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Socio-demographic characteristics as indicators of the unemployment rate

Abstract. In modern society, there occur crisis phenomena that respectively lead to the aggravation of the problem of employment of the population, and the lack of control over the hidden and real unemployment.

In this article, the links between the unemployment rate and socio-demographic characteristics are revealed on the basis of correlation analysis. The authors reveal the peculiarities of the established dependencies are revealed on the example of several European countries and Russia with regard to its the Central Federal District, including, in particular, the relationship between the level of education, gender and age structure, and general patterns of indicators such as social tension and migration processes are revealed. The proposed approach allows us not only to give a more accurate description of the rate of unemployment, but also to predict possible changes.

The correlation analysis of the unemployment rate and social indicators for the period from 2005 to 2016 was carried out with regard to ten European countries: Belgium, the United Kingdom, Germany, Finland and France (Western Europe); Bulgaria, Poland, Romania, Slovakia and Russia (Eastern Europe).

Keywords: Unemployment; Unemployment Rate; Social Tension; Crime Rate; Education Level; Migration; Mortality Rate; Birth Rate

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Соціально-демографічні характеристики як індикатори рівня безробіття

Анотація. У сучасному суспільстві склалася ситуація, яка сприяє розвитку кризових явищ, що призводить до загострення проблем, пов'язаних із працевлаштуванням населення, відсутністю контролю за динамікою прихованого та явного безробіття. Авторами статті на основі кореляційного аналізу було виявлено взаємозв'язок між рівнем безробіття та соціально-демографічними характеристиками. У статті розкрито особливості встановлених залежностей на прикладі декількох європейських країн та Росії по центральному федеральному округу, зокрема особливості взаємозв'язку між безробіттям та рівнем освіти, статево-віковою структурою населення, а також із такими показниками, як соціальна напруженість та міграційні процеси. Запропонований авторами статті підхід дозволяє не тільки давати точнішу характеристику стану безробіття, але й прогнозувати можливі зміни. Аналіз рівня безробіття та соціальних показників зроблено за період з 2005 по 2016 роки з використанням даних стосовно десяти європейських країн, а саме: Бельгії, Великобританії, Німеччини, Фінляндії та Франції, що відносяться до країн Західної Європи, а також Болгарії, Польщі, Румунії, Словаччини та Росії, що відносяться до країн Східної Європи.

Ключові слова: безробіття; рівень безробіття; соціальна напруженість; рівень злочинності; рівень освіти; міграція; рівень смертності; рівень народжуваності.

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Социально-демографические характеристики как индикаторы уровня безработицы

Аннотация. В современном обществе сложилось положение развивающихся кризисных явлений, что, соответственно, приводит к обострению проблемы занятости населения, отсутствию контроля над динамикой скрытой и реальной безработицы. В данной статье на основе корреляционного анализа выявлены взаимосвязи уровня безработицы с социально-демографическими характеристиками. Раскрыты особенности установленных зависимостей на примере нескольких стран Европы и России по Центральному федеральному округу, в частности, взаимосвязи с уровнем образования, половозрастной структурой, а также общие закономерности по таким показателям, как социальная напряженность и миграционные процессы. Предложенный подход позволяет не только давать более точную характеристику состояния безработицы, но и прогнозировать возможные изменения. Осуществлен корреляционный анализ уровня безработицы и социальных показателей за период с 2005 по 2016 годы в отношении десяти стран Европы: Бельгии, Великобритании, Германии, Финляндии, Франции, относящихся к странам Западной Европы; Болгарии, Польши, Румынии, Словакии, России, относящихся к странам Восточной Европы.

Ключевые слова: безработица; уровень безработицы; социальная напряженность; уровень преступности; уровень образования; миграция; уровень смертности; уровень рождаемости.

1. Introduction

The variety of socio-economic processes taking place within the labour market increases unemployment. Having a systemic social character, unemployment is caused by a certain inconsistency of social indicators. In conditions of globalisation, unemployment has become an international phenomenon that has united social layers and classes into a single social structure, and the human capital pursues its interests outside national borders. As a result, there has been a decrease in the educational potential in the regions of residence. Consequently, under globalisation, unemployment is a form of the ongoing contradictions between social needs and the needs of the capital.

Unemployment is formed under the impact of various social factors, which can be both positive and negative. These factors can be called determinants of unemployment. Among the factors impacting the level of unemployment, there are the crime rate, the coefficient of social tension and the level of education, which, when showing their negative side, may result in a high degree of socially dangerous impact manifesting itself in a high level of unemployment, as well as a low level of security and welfare of the population.

2. Brief Literature Review

Studying the phenomenon of unemployment, we can determine what problems it causes and improve the existing approach and adapt new public policy measures affecting the employment rate. Qualitative changes in the system of public relations transform relations within the production process and influence not only the labour market or the national and global economy, but also the quality of life of the population as a whole.

The problem of unemployment is consecrated in the works by S. Fisher (2010), R. Dornbusch (2010), R. Starz (2010) [1], A. Oaken 1975, M. Keynes (1936) [2] and many others. The essence and causes of unemployment were investigated by scientists of various schools and directions, in particular by A. Smith (1776) [3], A. Marshall (1890) [4], F. Hayek (1979) [5], J. Schumpeter (1910), J. D. Sachs and F. B. Larrain (1994) [7] and others. Studying unemployment, scientists carried out data analyses, establishing its relationships with the fundamental parameters of macroeconomics. U. Phillips (1958), relying on empirical data, stated the existence of a relationship between the level of unemployment and changes in wages. M. Friedman (1967) analysing the relationship between unemployment and inflation, introduced the concept of «natural unemployment» into the scientific circulation.

In Soviet Russia, among those who first to studies the problems of unemployment were A. M. Bakhtov (1928), S. Bergauz (1920), A. I. Gindin (1923), L. Ginzburg (1927), A. Isaev (1924), V. Losev (1926), L. E. Mintz (1924), V. B. Schmidt (1927), and others. The works by P. G. Lebit (1927), Z. A. Astapovich (1958), M. I. Zimina (1959), A. S. Sycheva (1967), K. I. Suvorov (1968) and L. S. Rogachevskaya (1973) are devoted to the development of measures to combat unemployment and criticism of foreign employment theories. At the end of the 20th century, unemployment was studied by I. M. Atayan (2000), T. N. Kuzmina (1997), I. Zaslavsky (1995), L. N. Kekalova (1984), A. I. Tchernykh (1989), D. Tsagadaev (1993), I. Kuzminov (1987), F. Prokopov (1990) and A. S. Semenov (1996). Many Russian scientists have addressed the problem of unemployment lately: S. Andreev (2016), B. V. Borisov (2008), A. N. Ershov (2016), A. V. Zavalniuk (2016), U. V. Zubkova (2014), V. A. Kuzmin (2017), E. B. Krylova (2008), A. A. Mamedov (2016), U. Jakovets (2004) and others.

O. G. Nikonova (2014) and N. V. Goffe (2012) paid attention to the impact of financial and economic crises on unemployment and their consequences in different countries. Works by T. V. Chernomorova (2008), A. N. Ershova (2016), O. G. Lebedinskaya (2016), A. G. Timofeev (2016) and O. N. Fedoseeva (2016) are focused on the effects of globalisation on labour markets and unemployment, giving a study of the impact of technological progress on unemployment. Methods of combating unemployment are reflected in the works by L. A. Girenko (2013), V. P. Belyaeva (2012),

I. V. Kirasova (2009), E. U. Shiketa (2013) and O. A. Roslyakova (2014). The use of the unemployment insurance system was analyzed by A. V. Yakovleva (2013), V. B. Morozov (2010) and L. U. Laskina (2012).

The word unemployment can be interpreted in various senses. E. Raikhlin [6, 4] understands unemployment in its narrow sense as underuse of labour resources which consequently become a reserve army of labour. According to a number of researchers, unemployment represents an economic situation when some part of the able-bodied population becomes redundant, loses jobs, searches for jobs and is ready for retraining [7, 27]. V. I. Plaksya [8] suggests that unemployment as a lack of employment for various reasons, and not only economic, for a certain part of the efficient population wishing to work. Analysing various points of view, unemployment should be understood as a phenomenon characterised by unemployment of one part of the economically active population caused by the discrepancy between the demand for and supply of the labour force in the labour market.

3. The purpose of the article is to investigate the relationships between the unemployment rate and the relevant socio-demographic characteristics.

4. Results

The research on diverse issues relating to unemployment is aimed at solving social tensions in society. The unemployed, excluded from the active part of the socio-economic structure, can count on neither the improvement of their well-being, on a better quality of their lives. This category of the active part of the population is eliminated from working life, which violates human development. The systems of value orientation that create the intellectual and moral and psychological background of the personality, on which social behaviour is formed are decisive when introducing the relevant normative framework [9].

Investigating the relationship between the unemployment rate and social indicators, we analysed the problem within the period from 2005 to 2016 with regard to ten European countries: Belgium, the United Kingdom, Germany, Finland and France in Western Europe and Bulgaria, Poland, Romania, Slovakia, and Russia in Eastern Europe. The conducted analysis shows that the correlation between the unemployment rate and social indicators is not observed in all the countries mentioned above.

Identifying the relationship between the unemployment rate and social indicators [10], we obtained the following results. In the Central Federal District (CFD), in particular Belgorod, Voronezh, Kursk, Lipetsk and Orel regions in the 2005-2016 period, the first social indicator that affects the unemployment rate is defined as the coefficient of social tension. Social stability is one of the basic social values of the population [11, 93]. The coefficient of social tension is predetermined by the lack of coherence, as well as by the contradiction between the needs and social expectations of a significant part of the population. Based on the scientific literature on this subject, we have found out that the dependency determines the Pearson correlation coefficient equal to 0.9. This means that the unemployment rate in the period 2005-2016 is in a direct proportion to social tension and is decreasing in the Central Federal District of the Russian Federation. The percentage of social tension in the labour market on average did not exceed 2.5%.

However, in the 2005-2016 period, there was a rise social tension in the labour market. From 2007 to 2009, there was also a significant growth. The period from 2009 to 2014 is characterised by a decrease in social tension in the labour market, with a slight increase in the period from 2014 to 2016.

Considering the relevant indicators by region, we obtained the following results. In Belgorod region, a correlation was found between the unemployment rate and the social tension coefficient, with the Pearson correlation coefficient being 0.86. Consequently, there is a clear dependency of the unemployment rate on the coefficient of social tension in the region. As social tension increases, the unemployment rate also increases. In such a case, the increases and decreases

Tab. 1: Correlation dependency of the unemployment rate on social factors in 2005-2016

Country	Birth rate	Mortality rate	Level of immigration	Level of emigration	The level of education	Crime level
Belgium	-0.5	0.2	-0.9	0.1	-0.3	0.2
Bulgaria	-0.6	-0.5	0.5	0.5	0.3	-0.6
United Kingdom	0.6	-0.7	-0.3	-0.02	1.0	-0.7
Germany	-0.5	-0.4	-0.3	0.2	-0.2	-0.02
Poland	-0.4	-0.7	-0.5	-0.5	-0.1	0.5
Russia (CFD)	-0.2	-0.3	0.2	-0.1	-0.3	0.5
Romania	-0.3	0.2	0.4	-0.9	-0.6	-0.4
Slovakia	-0.3	-0.2	-0.9	-0.1	-0.6	-0.3
Finland	-0.6	0.6	0.04	0.5	-0.6	-0.7
France	-0.7	0.8	0.9	0.7	0.8	-0.4

Source: Compiled by the authors based on data by Eurostat

in the coefficient of social tension in Belgorod region during the period under study varies within 1.5%.

Studying the statistical data on Voronezh region [10], we determined that there is also a strong correlation dependency between the coefficient of social tension and the unemployment rate, i.e. the unemployment rate in Voronezh region depends on the coefficient of social tension, with the Pearson correlation coefficient in this case being 0.9. Over the past 5 years, the level of social tension has been slightly decreasing with an error of 1-1.3%. However, for the period between 2014 and 2016, it remains unchanged at around 2.3%.

In Kursk, Lipetsk and Oryol regions, there is also a clear relationship between the unemployment rate and the coefficient of social tension.

Based on the data, we can talk about the effect of the social tension factor on the unemployment rate in the Central Federal District, i.e. Belgorod, Voronezh, Kursk, Lipetsk and Orel regions, which indicates that the higher the statistical indicator of the social tension factor in the labour market is, the higher the unemployment rate we have. Indeed, the tension in social and labour relations, the main victims of which are the unemployed, affects not only man's natural condition, but also the socio-economic development of regions.

Another peculiarity of European statistics should also be noted. The coefficient of social tension in the labour market is not taken into account when analysing socio-economic processes.

Further considering the dependency of the unemployment rate on social indicators, we turn to the obtained data for Belgorod region [10]. We observe a correlation between the unemployment rate and the level of crime in Belgorod region. The crime rate shows the total number of crimes committed and the number of persons who committed them within a certain period in a particular region. On this basis, the crime rate provides a complete picture of the prevalence of criminal activity in a given locality or region. According to the Federal State Statistics Service, the crime rate for the period under investigation was rapidly declining, and by the end of 2014, it had amounted to 1,332 thousand crimes per 100 thousand. However, by the end of 2016, the crime rate had increased slightly, due to which the unemployment rate in the Belgorod region increased. Thus, we have identified the relationship between the level of crime and unemployment, determining that where the level of the unemployed increases, the level of crime increases, too.

However, analysing the data provided by the Statistical Office of the European Union [12] for the 2005-2016 period, we found that there is a correlation between the level of crime and the unemployment rate in the UK and Finland. The correlation analysis established the Pearson correlation coefficient to be -0.7, indicating an inversely proportional relationship. In other countries, these characteristics are not correlated.

The level of education is another social indicator. This indicator characterises the level of knowledge retention by educational programs at different levels by both the individual and the population as a whole. The level of education shows the current and potential opportunities of society,

the state, and every individual citizen to live adequately and freely [13]. This is an important social indicator of the capacity of every single region and the country as a whole. We have discovered that this indicator is relevant to Voronezh and Kursk regions [10]. The dependency of the level of unemployment on the level of education in the Voronezh region is as obvious as it is in Kursk region. During the period under review, we observe trends towards a reduction in unemployment, with a rise in the level of education, which means that more and more people are striving to get higher education

when choosing priority specialties, according to the trends in the labour market. The level of education was only 27.1% in Voronezh region at the end of 2005. By the end of 2016, it had amounted to 32%.

In Kursk region, the indicator of the level of education increased from 22.3% in 2005 to 34.1% in 2015. However, during the period from 2007 to 2011, the education coefficient did not undergo any drastic changes, varying from 26.4% to 27.4%. The fact that the trend was retained for 5 years indicates a decent level of education, despite other negative trends in socio-economic development of the regions. Currently, the situation is viewed to be positive, with a growing number of people with higher education, which creates a favourable trend in the labour market.

Regarding the countries surveyed in Europe in the period between 2005 and 2016, we can state that the level of education affects the unemployment rate only in the UK and France. Moreover, in the UK such a dependency is revealed to a greater extent than in France (Pearson's ratio is 1 vs. 0.8) [14]. However, this does not prevent us from asserting that the unemployment rate is lower in countries with a high level of education. This is due to better training of workers with higher education, compared with those who have secondary vocational education. The process of production becoming more complex in the first, employers get more interested in those with higher education. Thus, with an increase in the level of education, the unemployment rate decreases.

As it has already been noted, the level of employment of the population is under the impact of a number of factors which determine its dynamics, including demographic factors.

From all the diversity of demographic indicators, we begin our comprehension with the indicator of both internal and external migration. Being an important indicator, migration greatly affects the state. The main role of migration as a demographic process lays in the fact that it forms the number of a country's population. Population movements from one country to another also impact the economy, and this impact can be either positive or negative. The combination of a very high unemployment rate and a low level of well-being, as exemplified by Bulgaria, has extremely high social and personal costs [15].

Analysing the statistical data [10], we found that these indicators affect the unemployment rate in the Central Federal District, and for Kursk region we singled out only the indicator of external migration worked. Data show that during the period the levels of both internal and external migration steadily increased from year to year. In the Central Federal District, its peak falls on 2012-2013, where the flow of migrants was 146,027 and 142,551 persons, respectively, while the unemployment rate remained almost unchanged. In 2014, the territory of the Central Federal District experienced a sharp decline in the level of internal migration down to 119,382 persons with its further increase in 2015. Such sharp jumps within a short period are explained by various political events taking place in the world, as well as by their manifestation, which led to the relevant changes in the field of migration processes.

When speaking of external migration, we mean emigration from and immigration to the country. According to the statistics obtained in the Central Federal District, we see that the level of external migration, starting from 2005, is gradually increasing, which indicates a high level of economic development of all federal districts of the Russian Federation.

Carrying out the correlation analysis, we established a strong link between migration and unemployment in Belgium, Romania, Slovakia and France. In Romania, with a declining level of emigration over the period under study, there is an inverse relationship between these indicators (the Pearson correlation coefficient is -0.88). In Slovakia, the inverse relationship is found between immigration and the unemployment rate with a sufficiently strong connection (the Pearson correlation coefficient is -0.9). In this case, emigration of one part of the country's population can partially solve the problem of unemployment. A similar situation with migration processes has developed in France, a fairly developed Western European country. Here, with an increase in the proportion of the population that immigrates, there is an increase in the unemployment rate (the Pearson correlation coefficient is 0.9) [16, 17]. Apparently, the potential immigrants in France represent the employed population with their professional qualities and abilities.

The indicator of external and internal migration characterises the resettlement of people within the employment process and has its own specific features. Each person, for maximum profit, considers the most favourable conditions. That is why the process of resettlement occurs, having different causes and consequences every year.

In conditions of a relatively stable social and economic atmosphere in the modern world, the reproduction of the population is determined by the level and dynamics of the birth rate. The importance of the analysis of fertility is due to the fact that the conditions, level and quality of life of the population are largely determined by this indicator. In turn, the death rate of the population is an indicator reflecting the state of public health. The death rate characterises the economic and social health of the country, reflects the effectiveness of the policy conducted by the authorities. The Pearson correlation coefficient helped us to determine the dependency between the indicators for Belgorod region. The mortality rate and the unemployment rate in Belgorod region are decreasing in proportion of one indicator over the other. On average, the death rate has been equal to 14% for 12 years. Also, we have been observed no sharp leaps in the mortality rate in Kursk region during the period under study. It had declined by the end of 2016 and was 16.1%. The current situation in both regions pushes us to the conclusion that the process of employment of the population

within this period can be viewed as positive: the mortality rate coefficient does not increase and is stable. Thus, the impact of mortality on unemployment in Belgorod and Kursk regions is seen as a factor contributing to stability in the labour market, thereby increasing the number of jobs and able-bodied workers in a natural way.

Analysing the data relating to European social statistics in the period from 2005 to 2016 [18], we established a relationship between the level of mortality and the birth rate in the UK, Poland and France. If in the UK and Poland, with an increase in the death rate of the population, the unemployment rate decreases (the Pearson correlation coefficient is -0.7 and -0.7, respectively), then in France an increase in the mortality rate leads to an increase in the unemployment rate (the Pearson correlation coefficient is 0.8). Apparently, France has better developed social protection programs for the unemployed, which helps those who lose their jobs to cope with difficulties and find work, possibly changing their qualifications.

Considering the dependency of the unemployment rate on the birth rate in Russia, namely in the Central Federal District, we can observe how one factor impacting another factor contributes to an increase in the birth rate and a decrease in the unemployment rate. The current trend leads to changes in the workplace in the event of unavailability of key personnel due to various reasons: a lingering illness, maternity leave and so on. However, in France, an increase in the birth rate does not help to reduce the unemployment rate (the Pearson correlation coefficient is 0.7). Apparently, the population in France has a sufficiently high level of quality of life and health, and has a stable socio-economic structure.

5. Conclusions

Proceeding from all above-stated, we managed to find out that unemployment is formed under the influence of various social factors. Their impact can be both positive and negative. These factors can be called determinants of unemployment. Among the factors impacting the level of unemployment, there are the crime rate, the coefficient of social tension and the level of education, which, when showing their negative side, may result in a high degree of socially dangerous impact manifesting itself in a high level of unemployment, as well as a low level of security and welfare of the population.

That is why the demographic factors of employment are related to the peculiarities of the reproduction of the population. In the current socio-economic conditions, socio-demographic processes play one of the most important roles in modern society. With the help of socio-demographic factors, it is possible to identify topical problems of unemployment which is a macroeconomic phenomenon.

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