Factors and Determinants of Interregional Unemployment Rate Differences in Rural Russia

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Abstract

This study involves an econometric assessment of the impact that macroeconomic, institutional, structural, demographic and social variables produce on the rate of and interregional differences in rural unemployment. We classify the regions of Russia by the rate of overall and rural unemployment and characterize the groups of regions we have selected according to key parameters of the labor market and features of regional development. Employing a regression analysis, this paper focuses on the factors of regional unemployment in the subjects of Russian Federation. When making our regression models, stepwise regression methods were used. Evaluating the regression models that include demographic, economic and social factors, we identify the determinants of rural unemployment. The regression analysis was carried out for both the Russian Federation as a whole and each of the typological groups individually. We find that such factors like a big share of young people in the structure of the rural population and a low level of education of rural residents do contribute to the growth of rural unemployment. At the same time, higher employment, diversification of the rural economy through promoting non-agricultural employment, and higher levels of vocational education among rural residents cause the rate of rural unemployment to fall.

Keywords

1. Introduction

Interregional differences of the labor market are a feature of the economy of most countries of the world, irrespective of the level of their development or polity. In Rus-

sia, where the rate of rural unemployment constitutes 7.5%, the interregional differences vary from 2.6% in the Republic of Tatarstan to 43.0% in the Ingush Republic. In 33 of the 85 regions of the Russian Federation, the rate of rural unemployment exceeds the national average. While the rate may change over time, the interregional differences tend to persist [1]. Although the factors of national economy are dominant in explaining the agricultural labor market's behavior, a considerable part of regional differences cannot be explained on the national level. Interregional differences of the labor market in terms of unemployment are addressed by many authors [2]-[4]. Some of them are interested in the geographical distribution of the unemployment rate [5] [6], while others analyze the stability of interregional differences in terms of unemployment [1]. Interregional differences in terms of rural development are examined with the use of various indicators [7]. However, the factors of geographical distribution of regions on the agricultural labor market remain the least studied.

In some studies the authors examine the topical issue of the impact of the financial crisis on unemployment and specifically youth unemployment [8]. A quantitative assessment of labor market imbalances is also provided [9]. An assessment of the impact of investment in human capital on the rate of regional unemployment revealed an inverse relationship between them [10]. Some papers assess the demographic effect and the effect of education on unemployment in Europe [11] [12]. The behavior of regional unemployment in the EU countries before and after the financial crisis is also examined [13]. The relationship between financial development and labor market volatility is investigated by Darcillon [14]. The authors address the joint impact of labor market policy and economic recession on unemployment in Europe [15]. The position of young people on regional labor markets appears of interest as well [16] [17]. The authors highlight the importance of finding out the causes of interregional unemployment rate differences [3] [5]. Understanding the sources of interregional labor market differences is important for choosing the main directions of regional unemployment reducing policies. In Russia, the interregional differentiation in terms of unemployment has a shape of regional contrasts, especially in rural areas. The interregional differences on the agricultural labor market, which remain not only in the short term, but also in the long run, make the labor market not single, but rather segmented. Therefore, smoothed average assessments of the Russian labor market parameters are not appropriate for decision- making and setting key regional policy measures.

The objective of this study is to develop taxonomy of regions by the rate of overall and rural unemployment and to identify the factors of interregional differences on the agricultural labor market by the rural unemployment rate in regions of different types. Having in mind that interregional differences are persistent, it is important to identify and study the factors that contribute to the reduction of rural unemployment in regions of different types. The contribution of our study is that, firstly, we address the rural unemployed, whose problems are not paid enough attention to in the literature. Secondly, we analyze the factors of interregional differences for regions of different types. Thirdly, our regression analysis includes not only economic, but also social and demo-

graphic variables, distributed across the regions of Russian Federation. The paper is organized as follows. In Section 2, we make a review of the literature, generalize the approaches to analyze the factors of regional unemployment, present the research methodology and describe the database. Section 3 presents the results of our typological analysis, and describes the classification groups and estimated regression models for the regional labor markets of Russian Federation of different types. The concluding section contains our conclusions and proposals.

2. Materials and Methods

2.1. Theoretical Background

For the neoclassical economic theory, the issue of interregional differences on the labor market is an issue existing only in the short term. In the medium and long term, the mechanisms of interregional migration and regional policies are there to bring the labor market to relative equilibrium. Rural Russia is quite specific, which has to be taken into account. The interregional labor mobility is restricted by a number of factors. Firstly, Russia is a country with a vast territory, the largest in the world. Another important distinction is the low density of population, especially in rural areas: rural settlements are located far from each other. Secondly, it should be noted that the regional markets for affordable housing are poorly developed. Thirdly, non-cash remuneration is still extensively practiced in the form of in-kind payments, like payments for kindergartens, housing and etc. Fourthly, employers do not always pay wages in due time. Fifthly, because of the low wages and high transaction costs (transportation costs, the costs of searching for a job and housing), workers cannot afford moving to other regions. Sixthly, many employers are still persistent in pursuing the strategies of retaining their employees.

As a result, instead of a single labor market, we have regional segments that are much different in terms of the employment structure, the rate and duration of unemployment. Huber [18] shows that interregional unemployment differences are quite persistent in countries with transitional economies. There are a number of factors affecting the rate and structure of rural unemployment in regions of different types. Taking into account both the demand- and the supply-side factors is important. An important factor on the side of the demand for labor, which affects the regional labor market parameters, is the level and structure of the gross regional product (GRP). As it grows, the number of jobs and the rate of employment are usually also on the rise. And, vice versa, a reduction of the GRP—a token of economic recession—leads to a decrease in employment. The Okun's Law describes the impact of the gross regional product on the rate of unemployment. The impact of the gross regional product (GRP) on the regional rate of unemployment is addressed in many empirical studies. A higher level of the gross regional product is a feature of a stronger economy with a relatively low level of unemployment. An important exogenous factor affecting the unemployment rate is the structure of employment that mirrors the economic specialization of the region [19]. If the structure of the economy and employment in the region is dominated by growing

industries, the unemployment rate is likely to be low. When the regional economy is featured by a high share of agriculture, and the productivity growth is accompanied by a decrease in employment, the rate of regional unemployment is high. Agricultural regions often suffer from high unemployment. In the face of sectoral shocks and labor redistribution, short-term or long-term unemployment is unavoidable.

Among the labor supply-side factors affecting the rate of regional unemployment, one should mention investments in human capital, which is evidenced by many empirical studies [10] [20]. Regions with small amounts of investment in human capital usually have higher rates of unemployment. Rural areas are short of skilled labor, but have an abundance of unskilled workers. Skilled and unskilled workers differently respond to demand shocks. Moving from rural areas to the city are usually young people in order to get vocational education or a job, as well as the most skilled workers. In this sense, the interregional differences of the rural labor markets are usually formed by unskilled or low-skilled rural residents. Rural areas, where the share of young people in the population is considerable, are likely to have higher unemployment rates. Rural young people are more than urban youth exposed to the risks of unemployment, since their level of vocational education is lower. The fact that the age structure of the regional population does affect the labor market is supported in many studies. The authors argue that regions with high shares of young people in the population also have higher unemployment rates [4] [16]. In Russia, high rates of unemployment are registered in such regions, as the Republics of Ingushetia, Tyva and Chechnya, where the population is relatively young. The theory of the minimum wage puts it that the relationship between regional unemployment and wage levels is negative. When the minimum wage gets higher, it is the least competitive workers who get fired and become unemployed. The amount of the subsistence minimum determines the amount of the minimum wage.

The rate of unemployment is inversely related to the job search duration. Regions with high unemployment have low flows "out of unemployment", which is evidenced by high duration of unemployment and high shares of those searching for a job for more than 12 months. Rural unemployment (7.5%) is higher than the total unemployment (5.4%) or urban unemployment (4.8%) in Russia. Searching for a job for 12 months or longer were 36.4% of the 1.4 million Russian rural unemployed and 26.5% of the 2.9% million urban unemployed [21].

2.2. Data and Variables

The sources of data on rural unemployment in Russia are limited, especially in the regional dimension. In our empirical analysis of the factors and determinants of rural unemployment we used the official data from the Federal State Statistics Service (Rosstat), in particular, the results of employment sample surveys. The social-economic and demographic characteristics of the regions were taken from the Regions of Russia [22] and the Russian Statistical Yearbook [23]. For analyzing the interregional labor market differences in terms of unemployment we also used such statistical compilations, as The

Regions of Russia [22], The Labor and Employment [24], The Economic Activeness of the Population of Russia [25], where there are the results of the sample surveys of employment and other. Our sample is comprised of 81 of the 85 regions of Russia. Having analyzed and summarized the theoretical approaches applied by different authors, we have identified the main factors affecting the regional rates of rural unemployment in the different regions of RF. The geographical distribution of rural unemployment in the regions of Russia is affected by many economic, social, demographic, institutional and social factors. Our study is focused on assessing the impact of a limited range of determinants, including the share of the rural population below the working age, the amount of Gross Regional Product (GRP), the structure of Gross Value Added (GVA), the employment rate, the structure of employment of the region's population by kinds of economic activity, the amount of the subsistence minimum, and the level and structure of vocational education of the rural population.

3. Results and Discussion

3.1. Classification of the Regions of Russia

In order to distinguish relatively homogeneous groups in the heterogeneous space of the rural labor market, we have developed a classification of 81 regions of RF using the data for 2014. As the core factors in our classification we used the rate of rural unemployment, the rate of overall unemployment and the share of the rural population below the working age. The classification of the regions of RF was performed with the use of the STATISTICA Advanced for Windows 10.0. system, employing the procedure of hierarchical cluster analysis by Ward (Ward's method). As a result, four classification groups of regions were formed, whose composition is presented in Table 1.

Table 1. Classification of Russian regions by the rate of rural and overall unemployment.

Group	Number of regions	Composition
1	33	Republics: Mari-El, Mordovia, Tatarstan, Chuvashia. Krasnodar District. Oblasts: Belgorod, Bryansk, Vladimir, Vologda, Ivanovo, Kaliningrad, Kaluga, Kirov, Kostroma, Kursk, Leningrad, Lipetsk, Magadan, Moscow, Murmansk, Nizhniy Novgorod, Novgorod, Oryol, Pskov, Penza, Ryazan, Samara, Saratov, Smolensk, Tambov, Tver, Tula, Yaroslavl.
2	15	Republics: Bashkortostan, Udmurtia, Khakassia. Districts: Krasnoyarsk, Stavropol. Oblasts: Kemerovo, Novosibirsk, Orenburg, Omsk, Tyumen, Chelyabinsk. Nenets, Khanti-Mansi, Chukotka, Yamalo-Nenets Autonomous Okrugs.
3	13	Republics: Adigeya, Karelia. Districts: Altai, Kamchatka, Primorye. Oblasts: Arkhangelsk, Voronezh, Volgograd, Kurgan, Rostov, Sakhalin, Sverdlovsk, Ulyanovsk.
4	20	Republics: Altai, Buryatia, Dagestan, Ingush, Kabardino-Balkaria, Kalmyk, Karachayevo-Cherkessk, Komi, Sakha (Yakutia), North Ossetia-Alania, Tyva, Chechnya. Districts: Zabaikalian, Perm, Khabarovsk. Oblasts: Amur, Astrakhan, Irkutsk, Tomsk. Jewish Autonomous Oblast.

Source: own calculation.

The first group includes 33 Russian regions-members of the Central, Northwest and Volga Federal Districts (FD). Both rural and overall unemployment rates are low there (with the exception of Tver, Vologda, Kaliningrad, Murmansk and Pskov Oblasts, and Krasnodar District). The second group consists of 15 regions of RF, where the rates of both rural and overall unemployment are lower than the Russian average. The third group comprises 13 regions with the rate of rural unemployment exceeding the Russian average. The rate of overall unemployment there is also higher than the Russian average, except for Voronezh and Ulyanovsk Oblasts. The fourth group includes 20 regions mostly belonging to the Southern, North Caucasian and Far Eastern Federal Districts. The rate of rural unemployment in all the regions of the fourth group is higher than the Russian average. Among the observed regions of RF, rural unemployment is the highest in the Republics of Ingush (32.0%), Tyva (27.4%) and Chechnya (23.5%). The same regions demonstrate the highest rate of overall unemployment, exceeding the average for Russia in all the regions comprising the group. The characteristics of the selected groups are shown in Table 2.

The share of persons below the working age in the regions of the first group is lower than the Russian average. The educational structure of the rural population of the regions of the first group is featured by high numbers of the population having secondary

Table 2. Average values of the key parameters for each of the four groups of Russian regions, 2014.

Variables	Group number				
	Russia	1	2	3	4
Rural unemployment rate, %, (Overall unemployment rate, %)	7.9 (5.2)	5.6 (4.5)	6.4 (5.1)	10.0 (6.6)	13.6 (10.7)
Employment rate, %	65.3	65.8	66.7	62.5	60.0
Average job search time, months	7.3	7.2	6.9	7.4	8.6
GRP per capita, RUR	376,383	266,162	848,504	342,604	244,318
Subsistence minimum, RUR	8234	7944	9506	9250	8676
Share of community, social and personal services in regional GVA, %	17.9	15.6	13.0	16.4	14.2
Share of agriculture and forestry in regional GVA, %	4.4	8.0	4.9	9.3	9.5
Share of the employed in agriculture, forestry, hunting and fishing, %	9.4	11.0	9.2	11.9	14.0
Share of manufacturing in regional GVA, %	17.4	22.3	16.6	16.6	8.5
Share of youth below working age in the population, %	19.9	16.4	22.8	18.5	25.2
Number of rural population with higher vocational education, people per 1000 of population	111	110	101	101	116

Source: own calculation.

or primary vocational education per 1000 people. In the structure of gross value added, higher than the Russian average, are the shares of manufacturing (with the exception of Belgorod, Ivanovo, Tambov, Murmansk, Saratov and Magadan Oblasts, and Krasnodar District) and agriculture and forestry, hunting and fishing (except for Ivanovo, Moscow, Yaroslavl and Vologda Oblasts). The second group enjoys the highest rates of economic development of the regions (GRP per capita). This group includes regions with a high share of mining in their economy (Nenets, Yamalo-Nenets, Khanti-Mansi and Chukotka Autonomous Okrugs). The share of this kind of economic activity in the gross value added structure constitutes 24%, which of agriculture, forestry, hunting and fishing is close to the Russian average, and the shares of the other kinds of economic activity are below the Russian averages. The number of population with secondary and primary vocational education, and with or without basic general education (per 1000 people) in this group of regions exceeds the Russian average. As for the third group, in only 2 out of its 13 regions the amount of GRP per capita is higher than the Russian average (Sakhalin Oblast and Kamchatka District). The share of agriculture, forestry, hunting and fishing in the gross value added structure surpasses the Russian average. The exceptions are the Republic of Karelia and Sverdlovsk and Sakhalin Oblasts. The share of the employed in this kind of economic activity is also higher than the Russian average in 10 of the 13 regions. The educational structure of the rural population of the third classification group is featured by a high number of persons having secondary and primary vocational education or basic general education per 1000 people. In the fourth group, the amount of gross regional product per capita exceeds the Russian average only in the Republic of Komi, Sakha (Yakutia) and Tomsk Oblast. The share of agriculture in the gross value added here is greater than in the other groups. Also exceeding the average for Russia is the share of the employed in agriculture, forestry, hunting and fishing, reaching the national peak in the Republics of Dagestan (27.7%) and Kalmyk (26.3%). The number of persons with higher, secondary complete (general) and with or without basic general education in the educational structure of the rural population of the regions belonging to the fourth classification group is above the Russian average.

This typological analysis enabled to identify the spatial features of the rural labor market and assess the degree of interregional differentiation of rural unemployment. The interregional comparisons of the rate of rural unemployment in the typological groups, formed on the basis of a cluster analysis, with the labor market parameters and social-demographic characteristics of the regions of Russian Federation allowed determining the demand- and supply-side factors reducing rural unemployment. The results show that the rural unemployment rate in the regions of Russian Federation and its age structure depend on a set and a combination of different factors and conditions of economic, demographic and social development.

3.2. Determinants of Rural Unemployment Rate in Russian Regions

It is important to understand what factors have shaped the current structure and rate of rural unemployment. In this Section we discuss a set of the factors of regional devel-

opment, which might affect the interregional differences in terms of unemployment. When making our regression models we used the methods of stepwise regression in the STATISTICA Advanced for Windows 10.0 system. Models defining the dependence of rural unemployment from the social-economic and demographic parameters of regional development were separately constructed for Russia as a whole and the selected different typological groups (Table 3).

Estimating the regression equations for Russia as a whole (Model 1), we see that the rate of rural unemployment positively correlates with such parameters like the share of rural population below the working age, average job search time and the number of rural population without basic general education per 1000 people. This means that when the values of these parameters increase, the rural unemployment rate is also on the rise. Such parameters as gross regional product per capita and the share of the employed in agriculture and forestry, hunting and fishing are with the negative sign in the model, meaning that the rate of rural unemployment reduces when the values of these parameters grow. Estimations of the regression equation for the first group of regions with

Table 3. Determinants of rural unemployment rate in four groups of Russian regions and Russia as a whole.

Variables	Model 1 Russia	Model 2 Group1	Model 3 Group 2	Model 4 Group 3	Model 5 Group 4
Share of youth below working age in the population	0.605		0.248		0.840
Employment rate		−0.449	−0.158		
Amount of subsistence minimum		0.374			
Gross regional product (GRP) per capita	−0.183				
Share of agriculture and forestry in regional gross value added (GVA)					0.449
Number of rural population with higher education per 1000 people					−0.486
Number of rural population without basic general education per 1000 people	0.131				
Share of the employed in agriculture, forestry, hunting and fishing	−0.198		−0.194		
Average job search time	0.377			0.513	
Share of community, social and personal services in regional gross value added (GVA)		−0.157			
Share of manufacturing in regional GVA				−0.343	
Constant	−0.052	1.662	1.139	1.096	1.415
R-squared	0.740	0.830	0.849	0.822	0.905
F Change	42.682	6.692	5.147	5.516	12.404
Sig. F Change	0.00	0.014	0.023	0.035	0.005
Number of observations	81	33	15	13	20

Source: own calculation.

the lowest rate of rural unemployment (Model 2) reveal a positive correlation of the rural unemployment rate with the amount of subsistence minimum and a negative one with the rate of rural employment (an indication of the situation at the regional labor markets) and with the share of community, social and personal services in the regional gross value added (GVA). Estimating the regression equation for the second group of regions, where the rate of rural unemployment is lower than the Russian average, we find the following (Model 3). First of all, we see that the rate of rural unemployment positively correlates with the share of population below the working age. The value of this indicator in all the regions of the second classification group is higher than the Russian average, and its possible decrease in the future might weaken the demographic pressure on the rural labor market. A negative correlation is revealed between the rate of rural unemployment, on the one hand, and the share of the employed in agriculture, forestry, hunting and fishing and also with the employment rate, on the other hand.

The third classification group of regions is featured by a high rate of rural and overall unemployment. The resulting correlation (Model 4) shows that the factors determining the rate of rural unemployment in the regions this group are the average job search time for the rural unemployed and the share of manufacturing in the gross value added of the region. Development of the manufacturing industry in the regions of the group, according to the model, is a factor reducing rural unemployment. The fourth group has the highest rates of rural and overall unemployment, and the job search time there lasts the longest. The positive correlation between the rate of rural unemployment and the share of population below the working age (0.840) is a token of a high demographic pressure on the labor market in these regions (Model 5). A factor causing rural unemployment to grow is also the agricultural specialization of the regions where the share of agriculture, forestry, hunting and fishing in the regional gross value added is high. An increase in the number of rural population with higher education might help reduce the rate of rural unemployment in the regions belonging to the fourth group, since a high level of education enhances the competitive advantages on the labor market. The models built for the 4 groups of regions of different types describe from 82.2% (the third group) to 90.5% (the fourth group) of the variation of the independent variables. The reliability of the regression equations, as per Fisher's *F*-criterion, is quite high. The dependence coefficients are statistically significant at a 5% level by Student's test. The values of t-statistics for the variables used in the model indicate that these parameters are significant.

4. Conclusions

The Russian labor market is not homogenous, but represents a diversity of regional segments. We have performed an empirical analysis of the factors affecting the reduction of youth unemployment in the regions of Russia. For our statistical assessments, we used regression models. The database is comprised of the statistical data posted on the official website of Rosstat. Our typological analysis enabled us to identify the spatial features of the rural labor market and assess the degree of interregional differentiation

of rural unemployment. The estimation of the models of regression equations made for 81 regions of Russia, united into four typological groups, allowed identifying the factors affecting the growth and reduction of rural unemployment. The results show that the share of population below the working age, the low level of education of the population of the region (the number of rural population not having basic general education per 1000 people), the amount of subsistence minimum, the average job search time, the share of agriculture, forestry, hunting and fishing in the gross value added of the region have a direct relationship with the rate of rural unemployment. At the same time, the gross regional product, the rate of employment, the number of rural population with higher education per 1000 people, the share of the employed in agriculture, forestry, hunting and fishing, the share of manufacturing in the gross value added, the share of community, and social and personal services in the gross value added of the region have an inverse relationship with the rate of rural unemployment. The composition of the factors and the degree of their impact on the rate of rural unemployment are different for each of the four typological groups of regions, which is explained by differences in the specializations of the regional economies, demographic structures, levels of economic development and levels of vocational education of the rural population. As a result of this study, we arrived to the following conclusions.

First, the employment policy in rural areas of Russia should be pursued by using a differentiated approach with taking into account the specific features of regional development. For the third group of regions, it is expedient to develop the manufacturing industries, particularly the ones involving the processing of agricultural products, and to take measures that could help reduce the job search time for the rural unemployed. Development of the services sector could be instrumental in reducing rural unemployment in the regions of the first group. Increasing the number of rural population with higher vocational education and decreasing the share of agriculture in the gross value added through diversification of the rural economy and creation of new jobs for the young people wishing to live in the countryside might contribute to reducing unemployment in the regions of the fourth group. For the second group of regions, it seems important to increase the rate of employment, including that in the agricultural sector. Second, in the regions where the demographic pressure on the labor market is high, it seems advisable to stimulate the development of small- and medium-sized businesses, allowing creating new jobs already in the short term. Youth is the most vulnerable social-demographic group on the labor market, since not all of the young people have a sufficient level of education and professional skills. The demographic pressure on the labor market appears to be the highest in the regions belonging to the fourth group, although the impact of the demographic factor is also significant in the second group of regions of Russia as a whole. Third, the rural population of all of the regions is in need of a system of continuing vocational education, since those having vocational education also have higher competitive advantages on the labor market. Fourth, the rural economy should be diversified through technological modernization and creation of a multifunctional and multi-industry model of the countryside, which is expected to expand

the choice of jobs with decent working conditions and wages for the rural residents. The results of this study can be used for shaping regional strategies of rural development.
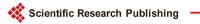
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