

# Macroeconomic Assessment of the Regional Labor Markets in the European Part of the Russian Arctic<sup>1</sup>

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Received May 7, 2015

**Abstract**—The article analyzes the modern condition of the sector of employment and the labor market in the regions of the European part of the Russian Arctic. Major changes in the structure of the manpower resources formation and its distribution based on sectors of activity are studied. An inertial assessment of the medium-term dynamics of basic parameters of the regional labor markets is given.

DOI: 10.1134/S107570071601007X

The prospects of the Russian economic development are not least determined by its ability of full realization of its regions' economic potential. The relevant issues were reflected repeatedly in scientific publications, including the *Studies on Russian Economic Development* journal [4–6]. Lately, great emphasis has been placed on the development of the Russian Arctic. In the context of accelerating economic development, the Arctic is not only a resource-rich and strategically important geopolitical region. Arctic resources' development is an integrated project of federal importance that is comparable with the task of re-industrialization and directly connected to it [1, 8]. Labor supply of the Russian Arctic regions, including in the medium and long term is an urgent question. The article analyzes the tendencies in employment and labor markets in the European part of the Russian Arctic<sup>2</sup>. Given all the conventions of this geographical division, stagewise study of the European and Asian parts of the Russian Arctic is justified. This allows for a more detailed study of the specifics of the processes in employment and labor markets in addition to the consideration of advantages of a complex macroeconomic assessment of a number of problems in these

regions. This largely determines the need for a study of the labor markets in the regions in question as a whole, although not all territories of these regions formally belong to the Arctic zone.

The integrated assessment of current and forecast dynamics of the amount and qualitative composition of the manpower resources of the Arctic regions is in demand. For this, reports and forecast manpower resources balance of the regions of the European part of the Russian Arctic (Arkhangelsk and Murmansk regions, the Komi Republic and Nenets Autonomous District) can be used. These balances allow one to not only analyze the amount and major sources of the formation and tendencies of the use of manpower resources in each region, but also enable one to identify the dynamics of the simulated indicators along with the national tendencies.

**Major sources of manpower resources formation in regions of the european part of the russian arctic.** In the context of the growing amount of manpower resources in the Russian Federation, which were 3.8% in 2013 (compared to 2000), in the period under review, the total amount of manpower resources in the Arctic Regions decreased by 6.4%, i.e., from 5.5 to 5.1 million people. Manpower resources of the European part of the Arctic decreased by 546700 people (Table 1).<sup>3</sup> During that time, the largest relative reduction took place in the Murmansk region, i.e., by 15400 people, or 22.5%, while the smallest one occurred in the Arkhangelsk region, i.e., by 148500 people, or 16.7%. In Nenets Autonomous District, an increase occurred in the size of the manpower resources by 6600 people. In general, over a 14-year

<sup>1</sup> This paper is based on research carried out with the financial support of the grant of the Russian Science Foundation (project no. 14-38-00009). Peter the Great St. Petersburg Polytechnic University.

<sup>2</sup> In accordance with President's Decree No. 296 on May 2, 2014, "On Dry Land Territories of the Arctic Zone of the Russian Federation," they include the territories of the Murmansk region, Nenets Autonomous District, the Komi Republic (in part), the Arkhangelsk region (in part) in the European part of the Russian Federation. Considering similarity of the problems in employment and labor markets, interrelations of regional labor markets and their territorial proximity, this article contains the results of using a similar methodology used in the Republic of Karelia.

<sup>3</sup> All the calculations in the article were done by the author based on the Federal State Statistics Service data.

**Table 1.** Dynamics of the size of the manpower resources in the regions of the European part of the Russian Arctic, thousand people

Region	2000	2005	2007	2010	2012	2013	2013/2000, %
Russian Federation	89031.2	92250.5	93594.0	92958.8	92847.0	92388.6	103.8
European part of the Arctic	2793	2581	2573	2493	2285	2246	80.4
share in the resources of the RF, %	3.1	2.8	2.7	2.6	2.4	2.4	—
Republic of Karelia	472.9	446.5	449.0	434.3	387.4	380.7	80.5
share in the resources of the European part of the Arctic, %	17.1	17.5	17.7	17.7	17.2	17.2	—
Komi Republic	728.4	662.1	652.6	634.5	577.9	567.2	77.9
share in the resources of the European part of the Arctic, %	26.4	26.0	25.7	25.8	25.7	25.7	—
Arkhangelsk Region	887.5	834.9	836.4	810.5	752.5	739.0	83.3
share in the resources of the European part of the Arctic, %	32.1	32.7	33.0	33.0	33.5	33.5	—
Nenets Autonomous District	30.3	31.8	35.6	35.0	36.4	36.9	121.8
share in the resources of the European part of the Arctic, %	0.5	0.6	0.6	0.6	0.7	0.7	—
The Murmansk District	673.5	606.1	598.9	579.1	530.3	522.1	77.5
share in the resources of the European part of the Arctic, %	24.4	23.8	23.6	23.6	23.6	23.6	—

**Table 2.** Changes in the elements of manpower resources balance by sources of formation in the European part of the Russian Arctic in the period of 2006–2013, thousand people

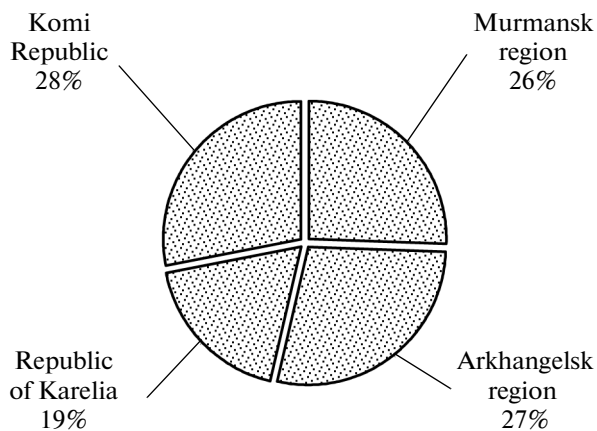
Indicator	2006	2008	2010	2011	2012	2013
Number of manpower resources	−4.5	−27.3	−88	−242.5	−296.9	−335.5
able-bodied working-age population	−16.1	−65.2	−127.1	−291.9	−365.5	−412.9
foreign labor migrants	1.4	16.9	11.7	6.3	12	12.9
persons over working-age and teenagers employed in the economy	10.2	21.0	27.5	42.9	56.6	64.5
of them:						
persons of over working age	8.5	20.7	27.7	43.0	56.1	64.3

period, a gradual decrease took place in the labor force share of the regions of the European part of the Russian Arctic in the total national number.

In the manpower resources structure, based on the sources of the formation, more than 90% are categorized as part of the able-bodied working-age population. Accordingly, the decrease in this particular cate-

gory of population has the greatest effect on the decrease in the size of manpower resources. In 2006–2013, the decrease in able-bodied working-age population in the European part of the Russian Arctic amounted to 412000 people (Table 2).

In turn, the decrease in the able-bodied working-age population is due to a decrease in the working-age



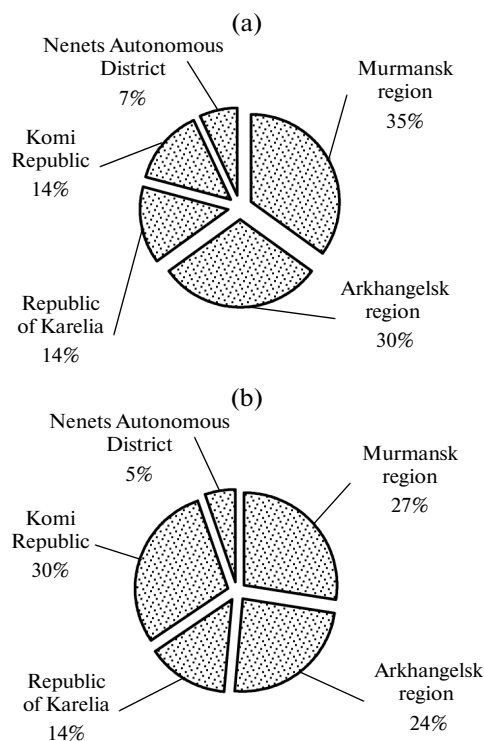
**Fig. 1.** Share of regions in the total decrease in the number of able-bodied working-age population of the European part of the Russian Arctic in 2006–2013.

population. In the context of this decrease, there is an increase in foreign labor migrants and workers outside the working age in the manpower resources structure by sources of formation in the regions of the European part of the Russian Arctic, which leads to decreased total losses of the manpower resources. The total increase in the number of employed individuals outside the working age in the review period amounted to 64 500 people and, by 2013, reached 7.6% of the total size of the manpower resources compared to 4% in 2005, mostly due to the increase in the amount and, accordingly, the proportion of people over working age.

An analysis of the contribution of each region to the change of the elements of the aggregated balance of the regions of the European part of the Russian Arctic for 2006–2013 showed that the share of the Arkhangelsk region was 28%, the Komi Republic was 28%, the Murmansk region was 26%, and the Republic of Karelia was 19% of total decrease in the working-age population (Fig. 1).

As noted above, in Nenets Autonomous District, there was an increase in the manpower resources during this period. The largest share in the increase in the number of foreign labor migrants falls to the Murmansk region (35%), while the smallest one occurred in Nenets Autonomous District (7%) (Fig. 2). In the regional structure of changes in the number of people over working-age and teenagers employed in the economy the largest ratio accounts for the Republic of Komi (30%), followed by the Murmansk region (27%), and the Arkhangelsk region (24%); the Republic of Karelia accounts for the smallest share (14%).

Apart from their own internal sources of labor resources formation and foreign labor migrants, internal Russian labor migration into the region can be allocated as a separate article of the resources of manpower resources balance, the scale of which tends to grow in the last 9 years, and so in the long-run, its role in the different regions will be enhanced. According to



**Fig. 2.** Share of regions in the total change (increase) in the number of (a) foreign labor migrants and (b) persons over working-age and teenagers employed in the economy of the European part of the Russian Arctic in 2006–2013.

the employment survey, in 2011, the labor migration between the regions of the Russian part of the Arctic (the sum of arrivals and departures of labor migrants) amounted to 2700 of people and, in 2012, to 6600 people.

In 2 years, migration turnover between these regions and the rest of the subjects of the Russian Federation amounted to 23600 and 37600 people, accordingly, and in both years, migration exchange between the regions of the European part of the Russian Arctic had a positive balance (1600 and 2100 people). In the structure of arriving internal Russian migrants the share of labor migrants in certain periods amounted to more than 60% (in the Komi Republic and the Arkhangelsk region). Nevertheless, in 2005–2012 not a single region had a stable positive labor migration balance. The detailed analysis of interregional labor migration in the regions of the European part of the Russian Arctic is presented in [13].

Table 3 shows the structure of manpower resources balances by sources of formation of five subjects of the Russian Federation in 2013. The able-bodied working-age population accounts for the largest share and, after them, there are people of senior working age employed individuals in the economy, as well as foreign or internal labor migrants. In Nenets Autonomous District, the number of internal labor migrants is

**Table 3.** Number of manpower resources based on sources of formation by regions in 2013, thousand people

Manpower resources	Murmansk Region	Arkhangelsk Region	Republic of Karelia	Komi Republic	Nenets Autonomous District
Able-bodied working-age population	468.7	680.4	350.8	510.7	25.7
Domestic labor migrants	4.4	0.5	–2	8.1	3.9
Foreign labor migrants	5.4	5.1	4.5	6.5	1.6
Persons over working age	43.0	52.5	25.4	41.3	5.6
Teenagers	0.6	0.4	0.0	0.5	0.1

**Table 4.** Distribution of the manpower resources in the European part of the Russian Arctic by spheres of activities, 2000–2013, thousand people

Indicator	2000	2005	2007	2009	2011	2013	2013/2000, %	2013/2005, %
Manpower resources	2792.6	2581.4	2572.5	2518.2	2338.9	2245.9	80.4	87.0
Average annual number of employed individuals in the economy	1851.3	1899.0	1927.7	1885.6	1842.3	1797.1	97.1	94.6
Working-age day-release students	200.4	219.5	199.1	170.4	150.3	132.8	66.3	60.5
Able-bodied working-age population not employed population in the economy and not studying in the educational system	466.6	286.2	301.7	282.1	195.6	180.2	38.6	63.0
Unemployed population (ILO)	273.9	176.8	143.9	180.2	150.7	135.9	49.6	76.8

2.5 times higher than the number of foreign ones and, in the Komi Republic, the same ratio is 1.2. In the Republic of Karelia, the balance of internal labor migration is negative.

According to the Government order of March 20, 2015 No, 257 [4], the notions of the subjects of the Russian Federation on foreign manpower resources intake arriving into the Russian Federation by visa must meet a number of criteria, such as the impossibility of satisfying the demand in manpower resources by means of intake from other regions of the Russian Federation. Therefore, monitoring the scale and dynamics of interregional labor migration, as well as its display in the manpower resources balance of the subjects of the Russian Federation are important for labor supply of the regions.

***Main directions of manpower resources use in the regions of the european part of the russian arctic.***

Dynamics of the distribution of the manpower resources balance in the European part of the Russian Arctic is characterized by a decrease in all of its elements. In 2013, the average annual number of employed individuals in the economy decreased by 2.9% compared to 2000. If one takes 2005 as a basis for comparison, the decrease amounts to 5.4% (Table 4) due to the positive growth rates of the average annual number of individuals employed in 2000–2007. In 2008, positive dynamics of the indicator changed to negative and, in the following years, the number of employed individuals did not reach its precrisis level.

In the dynamics of the number of the working-age day-release students, two periods can be distinguished as follows: until 2004, it increased and, in the following years, it decreased until 2013. Overall, the number of working-age day-release students decreased by 33.7%. In the dynamics of able-bodied working-age

population not employed in the economy and not studying in the educational system (military personnel, Russian citizens working abroad, housekeepers and others) there are no pronounced prolonged periods of stable growth or decrease. However, as a whole, the number decreased by 286 400 people in the period under review. The number of unemployed individuals decreased by half (hereinafter, unemployment is measured according to the International Labor Organization (ILO)). In 2013, the unemployment rate in the regions included in the European part of the Russian Arctic was 7% (in 2000, it was 13%). Three periods could be distinguished in the dynamics of unemployment, i.e., 2000–2002, 2004–2007, and 2010–2012, during which it was decreasing.

As in 2013, four-fifths of the manpower resources of the regions under consideration, or 1 797 000 people, were employed in the economy. The able-bodied working-age population not employed in the economy and not studying in the educational system amounted to 8% of the manpower resources. The shares of unemployed population and day-release students of working age amounted to 6%.

A regional analysis revealed that changes in labor resource distribution are directed differently in different regions of the Russian Federation.

Two periods could be clearly distinguished in the Murmansk region, i.e., 2000–2006 and 2007–2013, in which both positive and negative rates of employment growth were observed. During the first seven years, the number of employed individuals increased by 23 000 people. The maximal growth rate in the number of employed individuals was observed in 2000. However, the tendency of the employed population to grow was very modest and ran its course rather quickly. During the second period, negative tendencies were observed in employment, i.e., the number of employed individuals decreased by 25 000 people. Thus, by 2013, this decrease negated the increase in employment of the previous period. The share of employed population in the total size of the manpower resources grew inexorably from 64% in 2000 to 80.2% in 2013 due to the decrease in shares of the rest of the manpower resources categories. During the reviewed period, the share of unemployed population decreased from 14 to 6.5%, while it had opposite dynamics to the number of employed individuals. From 1999 up to the crisis of 2008–2009, the number of unemployed individuals was decreasing. During 2008–2010, unemployment in the regional labor market increased by 30%, and a noticeable decrease was only observed starting in 2012. Thus, the decrease in the number of employed individuals was accompanied by growth in unemployment and an increase in the number of foreign labor migrants in the regional labor market. Although the ratio of foreign manpower resources is relatively small (about 1% of total number of employed individuals), the preservation of high growth rates of this category can lead to substantial changes in the structure of employed population in the long run.

The share of working-age day-release students in the regional manpower resources fluctuates from 5.1% (2013) to 7.6% (2014), and its dynamics can be divided into two timeslots, i.e., 2000–2004 and 2005–2013, which are peri-

ods of growth and decrease, respectively. In the 14-year period, the total decrease in this category of the population amounted to 12 400 people. In 2002, the share of able-bodied working-age population not employed in the economy and not studying in the educational system in the structure of manpower resources was 20% and, in 2011, it was 7.4%; in absolute terms, it decreased by 85 000 people.

In the dynamics of the number of employed individuals in the Republic of Karelia, one can distinguish three periods with different tendencies of development with a certain degree of conditionality. In the first period (2000–2003), a marked increase in the number of employed individuals was observed. During the second period (2004–2007), there were minimal changes in the number of employed individuals (the growth rates were in the range of 99–101%). The economic crisis of 2008–2009 changed the situation in the regional labor market dramatically, which resulted in a subsequent decrease in the number of employed individuals in the region by 68 000 people by 2013. The share of this manpower resources category grew by 10 pp, i.e., from 70% in 1999 to 80% in 2014. For most of this period, the decrease in the number of employed individuals occurred simultaneously with the decrease in the number of unemployed individuals; i.e., there was an even larger decrease in the number of economically active population (compared to the number of employed individuals).

Let us note that the dynamics of the number of unemployed individuals and the size of the able-bodied working-age population not employed in the economy and not studying in the educational system were in antiphase. In 2006, in the context of the dramatic growth in the latter, unemployment was minimal. The subsequent decrease in the number of the able-bodied working-age population not employed in the economy and not studying in the educational system was accompanied by noticeable growth in the number of unemployed individuals. A similar situation but with smaller oscillatory amplitude was observed in 2012–2013. In 2004, the share of working-age day-release students in the manpower resources structure reached its maximum at 9.4%; in 2013, it was 6.4%. This number increased until 2003, and then decreased up to 2013; the decrease over the whole period amounted to 18 500 people.

In the Arkhangelsk region, the number of employed individuals in the economy amounted to 80% of the regional manpower resources in 2013. Compared to 2000, the share of employed population in the total manpower resources increased noticeably due to decreased shares of all the other categories. With certain reservations, 2000–2007 can be characterized as a period of growth in the number of employed individuals in the region. The negative growth rate of employment is characteristic of the second half of the considered time interval (2008–2013). The total growth in the number of employed individuals in the region was twice as large as its decrease during the second period, i.e., 36 500 people compared to 15 800 people. In 2013, the share of the second largest category, which consisted of able-bodied working-age population not employed in the economy and not studying in the educational system accounted for 9.1% of the regional manpower resources. The ratio of the third largest group in the manpower resources structure based on directions of use (6.1% of their total number in 2013), i.e., of working-age students, was decreasing (by 2.8 pp from the maximal 8.9% in 2004). In absolute terms, the decrease in this category of the population amounted to 28 000 people, down from 73 700 in 2004 to 45 000 people in 2013. In 2013, the share of unemployed population in the

total size of the manpower resources amounted to 5.2%. In 1999–2000, the ratio of this category was 10–12.2%. During the period under review (2000–2013), the unemployment rate decreased from 13 to 6%.

In the dynamics of the employed population in the economy of the Komi Republic, periods of its growth (2000–2004), stabilization (2004–2008), and decrease (2009–2013) can be distinguished. By 2013, the number of employed individuals decreased by 30000 people, or 5% compared to 2008. After the crisis of 2008–2009, the number of unemployed individuals decreased substantially. In 2006–2008 and 2010–2012, the number of unemployed individuals had similar dynamics; i.e., after the crisis, the labor market returned to its former path, but with different absolute values. Furthermore, in 2013, the situation in the labor market became even more serious. In 2013, the able-bodied working-age population not employed in the economy and not studying in the educational system (the second largest category in the total size of the manpower resources) amounted to 9.1% of the regional manpower resources. The ratio of the third largest category in the manpower resources structure based on the directions of use (in 2012, 6.2% of their total number) to working-age students also decreased by 3.2 pp from the maximal 9.4% in 2004. In absolute terms, a decrease in their number from 62000 in 2004 to 35000 people in 2013 took place. The rate of unemployment in the region is higher than the national average and higher than the average for the Northwest Federal District (in 2013, it was 7.4%).

In the manpower resources distribution of Nenets Autonomous District, the number of employed individuals dominates more clearly than in other regions; in 2013, it amounted to 90% of the total manpower resources of the region. Compared to 2000, the share of employed population increased substantially due to the decrease in all the other categories. Two stages can be distinguished in the dynamics of employed population. In 1999–2007, the number of employed individuals increased. The second stage includes the recession (2008–2010) and economic recovery (2011–2013), which resulted in the return of the employed population to the pre-crisis level and then surpassing it. The second largest category is unemployed. In 2013, the share of unemployed population in the total size of the manpower resources amounted to 4.4%. The rate of unemployment is not high. In 2013, it was 4.6%, but the instability of this indicator is worth noting, as well as the number of unemployed individuals. In retrospect, one cannot say that the tendency of low unemployment rate will be long-term, although, as noted above, until 2008, the number of employed individuals grew and yet, in 2003 and 2005, bursts of rising unemployment were observed. However, one can give a counterexample too. In the crisis period, a decrease in employment did not lead to a corresponding increase in the number of unemployed individuals, i.e., the share of employed individuals temporarily left the labor market. In general, one can note uneven dynamics in the number of unemployed individuals and alternating periods of its reduction and increase. The ratio of the third largest category in the structure of manpower resources (3.5% of their total number), i.e., working-age students, also decreased in the period of 2004–2013 by almost 2.6 pp. In absolute terms, the reduction amounted to 600 people.

***Structure of employed population based on types of economic activities by OKVED section.*** In order to assess the changes in the corresponding structure of

employment, the reference rates of growth in the number of employed individuals based on the types of economic activities for 2000–2013 were analyzed (2000 was the reference year). The analysis showed that all types of economic activity could be divided into several groups according to the dynamics of the number of employed individuals in them. The first group (six OKVED sections) includes the types of activities with substantial growth in the number of employed individuals (10% and more) in 2000–2013. Changes took place in the regions were similar in direction but different in intensity.

Maximal growth in the number of employed individuals (135%) occurred in section J (“Financial Activities”) (Table 5). In the three of the five regions, i.e., Murmansk and Arkhangelsk regions and the Republic of Karelia, this type of activity occupied the first and the second places with regard to an increase in employed individuals; Nenets Autonomous District did not hold key positions. Overall, in the five subjects, employment in sections H (“Hotels and Restaurants”) and F (“Construction”) increased by one-third. The general increase by the growth rates of 116–146% in section F occurred in all regions. The largest growth in employment in these sections took place in Nenets Autonomous District. The increase in each of these sections was more than 20% in the Republics of Karelia and Komi, and Murmansk region. In sections L (“Public Administration and Military Security; Compulsory Social Security”) and G (“Wholesale and Retail; Repair of Motor Vehicles, Motorcycles, Household Goods and Personal Items”), employment increased by one-fourth (24%). In the subjects, the growth rate in sector L was in the range of 16–20%. In the five regions overall the number of employed individuals in section E “Production and Distribution of Electric Energy, Gas and Water” increased by 21%, which was accompanied by growth in according employment in each region.

The second group includes three OKVED sections in which a moderate increase in the number of employed individuals took place. Unlike the first one, this group is characterized by mixed trends in the subjects.

In general, the growth rates in sections I (“Transport and Communication”), K “Real Estate Operations, Renting and Business Activities”) and O (“Other Community, Social and Personal Services”) amounted to 102–109%. In this context, there was a decline, albeit a slight one, in Arkhangelsk and Murmansk regions by 3 and 1%, accordingly. In 2013, in the Republic of Karelia, employment stayed the same as in 2000. Employment in the Arkhangelsk region decreased in section K by 3.5% and a decline was observed in section O.

A decrease in the number of employed individuals was noted in the remaining types of economic activities (third group) (sections A–D, M, N, P, Q). The most dramatic decrease took place in sections A (“Agriculture, Hunting, and Forestry”) and B (“Fishes and Aquaculture”). By the end of the period under review (2013), employment in these types of activities was at 70% of the 2000 level (in 2000, it was 58%).

**Table 5.** Dynamics of the number of employed individuals by types of economic activities in the regions of the European part of the Russian Arctic, 2013, % of 2000

Type of economic activity	Change in the number of employed individuals					
	Republic of Karelia	Murmansk Region	Nenets Autonomous District	Komi Republic	Arkhangelsk Region	Regions of the European part of the Russian Arctic
Economy, total	90.7	96.7	177.1	102.6	105.0	100.5
Section A. Agriculture, Hunting, and Forestry	38.0	46.4	72.8	66.6	64.4	57.6
Section B. Fisheries, Hunting, and Aquaculture	157.0	64.7	163.6	114.3	57.9	69.7
Section C. Mining	82.6	70.7	722.5	69.9	467.5	88.8
Section D. Manufacturing	64.5	74.9	92.5	83.7	100.3	85.0
Section E. Production and Distribution of Electric Energy, Gas, and Water	131.2	105.3	235.6	116.7	135.1	121.1
Section F. Construction	124.3	121.1	342.6	146.0	116.0	130.5
Section G. Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles, Household Goods, and Personal Items	119.3	115.1	104.7	125.1	137.1	124.2
Section H. Hotels and Restaurants	141.4	133.1	547.0	121.2	121.6	130.6
Section I. Transport and Communications	100.0	99.0	272.2	109.0	96.7	102.0
Section J. Financial Activities	142.3	143.0	177.9	117.2	144.3	135.6
Section K. Real Estate Operations, Rent and Services	113.3	103.2	104.1	130.2	96.6	109.4
Section L. Public Administration and Defense; Compulsory Social Security	117.6	116.6	202.7	124.7	130.9	123.7
Section M. Education	85.7	84.0	105.7	88.5	99.9	91.0
Section N. Health care and Social Services	93.5	89.8	132.7	102.8	107.5	99.7
Sections O, P, Q. Other Community, Social and Personal Services; Provision of Household Services; Activities of Extraterritorial Organizations	75.0	115.7	186.4	123.3	106.5	106.7

The largest decrease in section A took place in the Republic of Karelia: by 2013, the number of employed individuals in it decreased to 38% compared to 2000. Despite the general decline of employment in B section, in the Republic of Karelia, Nenets Autonomous District, the Komi Republic the number of employed individuals in fisheries and aquaculture increased by 57.63% and 14% accordingly. The largest decrease in employment (in the section “Fisheries and Aquaculture” – 42%) took place in the Arkhangelsk region.

In general, employment in sections C (“Mining”) and D (“Manufacturing”) decreased by 12–15%, while in M section (“Education”), it decreased by 9%. In section N (“Health and Social Services”), the growth rates of employment were close to zero. The

Arkhangelsk region and Nenets Autonomous District showed an increase in employment in mining.<sup>4</sup>

There were no substantial changes in the structure of employment based on type of economic activity in the regions of the European part of the Russian Arctic. In 2000 and 2005, section D was in the first place with regard to the number of employed individuals and, in 2013, the first place was occupied by section G, while section D moved to the second place. In 2000, section

<sup>4</sup> Regarding the latter, it can be assumed that the shifts in the other sections were directly determined by the growth in the number of employed individuals in the mining sector of the regional economy and related growth in the number of employed individuals in other industries, mostly infrastructural. By 2012, in Nenets Autonomous District, the number of employed individuals in section C amounted to 20%.

J (“Financial Activities”) and, in 2005 and 2012, section B were characterized by the smallest ratio of the number of employed individuals. Sections I (“Transport and Communications”) (third place) and M (“Education”) (fourth place) had stable positions in the structure of types of economic activities. Section A underwent the largest changes, i.e., it moved from the fifth place in 2000 to the ninth place in 2012 due to a drastic cut in the number of employed individuals. On the contrary, section L “Public Administration and Defense; Compulsory Social Security” moved from the eighth to fifth place.

In general, the ratios of the types of economic activities grouped according to the dynamics of the number of employed individuals in the regions of the European part of the Russian Arctic changed in the following way. Employed population was redistributed to the first group. The share increased from 30 to 37% due to a 7% decrease in the share of the types of activities included into the third group. The share of the second group of the types of economic activities with moderate rates of employment growth remained 21–22%.

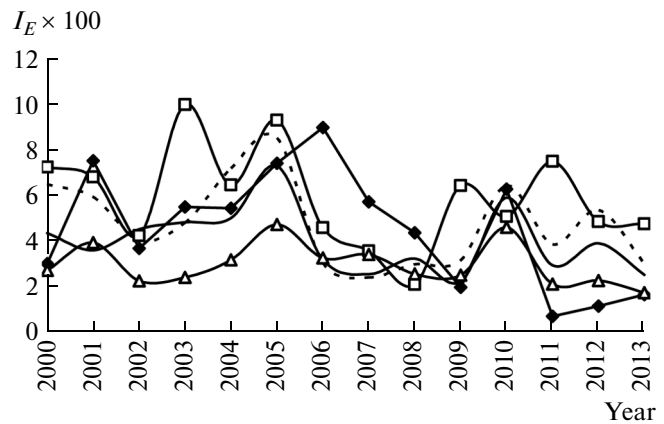
For an integrated assessment of the intensity of the changes in the structure of employment by types of economic activities the index of structural change was used [8], the dynamics of which is shown in Fig. 3.<sup>5</sup>

The periods with unidirectional changes in the structure of employment by types of economic activities in the regions can be noted. Growing intensity of changes in the structure of employment was registered in 2001 and 2005, and 2010. In these periods the index reached its local maximums. In 2001, the sharp increase in the index was influenced mostly by the change of the number of employed individuals in sections A, B, and C: “Agriculture, Hunting, and Forestry” and “Fisheries and Aquaculture” were losing employment, while the growth in employment was registered in “Mining.” In 2005, an increase in the index was mostly due to the changes in the following sections: “Real Estate, Renting and Business Activities”; and “Manufacturing” (decrease in employment); “Construction” (increase in employment). For 2010, the following three sections can also be distinguished that dominated the growth in the index: “Other community, social, and personal services”; “Hotels and Restaurants”, in which the number of employed individuals decreased; and “Public Administration and Defense; Compulsory Social Security” where the number of employed individuals increased compared to the previous period.

The corresponding indices in the subjects are mostly characterized by similar fluctuations, but due to the regional specifics, deviations from the general tendency were observed, which in this case refers to the evaluation of shifts calculated for the five regions together.

**Unemployment.** The decrease in the number of unemployed individuals is characteristic for the regions under review; it amounted to 138000 people,

<sup>5</sup> Due to dramatic jumps in the dynamics of the index in Nenets Autonomous District that are much higher than the change in other regions, this region is not shown in the figure.



**Fig. 3.** Dynamics of structural changes in employment by types of economic activities by regions of the European part of the Russian Arctic  $I_E$ , in 2000–2013: □ Republic of Karelia; — Murmansk region; ◆ Arkhangelsk region; - - - Komi Republic; △ total for five regions.

or one-half of the number of unemployed individuals in 2000. According to our research (see, e.g., [12, 14]), the structural component of unemployment makes a significant contribution to the whole number of unemployed individuals, which is due to inequality in the labor supply and demand. An assessment of the regional unemployment rate in the economy of the Russian Federation has shown that, in the 2000s, it was 30–40% behind the total unemployment and, in the 2010s, it has stayed high. It is possible to regulate structural unemployment by the complex influence of the federal and regional governments on the demand and supply of labor and their qualitative characteristics. In particular, migration policy (the move of the unemployed individuals from labor-surplus to labor-deficit regions) is important in the decrease in the regional component of structural unemployment and the policy of changes in the structure of vacant jobs by opening new modern jobs and closing old obsolete and worn-out jobs. Table 6 presents assessments of the input of certain regions into the all-Russia regional structural unemployment, which is the difference between the ratio of the number of unemployed individuals in the regional labor market to the number of unemployed individuals in the all-Russia labor market and the ratio of the number of vacancies in the regional labor market and the number of vacancies in the all-Russia labor market (the indicator is 1%).

Additionally, the table present assessments of the number of unemployed individuals who arrived or departed from the region, which decreases structural unemployment in the Russian Federation while preserving the regional structure of vacancies (indicator 2, thousands of people); as well as vacancies in the subject (a stated need for workers) and need to be changed



**Table 6.** Imbalances in the labor markets in the regions of the European part of the Russian Arctic

Region (indicators)	2008	2009	2010	2011	2012	2013
<b>Republic of Karelia</b>						
1	0.23	0.16	0.23	0.19	0.15	0.25
2	-10.8	-10.0	-12.8	-9.5	-6.3	-10.2
3	2.1	1.2	1.4	1.4	1.3	2.1
<b>Arkhangelsk Region</b>						
1	-0.09	-0.21	-0.03	-0.02	0.06	0.15
2	4.3	13.3	1.6	1.1	-2.4	-6.4
3	-0.8	-1.6	-0.2	-0.2	0.5	1.3
<b>Komi Republic</b>						
1	0.0	0.14	0.20	0.06	-0.04	0.05
2	0.2	-8.7	-10.9	-2.8	1.7	-2.1
3	0.0	1.1	1.2	0.4	-0.3	0.4
<b>Murmansk Region</b>						
1	-0.22	-0.47	-0.52	-0.17	0.09	0.03
2	10.1	29.6	28.9	8.5	-3.7	-1.1
3	-1.9	-3.6	-3.2	-1.3	0.7	0.2
<b>Nenets Autonomous District</b>						
1	-0.05	-0.06	-0.07	-0.03	-0.01	-0.01
2	2.3	3.5	3.9	1.4	0.4	0.4
3	-0.4	-0.4	-0.4	-0.2	-0.1	-0.1

(created or closed) under a current regional structure of unemployed population in order to eliminate structural unemployment (indicator 3, thousand people.).

According to the calculations, in 2008–2013, the Republic of Karelia was a stable labor-surplus region, which allows one to move a share of unemployed individuals to regions of the country with labor deficits in order to minimize structural unemployment. There were 6300 (2012) to 12800 (2010) of these structurally unemployed individuals in the region, which comprised 27 and 40% of the total number of unemployed individuals in the region, accordingly. An alternative measure of structural unemployment reduction is the creation of 1200–2100 additional vacancies in the Republic of Karelia. Up to 2011, the Arkhangelsk and Murmansk regions were labor-deficit regions, in the last two years all-country ratio of unemployed individuals surpassed the according ratio of vacancies in these regions. The Komi Republic was a labor-surplus region, except in 2012; in 2010, the largest emigration of unemployed population from this region was 11000 people, or one-fifth of the total unemployed population in the region, which would allow

one to liquidate structural unemployment. Nenets Autonomous District was characterized by an excess of the relative number of vacancies over the according share of unemployed population over the whole period.

In reality, the territorial movement of working places and the economically active population (employed and unemployed population) took place simultaneously and continuously. Furthermore, the process of coordinating the unsatisfied supply and demand of labor cannot be reduced to merely seeking their quantitative correspondence. The policy of training employed population is equally important, as well as training and retraining the unemployed population to meet the needs of the economy in the manpower resources of necessary qualifications. Nevertheless, the resulting estimates provide guidance in determining the needs of the regions in the additional manpower resources in the framework of the policy aimed at increasing labor force mobility [2, 3]. Estimates of the

number of vacancies can also serve as guidelines in implementing measures of creating highly productive working places at the federal and regional levels [15].

**Assessment of prospective dynamics and structure of the main indicators of regional manpower resources balances.** A prospective assessment of the dynamics of the basic parameters of the manpower resources balance is possible under the assumption of maintaining the main tendencies that prevail in the retrospective period. An inertial forecast of balance indicators was made in two versions depending on the length of the base period, i.e., 1998–2013 (version 1) and 2002–2013 (version 2). We repeatedly used this approach to analyze the dynamics of basic indicators of employment sector and labor market of Russia and its regions (see, e.g., [10, 12]). A comparison of the results with the estimates of the forecast manpower resources balance developed by the Ministry of Labor and Social Protection of the Russian Federation shows that they are close enough in a number of positions [13]. The average version of the Federal State Statistics Service of demographic forecast was taken as a basis. According to it, in the medium-term Russia will enter the period of the most intensive working-age population decrease: in 2014–2015, it will decrease by about 1 million people a year and, in 2016, it will decrease by 1.1 million. A significant decrease in the number of working-age population is also expected in 2017–2018. Overall, the preservation of retrospective tendencies means a fairly optimistic assessment of the prospective state of the employment sector and labor market.

As calculations for the regions of the European part of the Arctic have shown, a prospective decrease in the labor force number and its certain categories is the largest in consideration of the tendencies formed in a shorter period, i.e., in 2002–2013. The more pronounced consequences of the crisis of 2008–2009 in the modern tendencies play a certain part in this decrease (for the longer long-term tendency, the effect is partly neutralized by the former dynamics). The calculations showed that, in the regions of the European part of the Russian Arctic, except the Nenets Autonomous District, the size of the manpower resources will continue to decrease (Fig. 4).

In both versions, the largest relative decrease in manpower resources took place in the Komi Republic, while the smallest one is projected in the Republic of Karelia. Unfavorable demographic tendencies are still the key factors that determine the prospective decrease in the size of the manpower resources in the regions. According to the medium scenario of the Federal State Statistic Committee's demographic forecast, by 2020, the number of working-age labor force in the regions of the European part of the Russian Arctic will decrease by 330000 people, or by 15% compared to 2013.

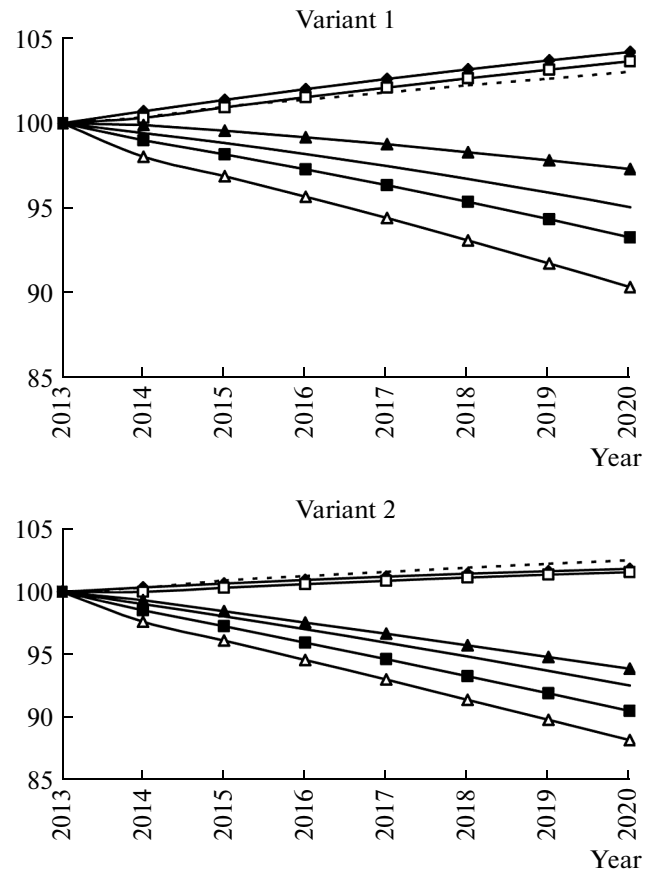


Fig. 4. Assessment of prospective dynamics of the size of the manpower resources by versions ◆ Russian Federation, ▲ NEFD, □ Republic of Karelia, ▲ Komi Republic, △ Nenets Autonomous District (NAD), — Arkhangelsk region (without NAD), and ■ Murmansk region.

In the Murmansk region, by 2020, the working-age population will decrease by 75000 people, or by 18% compared to 2013. According to the forecast, the working-age population will amount to only 55% of its number in 1990. According to the version 1 of the forecast, by 2020, the manpower resources of the region will decrease by 6.7%, or 35000 people. According to version 2, the manpower resources will decrease by 50000 people, or 9.4% (Table 7).

The size of the employed population in the economy will decrease by 3.7–4.4% depending on the version. The number of other categories of labor force is also decreasing. According to version 1, the number of students will decrease by 9.5%, and according to version 2, it will decrease by nearly 25%.<sup>6</sup> According to both versions, the number of unemployed individuals will decrease, but the rates of decrease are also quite different. According to the tendencies of 1998–2013, by 2020, the number of unemployed individuals will decrease by 41% and, if the tendencies of

<sup>6</sup> This is due to the fact that, beginning from 2004, the number of working-age students in the region has constantly decreased, while version 1 considers only the tendencies of longer periods, including time when the according indicator is growing.

**Table 7.** Assessment of prospective size of the manpower resources in the European part of the Russian Arctic and their distribution by spheres of activities, 2020, % of 2013 by versions 1 and 2

Structure of manpower resources	Murmansk Region		Arkhangelsk Region		Republic of Karelia		Komi Republic		Nenets Autonomous District	
	1	2	1	2	1	2	1	2	1	2
Manpower resources	93.3	90.6	95.1	92.6	97.3	93.9	90.4	88.3	111.1	110.6
Employed population in the economy, total	96.3	95.6	98.0	96.8	100.2	97.4	92.4	93.1	104.4	105.0
Working-age day-release students	90.4	78.2	89.4	77.6	95.4	78.5	89.1	76.0	83.7	75.6
Able-bodied working-age population not employed in the economy and not studying in the educational system	77.8	61.4	79.1	70	82.7	75.5	80.6	55.9	93.7	68.8
Unemployed population	58.9	75.8	68.3	78.3	72.5	88.5	74.9	86.6	79.2	85.1
Foreign labor migrants	67.6	111.1	51.3	105.6	98.1	89.8	89.6	79.5	122.1	109.4

1998–2013 continue, by 2020, unemployment will decrease by about 25%. The assessment of changes in the structure of employed population shows that, despite the decrease in employment in the region's economy as a whole, an increase in the number of employed individuals is expected in several types of economic activities and, in sections J and L, for example, the increase is expected to be very significant.

In the Republic of Karelia by 2020, the working-age population will decrease by 47000 people, or by 12.5% compared to 2013. According to Federal State Statistic Committee forecast, in 2020, the number of working-age population will amount to 70% of the number of 1990.

According to both versions, the manpower resources will decrease and, according to version 2, more intensively (i.e., for the tendencies of 2002–2013). According to version 1, by 2020, the manpower resources will decrease by 2.5% or 10000 people; according to version 2, it will decrease by 24000 people, or by 6% (Table 7). The number of employed individuals in the economy of the Republic of Karelia will actually stabilize if the tendencies of the longer period continue (version 1) and, with modern tendencies (version 2), it will decrease by 2.6%. The number of the remaining labor force categories will also decrease, but the assessment of the rates of decrease differs for each version. For instance, according to version 1, the number of students will decrease by 4% and, according to version 2, by almost 22%. According to the tendencies of 1998–2013, the number of unemployed individuals will decrease by almost 30% and, if the tendencies of 2002–2013 continue, by 2020, unemployment will decrease by only 12%.

In the future, the structure of distribution of employed individuals population by types of economic activities will also change. A significant decrease in the number of employed individuals is forecasted in the sections "Agriculture, Hunting, and Forestry," "Mining," and "Manufacturing." Despite the general decrease, growth in the number of employed individuals is expected in several sections and, in "Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles, Household Goods and Personal Items," "Financial Activities," in "Public Administration and Defense; Compulsory Social Security," the decrease is significant.

In the Arkhangelsk region, in 2020 compared to 2013, the working-age population will decrease by 16% or, according to the medium version of the forecast of the Federal State Statistical Committee, by 112000 people. In the forecast period, the size of the labor force in the region will decrease according to both versions; according to version 1, it will decrease by 5% and, according to version 2, it will decrease by 8% (Table 7). The number of employed individuals in the economy of the region will decrease by 2% according to version 1 and by 3.2% according to version 2. The number of unemployed individuals will decrease fairly significantly according to both versions. The number of other categories of labor force is also decreasing, only by different rates depending on the version. According to the dynamics of the number of employed individuals, the types of economic activities can be divided into several groups as follows: group 1, in which a significant increase in the number of employed individuals is expected; group 2, in which stabilization is expected; group 3, in which a moderate decrease is expected; and group 4, in which a significant

decrease in employment is expected. Depending on the version considered, the lists of economic activities attributable to a given group are somewhat different.

By 2020, the working-age population of Nenets Autonomous District will decrease by 7%. In forecast period, the manpower resources of the region will increase according to each version (Fig. 4 and Table 7). If the tendencies of the longer period (version 1) continue, the number of employed individuals in the economy will increase by 6.9% (1700 people) by 2020. If the modern tendencies continue (version 2), the increase will amount to 7.6%. The number of other categories of the manpower resources will also decrease, only by different rates depending on the version. The population of unemployed individuals will decrease according to both versions with only slight differences between them. In retrospect, regardless of the scenario, a further decrease in those types of economic activities where it took place is forecasted, i.e., sections A, D, G. The maximal growth in employment is expected in section I (“Transport and Communications”), where employment can grow by 25–30%.

In the Komi Republic, by 2020, a decrease in the working-age population by 95000 people, or by 17% (compared to 2013) will seriously affect the provision of the region with its own manpower resources. Depending on the version, the manpower resources will decrease by 9–12% (Table 7). In this context, the number of employed individuals in the economy of the Komi Republic will inevitably decrease, but at a more moderate pace than the size of the manpower resources. If the tendencies of the longer period (version 1) continue, employment will decrease by 7.6% (–33000 people), if the modern tendencies continue (version 2), i.e., by 6.9% (–30000 people). Thus, one can say that the choice of these tendencies does not fundamentally affect the dynamics of the employed population. For other categories of the manpower resources, the choice of the tendencies is of principal importance. According to version 1, the number of students will decrease by 11%, and according to version 2 – almost by 24%. The number of employed individuals will decrease according to both versions. In accordance with the tendencies of 1998–2013, the number of unemployed individuals in the long term (till 2020) will decrease by 25% and, if the tendencies of 2002–2013 continue, it will decrease by only 15%.

The decrease in employment is forecast in the most OKVED sections. According to version 1, employment will decrease in all sections. In certain sections, such as section A (“Agriculture, Hunting, and Forestry”), and C “Mining” decrease in employment can amount to 20%. In version 2, the predictive assessment for a number of industries are a little more optimistic (which is determined by the smaller decrease in the total number of employed individuals), in particular the increase in employment in “Construction” is not excluded. On the other hand, version 2 suggests a higher differentiation of types of economic activities based on the dynamics of employed individuals. For instance, in sections A (“Agriculture, Hunting, and Forestry”) and M (“Education”), the number of employed individuals will decrease more intensively.

Prospective dynamics of the basic indicators of the manpower resources balance is highly dependent on whether or not and to what extent a given investment project will be implemented (first of all, with regard to mining) in the Arctic Region. Therefore, inertial assessment of the dynamics and structure of the basic

indicators of manpower resources balance is largely conditional. Rather, it can be seen as a certain benchmark in which the formation of the tendencies of the previous period are taken into account. However, actual values can deviate significantly from the benchmark in the changed socioeconomic conditions. In the retrospective period, the tendency of the increasing importance of mining has already emerged, i.e., it was taken into account in the inertial forecast; furthermore, in the nearest future with increased attention to the development of the Arctic shelf, this tendency will be probably be enhanced.

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The analysis showed significant changes in the manpower resources structure in the European part of the Russian Arctic both by sources of formation and by directions of use. The able-bodied working-age population is definitely still the key source of the formation, but the role of another source, i.e., of employed individuals outside the working age (6–8% of the size of the manpower resources) has increased. High indicators of unemployment are a pressing issue in the regions under review. The unemployment rate in these regions is higher than average in the Northwestern Federal District than in the overall Russian economy. Labor migration tendencies have an even more telling impact on the state of the regional labor markets, including commutation and rotational migration as the most mobile part of manpower resources outside their regions of permanent residence. An analysis of the number and directions of migration of this part of domestic migrants allows to further study the specifics of regional labor market interrelations, sources (actual and potential) of additional labor supply, as well as its outflow. Furthermore, the problems of domestic labor migration are related to solving the unemployment problem and decreasing the share of the structural component as a result of increasing the territorial mobility of the population and the labor force, including through targeted measures in the form of monetary benefits. The cut (failure) of partial government financing of population expenditures associated with moving from one region to another in the context of the crisis will, if not increase, then at least preserve regional structural unemployment.

Based on inertial forecast assessments of prospective dynamics of the manpower resources and the employed population show that, in the context of unfavorable demographic tendencies in the European part of the Russian Arctic, except Nenets Autonomous District, they are still decreasing. Furthermore, the inertial assessment of the dynamics of labor market indicators does not take into account the consequences of the current deterioration of economic con-

ditions. At the same time, decreased GDP and investment growth rates will affect regional labor markets. In turn, a substantial decrease in the rates of production can lead to a noticeable (at least at the local and regional levels) number of individuals released from the labor force.

In addition, the range of changes in the rate of unemployment depends on the range of structural imbalances in the regional labor markets (see assessments of regional structural unemployment) and their mitigation by means of government policy measures implementation. Lately, despite the rather small rate of unemployment, great efforts have been made at the federal and regional levels in the sphere of employment policy aimed primarily at balancing the labor supply and demand, at reduction of tensions in certain local labor markets (regional, sectoral).

In integrated assessment of the dynamics of the number and qualitative composition of manpower resources of the regions and their projective dynamics it is especially important to provide their scientific support in the form of reported and projective manpower resources balance. The relevance of forecasting and analytical developments in employment and the labor market continues unabated, particularly with growth in public and scientific interest in this sphere; the regular development of projected manpower resources balances of the Russian Federation is one of the results. There are other directions of improvement in this forecasting instrument as well. It is necessary to consider the development of manpower resources balances for the long run and probably of more detailed (to the levels of subsections of the types of economic activities) at the initial stage, especially of sections C and D. In view of the relevance of providing the economy with qualified specialists, it is advisable to develop a forecast of the number of working-age students separately for different levels of professional education. A failure to develop the forecast manpower resources balance for the whole of the Russian Federation and its regions will lead to a narrowing of the forecasting horizons, reduce the possibilities of regulating the labor market via implementing measures, including those of a proactive nature, will lead to increased uncertainty in the labor market and will complicate the process of balancing of labor supply and demand. Measures of labor market regulation do not necessarily have to be highly specialized and precisely anti-crisis; they could be of an integrated macroeconomic character. For instance, imposing universal civic duty in the Russian Federation could balance the rights and obligations of citizens, as well as promote social ideas of national unity and of new, socially useful standards of behavior, especially for the younger generation.

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