10 April 2022), for comparison IMF data as of January 2022 are in parentheses. URL: <https://www.imf.org/ru/Publications/WEO/Issues/2022/01/25/world-economic-outlook-update-january-2022#Overview> (accessed 10 April 2022).

economies			
Emerging market and developing Asia	7.3 (7.2)	5.4 (5.9)	5.6 (5.8)
China	8.1 (8.1)	4.4 (4.8)	5.1 (5.2)
India	8.9 (9.0)	8.2 (9.0)	6.9 (7.1)
ASEAN-5	3.4 (3.1)	5.3 (5.6)	5.9 (6.0)
Emerging market and developing Europe	6.7 (6.5)	-2.9 (3.5)	1.3 (2.9)
Russia	4.7 (4.5)	-8.5 (2.8)	-2.3 (2.1)
Latin America and the Caribbean	6.8 (6.8)	2.5 (2.4)	2.5 (2.6)
Brazil	4.6 (4.7)	0.8 (0.3)	1.4 (1.6)
Mexico	4.8 (5.3)	2.0 (2.8)	2.5 (2.7)
Middle East and Central Asia	5.7 (4.2)	4.6 (4.3)	3.7 (3.6)
Saudi Arabia	3.2 (2.9)	7.6 (4.8)	3.6 (2.8)
Sub-Saharan Africa	4.5 (4.0)	3.8 (3.7)	4.0 (4.0)
Nigeria	3.6 (3.0)	3.4 (2.7)	3.1 (2.7)
South Africa	4.9 (4.6)	1.9 (1.9)	1.4 (1.4)

### *Regional level*

Based on the analysis of the legal literature concerning the development of the Russian Arctic as a whole and its regions, forecasted and planned development indicators are collected, correlated with real data. It was found that the majority of forecast and planned economic and social indicators of the regions of the AZRF were not achieved at the end of 2020. At the same time, the study of the adjusted forecasts of the AZRF subjects and the statistical data of 2021 allows us to speak about the stabilization of the situation, which makes it possible to use econometric models and the results of analysis of the behavior of real indicators for forecasting.

A series of models was built for forecasting on the basis of exponential production function (PF), Cobb-Douglas PF (both with and without scientific and technological progress), and the CES function. On the basis of modeling, the specifics of production processes in the regions of the Russian Arctic were revealed, taking into account which a model was selected for each region, best corresponding to real data<sup>9</sup>. The models of GRP production reflect the interaction of the main factors of production (labor and capital). Given the volume limitations, only the most significant characteristics are given when describing the forecast in this article. For the forecast, the planned indicators presented in the official forecasts for the development of the Russian Arctic were used: indices of the physical volume of investments in fixed assets (I), the number of employees (E). These official forecasts also include GRP forecasts, but the official GRP forecasts, as a rule, do not match the forecast values, as indicated by analysis of the feasibility of past pro-forecast GRP indicators for the regions of the AZRF (while the main indicators that determine GRP production, including those used in our modeling, are close to the predicted values).

### *Forecast for the Yamalo-Nenets Autonomous Okrug*

<sup>9</sup> An example of the approach used to select the most realistic model, see e.g.: [11, Skufina T.P., Baranov S.V., pp. 53–54; 12, Skufina T.P., Baranov S.V., Korchak E.A., pp. 27–33].

The GRP forecast was carried out using the Cobb-Douglas function. Forecast of the index of the physical volume of GRP relative to the previous year (for comparison, the official forecast values of the indices of the physical volume of investments in fixed capital (I), the number of employees (E) and GRP (Y) are given in: 2021 = 101.6% (I = 102.3, E=101.2, Y=101.6), 2022 = 97.5% (I=94, E=100.02, Y=103.4), 2023 = 103.% (I=100.8, E=100.02, Y=100.8).

Consideration of the structure of economy and capital investments, specifics of projects being implemented, corporate strategies allow us to state: the economic growth of the region in 2023 will be provided mainly by growth of natural gas production (in 2021, the region accounts for 82% of natural gas production, new deposits are being developed), LNG production growth (construction of Arctic LNG-2 plant with a design capacity of 19.8 million tons per year is underway in the region; by the end of Q3 2021, the project is 52% ready; construction of the terminal on liquefied natural gas Obskiy GCL liquefied natural gas terminal with 2 lines of 2.5 million tons per year). However, a review of corporate plans for LNG production and output shows that our lower GRP forecasts for 2021, 2022 and higher ones for 2023 (relative to the official forecast) are more realistic.

Data analysis showed that there was an increase in the number of employed in 2021, mainly due to an increase in the number of workers on a rotational basis and living outside the district; we predict that the number of employees will remain unchanged in 2022–2023, which is explained by the implementation of construction work on large facilities and the development of new oil and gas condensate fields. Population growth was ensured by the birth rate, however, having considered the age and sex structure of the population, the authors established the exhaustion of this source of growth in the coming years; we also noted a significant increase in mortality in 2020–2021, caused by the consequences of the COVID-19 pandemic. These factors in our forecast do not allow us to expect natural population growth as a source of population growth in the region in the period 2021–2023.

### ***Forecast for Chukotka Autonomous Okrug***

It is impossible to do the same modeling and make GRP forecast by econometric models for Chukotka Autonomous Okrug due to revealed peculiarity of economics functioning: there is no significant positive relation between GRP and production factors for period 2000–2020 (no relation between GRP and investments (correlation = 0.18), no relation between investments and fixed assets (correlation = –0.19), which means that basic conditions of using SPF tool were broken.

However, limiting the analysis to data from 2014 to 2019, the authors found a significant correlation between investment in fixed assets and GRP (correlation 0.87) and a weak relationship between the number of employed and GRP (0.35). The simulations show that the coefficient describing the contribution of the number of employed to GRP is statistically insignificant. For the period 2014–2019, the linear PF with one factor of production (investment in fixed capital) corresponds best to the real data ( $r^2$  value per one degree = 0.7).

However, the use of this model is associated with a problem: it is impossible to use the official forecast and planned indicators for the development of the Chukotka Autonomous Okrug for projection. For example, we have analyzed the Strategy for the socio-economic development of the Chukotka Autonomous Okrug up to 2030, where GRP growth (1.6 times) is accompanied by a strong decline in investment (2.8 times decline) in the period from 2020–2023. The strategy of the Chukotka Autonomous Okrug (unlike that of other regions of the AZRF) provides only projected values of GRP and investment in value terms (and it is not clear whether the values are deflated or not), and physical volume indices are not given.

Among the analytical results of assessing the prospects for the development of the Chukotka Autonomous Okrug, we present the development of the transport and logistics system (the main one is the construction of a new port for cargoes of the Baimskiy Mining and Processing Plant, the development of port infrastructure, including a berth for floating nuclear power plants, equipment with a fleet for year-round operation, development of road infrastructure, including the section to Bilibino), development of the extractive industry (in addition to the main product — gold mining (consideration of the plans of companies and regional development allows us to expect an increase in gold production in 2021–2023 due to the development of new deposits Klen, Kekkura, Peschanka, which compensates for the withdrawal of large Kupol and Dvoynoye deposits), the prospects for the development of the Beringovskiy coal basin, the Baimskaya ore zone (the world's richest porphyry copper area in terms of reserves — the data of 2021 indicate the acceleration of work on the construction of the Baimskiy MPP and related infrastructure projects) are considered. The possibilities and plans for the development of fisheries in the North-Western part of the Bering Sea, the development of fish processing are noted. Our joint analysis of demographic indicators (mortality, birth rate, migration, ethnic composition, gender and age structure), investment projects and the specifics of their implementation, focusing on a predominantly rotational work method, indicates that we should expect an increase in the number of employees in 2021–2023 due to the accounting of workers on a rotational basis by 4 thousand people (an average of 1.3 thousand per year), maintaining the population at the level of 49.5–49.9 thousand people.

### ***Forecast for Nenets Autonomous Okrug***

The GRP forecast was carried out using the Cobb-Douglas function. The index of the physical volume of GRP relative to the previous year (in brackets are the official forecast values of the indices of the physical volume of investments in fixed assets (I), the number of employees (E) and GRP (Y)): 2021 — 102.4% (I=103.9, E=101.1, Y=111.2), 2022 — 102.8% (I=105.3, Y=103.2), 2023 — 102.8% (I=105.1, Y=103.1). Our estimates of the GRP of the Nenets Autonomous Okrug for 2022 and 2023 are close to the official estimates of the conservative scenario, but below the baseline scenario of the official forecast (given above in brackets).

The analysis of real situation (part of the results is given below) shows that our forecast is realistic. The GRP of the Nenets Autonomous Okrug depends on demand and prices, primari-

ly for oil (the share of oil production in the GRP of the region is 75%, the share of workers in oil production in the number of employees is 25%), the demand for which is more unstable and the price is more volatile than for gas (gas production is much less in the region), which reflects the results of 2020 (in 2020, the decrease in export volumes of the Russian Federation: oil = -11%; oil products = -3.9%; gas = -6.3%; coal = -3%), and in 2021, the volume of oil supplies has just started to recover (unlike the gas market).

Consideration of the prospects for diversifying the economy of the Nenets Autonomous Okrug in terms of reindeer breeding, fishing, fish farming, harvesting of wild plants, processing of these products, fur production, fur farming, and tourism made it possible to note their importance for socio-economic development. However, the stabilizing factors for the growth of the region will be the development of hydrocarbons, the corresponding development of the transport infrastructure (including gas pipelines for the transportation of associated gas), and the construction industry, but most importantly, the development of hydrocarbon processing (the main development constraints are the transport infrastructure, which is currently being solved by investment projects, lack of energy capacity).

Comparative analysis of investment processes by regions of the Russian Arctic in the period 2010–2021 pointed to the lag in the intensity of investment processes in the Nenets Autonomous Okrug. The most promising projects that go beyond our forecast horizons are the construction of a gas chemical complex for deep processing of natural gas into methanol and the development of the Kumzhinskoe and Korovinskoe fields, which will create 1000 jobs and increase methanol exports to the Russian Federation from 4 to 8 million tons.

Analysis of demographic indicators pointed not only to the problem of high mortality during the COVID-19 pandemic, but also to the traditionally high mortality among the working-age population. A joint analysis of demographic indicators (mortality, birth rate, migration, national composition, gender and age structure) and investment projects allow us to expect the population to remain at the level of 44.2–44.6 thousand people in the period 2021–2023.

### ***Forecast for Murmansk Oblast***

The GRP forecast was carried out on the basis of the linear PF. At the same time, only investments in fixed assets were used as factors of production, since there is a negative correlation between the number of employees and GRP.

The index of the physical volume of GRP relative to the previous year (the official forecast values of the indices of the physical volume of investments in fixed assets (I), the number of employees (E) and GRP (Y) are given in brackets): 2021 = 100.4% (I=103, Y=101.4), 2022 = 100.2% (I=101.5, Y=101.6), 2023 = 100.3% (I=102.2, Y=102.0). GRP of the Murmansk Oblast in 2021–2023 will depend on the intensity of the implementation of large investment projects, in particular, on the accelerated in 2021 Center for the construction of large-tonnage offshore structures.

Low growth rates of 2021–2022 are also explained by the exit of investment projects to their design capacity beyond the planning horizons, the insufficiency of diversification of the economy to replace the stagnation of a number of positions of traditional items of the region's economy (including the instability of the situation with fishing quotas).

Our more conservative estimates of GRP growth in 2021–2023 coincided with a decrease in metallurgical production in the Murmansk Oblast, both planned (2020: shutdown of the city-forming industries — smelters in Nickel and Monchegorsk), and initiated by accidents in 2021 (Nornickel, a subsidiary of Medvezhiy Ruchey LLC). Our GRP estimates are consistent with the official estimates of the Ministry of Economic Development in the Forecast of the socio-economic development of the Russian Federation for 2022 and for the planned period of 2023 and 2024, which placed the Murmansk Oblast in the top ten subjects of the Russian Federation with the expected worst GRP dynamics in 2022–2024 (place 79, rate 101.2).

The dynamics of the working-age population is analyzed in connection with the implementation of large investment projects, indicating the lack of communication, which is due to the predominant use of the rotational method. Our analysis of demographic indicators, the activation (including at city-forming enterprises) of the use of the rotational method in our version of the forecast worsens the population indicators compared to the official forecast (due to increased migration and high mortality rates). We expect a decrease in the annual population of the Murmansk Oblast by an average of 1.2% per year.

***Instead of a conclusion: on the achievability of target indicators for the implementation of the Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035, of the Program "Socio-economic development of the Arctic zone of the Russian Federation"***

Of particular interest is the statement of compliance (non-compliance) of our assessments with the target indicators for the implementation of the Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035 (Decree of the President of the Russian Federation of October 26, 2020 No. 645, hereinafter referred to as the Strategy for Developing the Russian Arctic Zone), the Program "Socio-economic development of the Arctic zone of the Russian Federation" (Decree of the Government of the Russian Federation of March 30, 2021 No. 484). Let us recall once again that, as we determined at the beginning of the article, it is currently not possible to reliably take into account the factor of influence of the MSO in Ukraine. Therefore, the assessments include the latest trends that have developed at the global, national, and regional levels without taking into account the qualitative breakdowns of trends, which are impossible to predict within the framework of scientific forecasting.

Indicators with a low probability of achievement are as follows. Firstly, the increase in the migration growth rate (it is planned to decrease to (–2.5) in 2024, reset to zero by 2030, increase to 2 by 2035 in the Development Strategy of the Russian Arctic) is limited by the acti-

vation of labor productivity growth, digitalization, automation and robotization, increased use of the rotational method and remote work in the Russian Arctic.

Secondly, the increase in life expectancy (it is planned to be 78 years in 2021, 80 years in 2030, and 82 years in 2035 in the Development Strategy of the Russian Arctic) is limited by the extremely negative impact of the pandemic on the population of the Russian Arctic regions, despite significant costs. For instance, of the 4 regions that are fully included in the ASRF, three subjects are in the top ten in spending on pandemic COVID-19 (according to the Accounts Chamber, spending in 2020, thousand rubles per person): Chukotka Autonomous Okrug = 32.1 (1st place among the regions of the Russian Federation); Yamalo-Nenets Autonomous Okrug = 29.0 (2nd place), Murmansk Oblast = 10.5 (10th place)), with mortality growth in 2020–2021 above the Russian average (according to preliminary data, November 2021), and life expectancy has decreased more than in the Russian Federation as a whole (in the Russian Federation — a decrease by 1.8 years) in the Murmansk Oblast — by 1.94 years, in the Yamalo-Nenets and Chukotka Autonomous Okrug — by 2.27 years, and in the Nenets Autonomous Okrug — by 2.79 years.

The achievement of the following strategic goals and indicators should be expected: an increase in the share of GRP produced in the Russian Arctic in the total GRP of Russia; increasing the share of crude oil and gas production in the Russian Arctic; increasing indicators for attracting private investment and creating new jobs, ensuring the growth of high-tech and knowledge-intensive sectors of the economy, increasing the share of domestic spending on research and development and technological innovation in the Arctic, ensuring 100% broadband access of households to the Internet, wage growth of workers in the Arctic. Reasons: institutional support at the national level, accelerated growth in global demand for fertilizers, gas, oil, metals, agricultural products (demand for fish is also important for the northern regions, the Russian Federation is the world leader in fish exports in 2020, 2021), recovery of domestic demand; increasing the possibilities of developing new and known deposits, etc. At the same time, there are also limiting factors, including the accumulated problems of the mineral resource base, remoteness, etc. However, the main one is transport and infrastructure, which cannot be resolved in an accelerated mode, but is envisaged for leveling within the framework of the adopted November 26, 2021 of the Transport Strategy of the Russian Federation up to 2030 with a forecast for the period up to 2035

We believe that it is necessary not only to talk about the achievability of indicators related to supporting the traditional economic activities of indigenous peoples, and increasing share of investments in fixed assets carried out for the protection and rational use of natural resources in the total investments in fixed assets of the Russian Arctic, but also to emphasize an increase in the significance of these indicators in the period 2020–2021, which is also expected in the future, including due to the consequences of climate warming, the increased likelihood of man-made disasters due to the intensification of economic activity. However, the

main reason for the increased significance of these factors is that the conditions of the COVID-19 pandemic and a number of major environmental disasters in the Russian Arctic have accelerated the strategic transition to providing real factors for the sustainable development of the Russian Arctic. Thus, consideration of the policy and practice of state and corporate governance during the pandemic period of 2000–2021 in the AZRF pointed to the primacy of environmental issues, social responsibility, related issues of climate change [7, Skufina T.P., Korchak E.A., Baranov S.V.]. Reviewing the latest global peculiarities of functioning of oil and gas, mining and metallurgical enterprises, analysis of international rating 2021 of risks and opportunities in the mining and metallurgical sector confirms the accelerated implementation of the worldwide strategy for ensuring the factors of sustainable development of the area of operation, including ecologization of production, compliance with ethical standards, support for economic growth, social responsibility of business [10, Skufina T.P., Korchak E.A., pp. 21–51, 141–176]. In fact, this is a paradox — previous crises mainly delayed the introduction of sustainable development factors, including in the Russian Arctic.

This paradox confirms the importance of our chosen broad context of research into the dynamics and prospects for the development of the Russian Arctic, considered not only in terms of achieving the economic performance of specific enterprises, not only from the standpoint of achieving target indicators set at the regional and national levels, but precisely the movement within the global trends in the global strategy for the development of the oil and gas, mining, metallurgical business, taking into account risks, opportunities, as well as new roles in social stabilization in the context of the COVID-19 pandemic. It should be noted that the actualization of the risks and opportunities of ecology and social responsibility for the Russian Arctic enterprises requires additional in-depth study.

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