

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Diploma Thesis

**Analysis of influence of selected macroeconomic indicators on
development of unemployment in the Russian Federation**

Valeriya Korshunova

© 2021 CZU Prague

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. Valeriya Korshunova

Economics and Management
Economics and Management

Thesis title

Analysis of the influence of selected macroeconomic indicators on the development of unemployment in the Russian Federation

Objectives of thesis

The aim of the dissertation is to assess the impact of selected macroeconomic factors (migration growth of the population, the level of urbanization of the population, average real wages of the population, inflation and investment activity) on unemployment and their relationship. This goal assumes the solution of the following research questions:

Is there a relationship between unemployment and selected macroeconomic indicators (migration growth and level of urbanization of the population, average real wage, inflation and the investment activity)?

What effect selected macroeconomic factors have on unemployment (no effect/ negative/ positive)?

Methodology

First theoretical part includes literature review of unemployment as economic element and its essence. The view point of different economic schools and also modern theories on unemployment will be described in this part. There is will be touch the question of unemployment impact on economic growth of country. Theoretical part include topics that characterizing unemployment in Russian Federation in terms of the types, reasons for its occurrence and manifestation in country.

The practical part covers the analysis of the relationship between unemployment and selected macroeconomic factors (migration growth of the population, the level of urbanization of the population, average real wages of the population, inflation and investment activity). For analysis was chose The Ordinary Least Squares Method (OLSM). Time series data from 2008 to 2020 is used for the analysis as the primary quantitative method for examining the correlation between the main influencing macroeconomic indicators and unemployment. The analysis was carried out using only the SW Gretl program.

The first step is to create a model that consists of a dependent variable (unemployment) and independent (migration growth of the population, the level of urbanization of the population, average real wages of the population, inflation and investment activity). Next step is to carry out a regression analysis of the dependence of indicators, and then calculated a correlation coefficient and build a correlation matrix to

find out the relations between variables. White's test and the test for normality provide in analysis to check the model for heteroscedasticity.

The third part describes the main obtained results and discussion with other authors.



The proposed extent of the thesis

60 pages

Keywords

Russia, unemployment, macroeconomic factors, analysis, trends, specifics

Recommended information sources

FROYEN, R T. *Macroeconomics : theories and policies*. New York: Pearson/Prntice Hall, 2004. ISBN 0-13-143582-5.

RAMRATTAN, L. – SAMUELSON, P A. – SZENBERG, M. *New frontiers in economics*. Cambridge, UK ; New York: Cambridge University Press, 2004. ISBN 0-521-54536-6.

ROMER, D. *Advanced macroeconomics*. Boston: Irwin/McGraw-Hill, 2006. ISBN 0-07-287730-8.

SAMUELSON, P A. – NORDHAUS, W D. *Economics*. Boston: McGraw-Hill Irwin, 2010. ISBN 9780073511290.

Expected date of thesis defence

2020/21 SS – FEM

The Diploma Thesis Supervisor

prof. Ing. Luboš Smutka, Ph.D.

Supervising department

Department of Trade and Finance

Electronic approval: 17. 3. 2021

prof. Ing. Luboš Smutka, Ph.D.

Head of department

Electronic approval: 19. 3. 2021

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 31. 03. 2021

Declaration

I declare that I have worked on my diploma thesis titled " Analysis of influence of selected macroeconomic indicators on development of unemployment in the Russian Federation " by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break any copyrights.

In Prague on 31.03.2021

Acknowledgement

I would like to thank and express gratitude to my scientific supervisor Ph.D. Luboš Smutka for all the help, significant recommendations that were put forward, advices and support. I also would like to express my appreciation to the Czech University of Life Sciences for the knowledge and experience gained during my studies.

Analysis of influence of selected macroeconomic indicators on development of unemployment in the Russian Federation

Abstract

Unemployment is one of the most important macroeconomic problems, the solution of which ensures not only economic, but also stability in society. This thesis is a case study of the Russian Federation, since the current transition to market relations in the Russian Federation is associated with great difficulties and the emergence of many socio-economic problems. One of them is the problem of unemployment. The thesis principally describes condition of current situation, main causes of unemployment and its dynamic.

The aim of the dissertation is to assess the impact of selected macroeconomic factors (migration growth of the population, the level of urbanization of the population, average real wages of the population, inflation, and investment activity) on unemployment and their relationship based on analysis of data period 2008-2020. Using the ordinary least squares method turned out to identify the model of the most influencing factors.

The findings of the research are following: the final OLS model consist of three factors (average real wage, investment activity, and urbanization), which are significant; the influence of investment activity, that expressed with fixed capital investment, and urbanization level have an inversely effect on unemployment, the real wage effect in direct ratio. It is possible to say that previously thought was confirmed.

Keywords: unemployment, macroeconomic factors, development Russian Federation, ordinary least square method, model.

Analýza vlivů vybraných makroekonomických indikátorů na rozvoj nezaměstnanosti v Ruské Federaci

Abstrakt

Nezaměstnanost je jedním z nejdůležitějších makroekonomických problémů. Řešení problému nezaměstnanosti ovlivňuje nejen ekonomiku, ale také stabilitu společnosti. Tato diplomová práce je případovou studií a je zaměřená na zkoumání socio-ekonomických problémů a jevů, spojených se současným přechodem Ruska na tržní ekonomiky. Nezaměstnanost je jedním z těchto problémů. Diplomová práce popisuje stav současné situace v oblasti nezaměstnanosti v Rusku, její hlavní příčiny a dynamiku jejího vývoje.

Cílem této diplomové práce je na základě provedené analýzy zhodnotit dopad vybraných makroekonomických faktorů (migrace, úroveň urbanizace, průměrné reálné mzdy, inflace a investiční aktivita) na nezaměstnanost v období let 2008-2020. K identifikaci modelu analyzujícího nejvíce relevantní faktory ovlivňující nezaměstnanost v případě Ruska byla použita OLS metoda.

Hlavní zjištění výzkumu jsou: finální model OLS se skládá ze tří faktorů (průměrná reálná mzda, investiční aktivita a urbanizace). Vliv investiční aktivity, který je vyjádřen investicemi do fixního kapitálu, a úroveň urbanizace mají nepřímý účinek na nezaměstnanost. Vliv reálné mzdy na nezaměstnanost je vzájemně přímo úměrný. Na základě výzkumu, lze konstatovat, že základní předpoklady spjaté s tématem této diplomové práce byly v obecné rovině potvrzeny.

Klíčová slova: nezaměstnanost, makroekonomické faktory, rozvoj Ruska, metoda nejmenších čtverců, model.

Table of content

1 Introduction	12
2 Objectives and Methodology	13
2.1 Objectives.....	13
2.2 Methodology	13
3 Literature Review	17
3.1 General overview of unemployment.....	17
3.1.1 Literature review of unemployment essence	17
3.1.2 Modern theories of unemployment.....	19
3.1.3 The influence of unemployment on economic growth	24
3.2 The main features of unemployment.....	28
3.2.1 Types of unemployment and its manifestation in Russia Federation	28
3.2.2 Causes of unemployment in Russia Federation	33
3.2.3 Socio-economic consequences of unemployment in Russia Federation ..	35
4 Practical Part	39
4.1 Dynamics of unemployment by selected parameters.....	39
4.2 Brief overview of the main influencing factors on unemployment in Russia Federation.....	45
4.2.1 The migration growth of population as influencing factor	46
4.2.2 Brief overview of the average monthly real wage of population as influencing factor.....	49
4.2.3 Brief overview of the inflation as influencing factor.....	51
4.2.4 Brief overview of the level of investment activity as influencing factor..	53
4.2.5 Brief overview of the degree of urbanization of the population as influencing factor	56
4.3 Analysis of selected macroeconomic factors influencing on unemployment in Russian Federation. One-equation model. Ordinary least squares method.	59
5 Results and Discussion	72
6 Conclusion	76
7 References	78

List of pictures

Figure 1 Example of Okun's Law regression of quarterly changes in the GDP growth and unemployment rate.....	26
Figure 2 Unemployment classification by main features.....	28
Figure 3 Types of unemployment.....	29
Figure 4 Voluntary unemployment.....	30
Figure 5 Dynamic of migration growth in years 2008-2020, people.....	47
Figure 6 Dynamic of average monthly real wage (rubles) and a growth rate (%) in years 2009-2019.....	50
Figure 7 Dynamic of average monthly real wages (rubles) and unemployment (%) in years 2009-2019.....	50
Figure 8 Inflation in selected countries in 2019, consumer prices (annual %).....	52
Figure 9 Dynamic of inflation (%) and unemployment (%) in Russian Federation in compare to average world inflation in %.....	53
Figure 10 Dynamics of investments in fixed assets (bil. rubbles) and unemployment (%) in the period 2008-2019.....	54
Figure 11 Dynamics of investments in fixed assets in % compared to the previous year in the period 2008-2019.....	55
Figure 12 Dynamics of the ratio of the volume of investments in fixed assets to GDP in %.....	56
Figure 13 Dynamic of urbanization rate in period 2008 to 2019 in % of total.....	58
Figure 14 Urbanization by district at 2019 in % of total.....	58
Figure 15 The results of the output of the correlation matrix.....	63
Figure 16 Checking the remnants of the model on the normality of the distribution.....	68
Figure 17 The result of testing of Normality.....	68
Figure 18 Detection of heteroskedasticity residues.....	69
Figure 19 Breusch-Pagan test for heteroskedasticity.....	70

List of tables

Table 1 Analyzing data set of years 2008-2020.....	14
Table 2 Indicator of change in the number of unemployed population in the Russian Federation in %.....	39
Table 3 The statistic of unemployment and registered unemployment in thousands people.....	40
Table 4 Population structure by level of participation in the labor force in 2019.....	41
Table 5 Gender composition of the unemployed in the Russian Federation.....	42
Table 6 The number of unemployed according to the most vulnerable criteria of citizens in thousand people.....	43
Table 7 Structure of the unemployed population depending on age in %.....	44
Table 8 Dynamic of arrived, retired population and migration growth in years 2008-2020, people.....	47
Table 9 Dynamic of average monthly real wage of population (rubles) and growth rate (%) in years 2008-2019.....	49
Table 10 Urbanization rate since 2008 to 2019 in % of total.....	57
Table 11 The economic and econometric model for OLSM.....	61
Table 12 Data of macroeconomic factors (2008-2018) and unemployment rate of Russian Federation (2008-2018).....	62
Table 13 The results of P-values.....	67

Table 14 The results of Normality and Heteroscedasticity for OLSM.....	67
Table 15 The results of OLS mmodel analysis.....	71

List of models

Model 1 OLS results from GRETL based on matrix X and vector Y using observations 2008-2020	64
Model 2 Solving the problem without multicollinear variable.....	65
Model 3 Solving the problem with statistically significant variables.....	66

1 Introduction

Unemployment is one of the most important macroeconomic problems, the solution of which ensures not only economic, but also stability in society. This thesis is a case study of the Russian Federation, since the current transition to market relations in the Russian Federation is associated with great difficulties and the emergence of many socio-economic problems. One of them is the problem of unemployment. The thesis principally describes condition of current situation, main causes of unemployment and its dynamic.

The urgency of the problem is obvious since the root causes of this phenomenon are associated with fluctuations in the main macroeconomic indicators of a market economy. Thus, the analysis of the main macroeconomic factors (migration growth of population, degree of urbanization of the population, income of the population, inflation, and level of investment activity) influencing the dynamics of unemployment, as well as the emerging economic consequences of this phenomenon, is the main aim of the Thesis.

Any market economy develops cyclically, there are periods of recession and recovery. In the context of periodic recessions, the unemployment rate rises sharply, at the same time, but the rise in business activity is characterized by a significant decrease in the unemployment rate and the economy is growing at a faster pace. The Thesis also covers the study of the relationship between the dynamics of GDP (as the main indicator of economic condition) and unemployment.

There is a significant body of literature researching the impact of unemployment on economic growth. Most studies claim that reducing unemployment has a positive effect on a country's economic growth. In this case, it was researched and analysed properly in order to prove the existence of the relationship between unemployment and GDP as the main indicator of the level of economic development in the Russian Federation.

The theoretical base is the works of domestic and foreign specialists in the field of employment and unemployment. A great contribution to the development of the theory of unemployment was made by well-known foreign experts, among whom the names of such as A. Smith, J. Keynes, specialists M. Friedman, J. Perry, A. Okun, A. Phillips and others. The information sources also were the official data of the Federal State Statistics Service, the Ministry of Health and Social Development of the Russian Federation.

2 Objectives and Methodology

2.1 Objectives

The aim of the dissertation is to assess the impact of selected macroeconomic factors (migration growth of the population, the level of urbanization of the population, average real wages of the population, inflation, and investment activity) on unemployment and their relationship. This goal assumes the solution of the following research questions:

– Is there a relationship between unemployment and selected macroeconomic indicators (migration growth and level of urbanization of the population, average real wage, inflation, and the investment activity)?

– What effect selected macroeconomic factors have on unemployment (no effect/ negative/ positive)?

2.2 Methodology

The present research is aimed to estimate influenced macroeconomic indicators on unemployment at Russian Federation by using the OLS (ordinary least squares) method approach.

The information base was the official data of the Federal State Statistics Service, the Ministry of Health and Social Development of the Russian Federation and the World bank.

To achieve the aim of the research, it is necessary to use methods of quantitative and qualitative analysis:

– the document analysis, which mainly includes a study of official governmental statements and reports, experts' opinions;

– the statistical analysis (statistical data of Rosstat, Worldbank, etc.);

– the econometric analysis (using OLS model at software Gretl);

– the analysis of time series, etc.

The OLS model was made for the econometric analysis of selected macroeconomic factors. This method is quite popular as its results can be easily compared with intuitive results. The equation 1 is used for modeling at practical part.

$$Y_{1t} = y_{12}x_{2t} + y_{13}x_{3t} + y_{14}x_{4t} + y_{15}x_{5t}\gamma + y_{16}x_{6t}\gamma + u_{1t} \quad (1)$$

Where, according to analyzing data, Y_{1t} - Unemployment, %;

x_{2t} - Migration growth, people;

x_{3t} - Urbanization level, % of total population;

x_{4t} - Inflation, %;

x_{5t} - Average real wages, rubles;

x_{6t} - Investment activities (fixed capital investments), billion rubles;

u_{1t} - Random error, $\sim \text{nid}(0, \sigma^2)$.

Here the suggested model shows dependence between unemployment as dependent variable and migration growth, urbanization level, inflation, average monthly real wages and investment activity (fixed capital investments): $y_{1t} = f(x_{2t}, x_{3t}, x_{4t}, x_{5t}, x_{6t})$. The OLS model used data set of years 2008-2020 (Table 1).

The following set of data will be used in analysis:

Table 1: Analyzing data set of years 2008-2020

	Y	X_2	X_3	X_4	X_5	X_6
<i>Year</i>	<i>Unemployment, %</i>	<i>Migration growth, people</i>	<i>Average monthly real wage, rub.</i>	<i>Inflation, %</i>	<i>Fixed capital investments, billion rub.</i>	<i>Urbanization rate, % of total</i>
2008	6.2	239 943	16 426	10.8	8 781.6	73.4
2009	8.3	321 023	17 706	11.7	7 976.0	73.6
2010	7.3	290 054	19 904	6.9	9 152.1	73.6
2011	6.5	255 697	22 201	8.4	11 035.7	73.7
2012	5.5	216 564	25 298	5.1	12 586.1	73.8
2013	5.5	219 698	28 302	6.8	13 450.2	74
2014	5.2	201 332	30 870	7.8	13 902.6	74.2
2015	5.6	229 165	32 282	15.5	13 897.2	74
2016	5.5	217 562	34 874	7.0	14 748.9	74.1
2017	5.2	203 164	37 209	3.7	16 027.3	74.3
2018	4.8	178 547	41 538	2.9	17 782.0	74.4
2019	4.6	155 621	41 747	4.5	19 329.0	74.6
2020	5	196 233	42 820	4.3	20 036.0	74.3

Source: Federal State Statistics Service, own calculation, 2020.

The influence of the selected indicators has already been studied more than once in the works of economists. Their relationship with unemployment has been proven in works famous economists such as Karl Marx, Arthur Okun, and a lot of modern scientists:

– Roger Farmer in his work “Unemployment” mentioned influence of demographic factors such as migration processes and urbanization, birth and death ratios;

– Michal Kalecki discussed inflation, trade flows (export and import), foreign direct investments, fixed assets investment like governmental instruments that can affect the unemployment in his work “Political aspects of full unemployment”;

– “Real Wages, Productivity, and Unemployment in Britain and Germany” is the work of Stephen Broadberry and Ritschl Albrecht, where they are explaining the influence of average real wage on unemployment on example of Great Britain and Germany.

Therefore, its decided to provide own analysis of unemployment and macroeconomic factors. that was mentioned before to prove relations between these factors or find out and describe specific model of unemployment and influencing factors at Russian Federation.

The software Gretl was chosen for calculating the presence of special econometric tests. For example, test on autocorrelation or heteroscedasticity was applied to the analyzed model. The Gretl program contains commands that allow you to carry out the necessary procedures with minimal time. To check the model on heteroscedasticity in Gretl there the White’s test, and for the autocorrelation is the Durbin-Watson test.

The ordinary least squares (OLS) model (Gujarati and Porter, 2009, p. 61)

In the research the OLS model was implemented as the basic one. This method is using the equation 2:

$$Y_t = a_1x_{i1} + a_2x_{i2} + \dots + a_nx_{in} + u_t \quad (2)$$

White’s test (Verbeek, 2008, p. 99)

When using this test, it is assumed that the variances of the regression errors are the same function equation 3 of the observed values of the regressors, i.e.

$$\sigma_i^2 = f(x_i), i = 1, \dots, n. \quad (3)$$

Most often the function is chosen to be quadratic, which corresponds to the fact that the root-mean-square error of the regression depends on the observed values of the regressors approximately linearly. The case of “const” corresponds to the homoscedastic sample.

The idea behind White's test is to evaluate function (equation 3) using the corresponding regression equation 4 for the squared residuals:

$$e_i^2 = f(x_i) + u_i, 1, \dots, n \quad (4)$$

The hypothesis of the absence of heteroscedasticity (condition / = const) is accepted in the case of insignificance of regression (4) as a whole.

Robust method (Wilcox, 2012, p. 10)

This is a feature of a statistical method. It characterizes the independence of the effect on the result of the study of various kinds of emissions, resistance to interference.

The robust method was implemented to eliminate heteroskedasticity. The white's corrections were considering. Practically, it doesn't differ in explanatory power of the initial settings.

Breusch-Pagan test. (Kleiber and Zeileis, 2008, p. 101)

One of the statistical tests to check the presence of heteroskedasticity of random errors of the regression model.

It is used if there is reason to believe that the dispersion of random errors may depend on some set of variables. In this case, a linear dependence of the dispersion of random errors from a certain set of variables is checked in this test.

The test based on the LM test statistic.

Breusch-Pagan LM test:

$$LM = \frac{1}{2}(TSS-SSR), \quad (5)$$

where TSS is the sum of squared deviations of the g_i ($g_i = \frac{\varepsilon_i^2}{\sigma^2}$, where ε_i^2 - compute the regression residuals, σ^2 - the Maximum Likelihood estimate of the error variance) and SSR is the sum of squared residuals from the auxiliary regression ($g_i = y_1 + y_2 z_{2i} + \dots + y_p z_{pi} + \mu_i$)

Normality test (Razali and Wah, 2011, p. 30)

Checking the balance of linear regression on normality - allows you to check whether the applied regression model corresponds to the source data.

To verify the normality of the distribution, normality criteria are used - this is a group of statistical criteria. As part of this work, the test is carried out based on the chi-square criterion.

Chi-square criterion is an any statistical test of the hypothesis, in which the selective distribution of the criterion has a chi-square distribution under the condition of the validity of the zero hypothesis.

3 Literature Review

3.1 General overview of unemployment

3.1.1 Literature review of unemployment essence

Nowadays, scientists interpret the essence of unemployment in different ways, however, there is no originality in their definitions, since almost all of them use phrases related to the same synonymous series.

Since there are a large number of approaches to explaining the essence and causes of unemployment, it is obvious that there are different points of view on the definition of "unemployed".

For example, the concept of unemployment by the American economist and author of the textbook "Economics" K. McConnell is the most famous and frequently used: "Unemployment is a phenomenon in the economy, in which a part of the economically active population who wants to work cannot use their labor force" (McConnell, 1960, p. 21).

Russian economists put forward their interpretation, but close in content to McConnell's one.

B.D. Breev "Unemployment is a social and economic phenomenon in which part of the labor force (economically active population) is not employed in the production of goods and services. The unemployed, along with the employed, form the labor force of the country" (Breev, 2005, p. 115).

L.G. Avdeev interprets unemployment as a social phenomenon in which a certain number of able-bodied people cannot find a job that they are able to perform (Avdeev, 2010, p.6).

M.V. Chekmareva refers to the socio-economic situation in society as unemployment, in which part of active able-bodied citizens cannot find a job that they are able to do, which is due to the prevalence of labor supply over demand for it (Chekmareva, 2016, p. 48).

N.V. Kovalev considers unemployment as a socio-economic phenomenon in which part of the economically active population is not employed in the economic sphere (Kovalev, 2014, p.5).

In the opinion of such an institutionalist as J. Galbraith, "the concept of unemployment is increasingly losing its former meaning over the years" due to the fact that

the unemployed include people who drop out of the structure of society, for example, unskilled workers, whose routine work is automated (Galbraith, 2004, p. 112).

The Marxist theoretical concept shows the dual socio-economic nature of unemployment. On the one hand, unemployment is the most important reserve of capitalist production, a key factor in ensuring its growth, flexibility, and adaptive capacity. Such reserve helps capital to successfully mastering new spaces, creating new areas of activity, and gaining almost unlimited opportunities to create and fill any vacancies necessary for its development. Unemployment can also act as an incentive and incentive for workers to master new professions, improve the skills and quality of the workforce.

However, on the other hand, unemployment testifies to the flawed economic system, its inability to provide full (at the level of production capabilities) use of the main productive force - labor resources.

Within the framework of the classical school, economists saw unemployment is interpreted as a random deviation from full employment due to the action of purely external factors, as a consequence of random market fluctuations, its long-term nature can only be caused by government intervention, in equilibrium economy there is full employment (Elhorst, 2003, p. 719).

The Economic Encyclopedia interprets unemployment as a socio-economic phenomenon in which part of the working-age population wants to work, but cannot find a job, becomes redundant, replenishing the reserve army of labor.

The International Labor Organization recognizes unemployed persons aged 15–70 years (registered and not registered with the State Employment Service) who simultaneously meet three basic conditions:

- do not have a job (profitable occupation), they did not perform any work for at least one hour for hire or on the terms of self-employment;

- ready to start work in the near future, to start paid work for hire or in own enterprise;

- are actively looking for work or trying to organize own business for a certain period of time preceding the survey, they take certain steps to find paid employment or start own business.

According to Article 3 of the Law of the Russian Federation "On Employment of the Population in the Russian Federation", able-bodied citizens are recognized as unemployed who:

- do not have a job (or any other income-generating occupation);
- are registered with the employment service as job seekers;
- have the opportunity to start work at any time .

After analyzing the definitions of scientists, it can be noted that not there is a single agreed point of view regarding the essence of this complex and multifaceted phenomenon. Summarizing all the above statements, we offer such an understanding of it. Consequently, unemployment is a large-scale social situation in a country caused by economic, political or social factors, in which a significant part of the working-age population cannot realize their labor and creative potential through a limited number of vacant jobs or because of their lack of competitiveness in the labor market.

3.1.2 Modern theories of unemployment

In the modern world, unemployment is growing steadily, worsening the economic situation of citizens. In an effort to ease tensions, economists propose various concepts to explain the causes of unemployment from a monopoly perspective.

Among the most prominent representatives of this trend are Zh. B. Say and T. Malthus.

So, Say directly noted that it is the actions of the state (“some war, some new customs law”) become the cause of mass unemployment. They also defended the senselessness of direct government intervention in the labour market and some direct measures to support the unemployed (“no cash temporary benefits will lead to anything - they will only delay the time of the onset of the disaster”). At the same time, Say notes the usefulness of certain measures of active state policy in the labour market, for example, creating new jobs, stimulating the development of industry.

One of such theories is T. Malthus's theory. He argued that poverty and unemployment are caused by nature, the rapid growth of population. “The main and continuous cause of poverty, - wrote Malthus, - depends little or not at all on the form of government, or on the uneven distribution of property: the rich cannot provide the poor with work and food, therefore the poor have no right to demand work and food from them.” Malthus saw the main reason for the growth of unemployment and poverty in “the constant desire, which is characteristic of all living things, to multiply faster than is

allowed by the amount of food at their disposal.” According to Malthus, the world's population doubles every twenty-five years and increases exponentially (1,2,4,8,16,32), and the means of subsistence increase only in an arithmetic progression (1,2,3,4,5,6) under the most favourable working conditions. Population growth, changes in its structure are determined by socio-economic factors and from (Malthus, 1986, p. 351).

Say held a similar point of view: the difficulty during the famine creates a “surplus of a commodity called labour”, while the working class shrinks. this it grows exponentially. (Say, 2007)

This approach determines the degree and nature of the use of the population in the production process, the living standard of the population, as well as its natural increase. The accumulation of capital leads to the fact that a part of the working population inevitably turns out to be surplus, is pushed out of production and goes over to poverty and unemployment, which is clearly shown by the eternal law of population, about the existence of which Malthus wrote. Malthus's theory is a mechanical transfer of the biological law of reproduction of living beings to human society (Malthus, 1986).

Today, a large number of books and articles have been published in which Malthusian ideas about the causes of unemployment are widely disclosed. It recommends programs to reduce it, justifies wars and neo-colonialism. Neo-Malthusians argue that unemployment at the present stage is not the result of market relations of production. In explaining the causes of unemployment, they eclectically combine biological and socio-economic factors, giving preference to the former.

The American economist W. Vogt admits the presence of a large number of unemployed in the most developed country in the world. The main reason for the rise in unemployment and poverty, in his opinion, is due to the rapid growth in the birth rate. Families simply have too many children, far more than the available resources allow. As the main task, he puts forward the reduction of the population, and not only by reducing the birth rate, but by increasing the death rate (Vogt, 1990).

To prove the overpopulation of the land, the neo-Malthusians compare the amount of cultivated land per person with the amount of land required by scientific data to provide one person with normal living conditions. At the same time, they proceed from the fact that the fund of the cultivated area cannot be increased, since all land suitable for agriculture is already in use, and do not take into account the intensification of agriculture, in which more products can be obtained on the same land area.

Food production, as shown by data from the Food and Agriculture Organization of the United Nations, is increasing overall and per capita. The growth of production per capita was 25% in developed countries and 5% in developing countries. The reasons for the lag in production growth in developing countries are wars, long-term colonial rule by developed countries, the preservation of local vestiges and neo-colonialism, which retard the development of production forces and technological progress. Huge amount of untapped natural resources in developing countries, under certain socio-economic conditions, could be rationally used for a significant increase in production.

Some economists-scientists (in France - A. Sauvy, R. Dumont, in Germany - F. Baade, G. Makenroth, in England - K Clark, in Sweden - G. Myrdal, etc.) are disagreeing with the concept of Malthus and modern Malthusians and put forward new theories of unemployment. In their works, they pay great attention to the problem of employment in developing countries, in which the emergence of market relations of production gives rise to a huge increase in unemployment in cities and overpopulation in rural areas. The main reason for the growth of unemployment and underemployment, according to Myrdal, is the preservation of outdated institutional conditions and views in the countries in the socio-economic system of society. Undoubtedly, the preservation of traditional institutions in African and Asian countries restrains the development of productive forces in these countries and leads the population to poverty. According to Myrdal, in order to eliminate unemployment in these countries, industrialization should be carried out, complemented by a system of state political measures. The main methodological disadvantages of the concept of Myrdal and others are, first, that in industrialization they see the main means of eliminating unemployment and increasing employment and do not take into account the prevailing production relations under which it is carried out; second, the role of government measures to increase employment in developing countries is highly overestimated. It is well known that industrialization in a market economy in the conditions of preservation of the remnants of feudalism leads to an increase in unemployment and poverty. Myrdal's vision is for all developing countries to strictly follow the pattern of Western countries. (Myrdal, 1956)

Keynes's theory is the most widespread among the theories of unemployment. He proceeds from the premise that in a market economy it is not only possible to eliminate mass unemployment, but also to establish full employment. Keynes wrote "Clear that the world will no longer tolerate unemployment, which, except for short periods, inevitably

accompanies modern capitalist individualism. However, it is possible with the correct analysis of the problem to cure the disease and at the same time maintain efficiency and freedom.” Keynes's theory can be called insufficient demand theory. His work is also pointing in that “the volume of employment is in a definite way related to the volume of effective demand”. He argues that the cause of unemployment and underemployment is in insufficient effective demand for a product or insufficient volume of “effective demand”. Since Keynes uses the macroeconomic method, in which the object of study is society as a whole, the effective demand for it is equal to the national income and includes consumer demand for personal consumption items and investment demand for means of production. (Keynes, 1998, p. 165)

Keynes considers them to be complementary components in “effective demand”. Keynes sees the main reason for the inadequacy of consumer demand in the “basic psychological law”, manifested in the fact “that people are inclined to increase consumption with the growth of income, but not to the same extent as the increase in income.” In his opinion, human psychology is that with the growth of the income, his propensity to consume decreases. Thus, as their income grows, people spend less and less of it on consumption and save more and more, which causes insufficient consumer demand. According to Keynes, the lack of consumer demand can be compensated for by an increase in investment, i.e. investment demand. “Incentives for investment, capital investment” should be increased to ensure “full employment”. Keynes considers the rate of interest on loan capital as the most important objective factor affecting investment demand. He attributes to it the role of regulator of the volume of investments, if it is high, then the propensity to invest decreases, if it is low, then it increases. (Keynes, 1998, p. 172)

Subjective psychological factors act in the same direction. Adopting unfavourably, they create uncertainty for entrepreneurs in the future and determine the “preference for liquidity” - the accumulation of capital. Thus, Keynesian unemployment is the result of a decline in “effective demand” arising from lower consumption by people and weak incentives to invest. Keynes saw the way out in an increase in government spending and expansion of government demand. To this end, he developed a number of practical measures: 1) stimulating the growth of state investment and expanding any types of consumption, even the most irrational (an increase in armaments, the luxury of millionaires, which is also a positive phenomenon); 2) creation of favourable conditions for private investment. (Keynes, 1998, p. 154)

He attributed a significant role in this to lowering the rate of interest in order to increase the rate of profit and thereby stimulate new private investment and an increase in employment. Reducing real wages through controlled inflation, as well as lending and financing entrepreneurs from the state budget should serve the same purpose.

Followers of Keynes (the Keynesian school) criticized Keynes's teaching for insufficient attention to the issue of production growth rates. "Full employment, noted the neo-Keyssian R. Harrod, is one thing, but a steady pace of development is quite another. The desire to provide full employment within a short period is unjustified without considering the conditions that are necessary to ensure a sustainable pace of development. "(Harrod, 1999, p. 81)

The scientific and technological revolution is exacerbating the problem of unemployment. The introduction of the latest "labor-saving" equipment leads to the displacement of workers by machines, to a decrease in their employment and an increase in the threat of unemployment. Technological progress in industry requires continuous retraining of workers, the replacement of old specialties with new ones. The demand for skilled labor is growing significantly and is falling sharply for unskilled workers. Theorists of "technological unemployment" try to explain the existence of a huge army of unemployed by the scientific and technological revolution, technological changes and the re-equipment of industrial enterprises with the latest equipment, and a more perfect management organization.

An alternative to Keynesianism was the continuation of the development of economic theory in the framework of the direction of monetarists, the founder and leader of which is M. Friedman. The concept of the monetarists is as follows: "the market economy has a high degree of stability and competitiveness, the desire for stability and self-adjustment." In contrast to Keynes, monetarists opposed budgetary and tax regulation, their main idea was the stable emission of money, regardless of the state of the conjuncture.

Monetarists put forward a hypothesis about the "natural rate of unemployment": even in the most favourable conditions, there is a need to retrain some workers, since certain professions simply die away, and besides, people are forced for one reason or another to change their place of residence, etc. It is proposed to consider unemployment within 4-5% as economically acceptable and "natural". (Fisher, 1993, p. 334)

The well-known American researcher and historian of economic thought M. Blaug noted that the natural rate of unemployment keeps real wages at a constant level and maintains a constant price level provided that labour productivity is zero. (Blaug, 1997, p. 120)

According to monetarists, by lowering the interest rate to stimulate growth, the authorities are sending false signals to the market, as a result of which investment projects are launched a masse without resources. After reaching a certain critical point, there is a massive cleansing of the market from these projects, an economic crisis unfolding, provoked by government regulation.

Summing up, it can be said that in order to substantiate the choice of the concept of unemployment, which should be adhered to when moving from the level of pure theory to the level of explaining specific changes in the labour market and forecasting it. It is necessary to keep in mind a clear link to the general market situation. These parameters determine which of the concepts of unemployment will be most correct in this case.

3.1.3 The influence of unemployment on economic growth

When the study of economics became widespread, economic growth and jobs became the two main factors that economists began to study in the first place. Many economists have debated and actively studied the relationship between two points: economic growth and unemployment. Economist Arthur Okun first took up this topic in the 1960s, and his research on the subject has since become known as Okun's Law.

At its core, Okun's Law examines the statistical relationship between a country's unemployment rate and its economic growth rate. Economists at the research arm of the Federal Reserve Bank of St. Louis explain that Okun's Law “is intended to explain to us how much a country's gross domestic product (GDP) can be lost when unemployment exceeds its natural rate”.

The logic behind Okun's Law is simple. Productivity depends on the number of workers used in the production process, so there is a direct relationship between productivity and employment. Total employment is equal to labour force minus unemployed. And here there is already an inverse relationship between productivity and unemployment. (Prachowny, 1993, p.333)

Okun's Law is essentially an empirical pattern that explains and analyses the relationship between employment and economic growth. Former Federal Reserve Chairman Ben Bernanke's speech perhaps summarizes the core concepts of Okun's Law: "This rule describes the observed relationship between changes in unemployment and real gross domestic product (GDP) growth. Oaken noted that due to the constant increase in the labour force and productivity levels, actual GDP growth is close to the growth rate of potential GDP, which is enough to keep unemployment constant". (Okun, 1975)

For a more accurate understanding of Okun's law, it is enough to give the following example. Achieving a 1 percent drop in unemployment in one year would require that actual GDP growth outstripped potential GDP growth by 2 percent over the same time period. Thus, if we assume as an example that the growth rate of potential GDP is 2%, then according to Okun's Law, GDP must grow by about 4% in one year in order to achieve a decrease in the unemployment rate by 1%. It is very important to note that Okun's Law is a statistical relationship that relies on unemployment regressions and economic growth (Figure 1).

Thus, the course of the regression can lead to different coefficients that are used to solve the change in the unemployment rate based on the growth rate of the economy. It all depends on the time periods used for data entry (historical data on GDP and employment). (Burgen, Meyer, and Tasci, 2012, p. 13)

The laws of this law have been modified over time to match the current environment and trends in unemployment over the period. The first scenario according to Okun's Law is when the unemployment rate drops by 1%, and the GNP rises by 3%. And, according to the second option, where attention is focused on the relationship between unemployment and GDP, an increase in unemployment with each percentage increases the drop in GDP by 2 percent.

Figure 1: Example of Okun's Law regression of quarterly changes in the GDP growth and unemployment rate



Source: own composition

Bloomberg article explored data from the 2008 global crisis and said: “This empirical relationship shows that for every percentage point that exceeds potential growth every year, the unemployment rate falls by half a percent.” You should look at various indicators of economic growth, such as GDP and GNP, in order to determine what exactly is meant by the measure of potential economic growth. (Applegate, 2013)

As with any law in economics, science, or any other discipline, it is important to determine whether it works under different conditions and over time. Okun's Law works under certain circumstances, but under other conditions it can be powerless. There are various ways to track unemployment. and of course the United States was the main testing ground for Okun. Okun analyzed the gap between the potential economic product and the actual rate of economic growth. A quarterly survey of Kansas City showed some discrepancy with Okun's calculations. They consisted in the fact that the initial data showed greater dynamics than usual. Subsequently, Okun finalized the law, proposing to introduce or omit variables depending on the period of economic development.

Despite the fact that there are many factors that influence the relationship between unemployment and economic growth, the operation of the law is proven empirically. The study led the Kansas City Federal Reserve Bank to conclude that "Okun's Law is not

closely related," however, "Okun's Law predicts that declining growth tends to coincide with rising unemployment." Due to the fact that the law did not work during the financial crisis, Bernanke suggested that "the obvious reason for the failure of Okun's Law may be, in particular, statistical noise." (Beranke, 2018, p. 16)

Other studies have been more supportive of Okun's Law. Many economists have concluded that "Okun's Law works well and that it can be used to make some economic predictions." The previously mentioned Federal Reserve Bank of St. Louis also made the following conclusions: "The Okun's Law can be a useful guide for monetary policy, but only if the natural rate of unemployment is correctly measured."

Overall, there is not much discussion that Okun's Law is one of the easiest and most convenient ways to study the relationship between economic growth and employment. One of the key benefits of Okun's Law is its simplicity, that a 1% drop in unemployment will occur when the economy grows about 2% faster than expected. In addition, this pattern has been extensively studied since it was first published. Finally, over the past six decades, since Okun's first work was published, history has provided many economic situations to test this pattern.

In fact, making certain forecasts about unemployment and taking into account economic growth trends, while relying on Okun's law, is not always effective. For example, since this pattern was studied, the world has experienced many economic changes over time, such as the emergence of more unusual economic conditions, including the recovery of unemployed people in jobs and the global financial crisis.

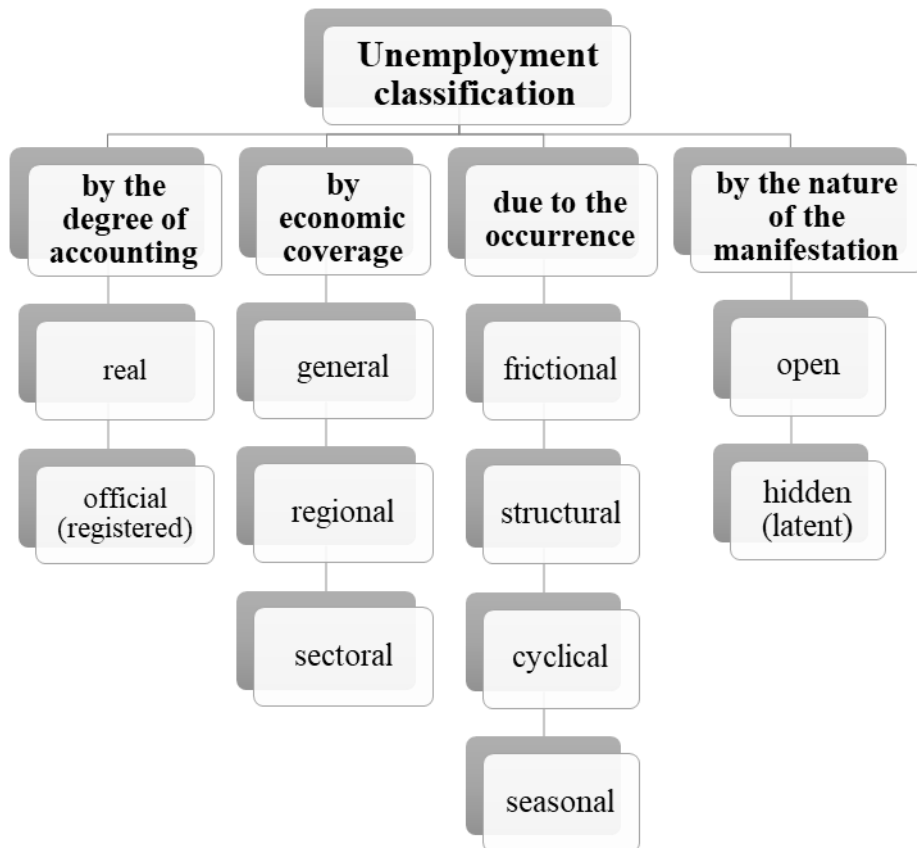
It is quite difficult to draw up a pattern due to the complexity of inputting the initial data and the use of different time periods, which can be applied with uncertainty that depends on the economic situation. Many different economic variables need to be used to analyze the relationship more accurately. Okun's Law does not always work even in the case of specific and clearer conditions, but so far empirical evidence actually confirms its usefulness. Although Okun's Law cannot provide a complete prediction, it helps to define the framework for the discussion of economic growth and its impact on employment (and vice versa).

3.2 The main features of unemployment

3.2.1 Types of unemployment and its manifestation in Russia Federation

Unemployment refers to idle labor reserves, which can be used in subsequent production expansion or structural adjustment. This is a socio-economic phenomenon which mean that the country's economically active population has no jobs or income for a period of time or permanently. Based on the causes of unemployment, it is possible to formulate its main types. The entire classification of types of unemployment is shown in Fig. 2.

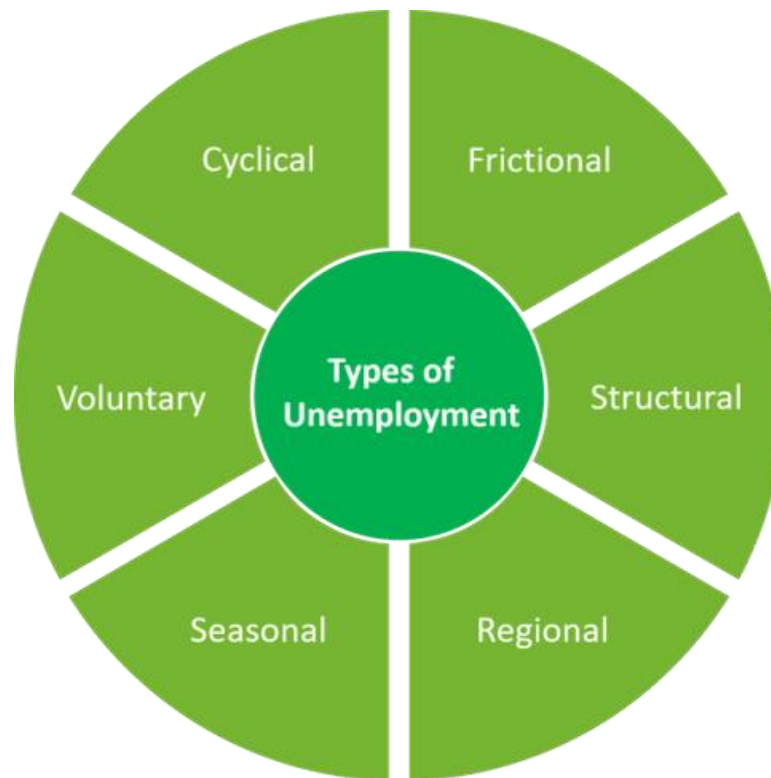
Figure 2: Unemployment classification by main features



Source: own composition

Currently we can talk about 6 main types of unemployment (Figure 3) that can appear at the Russian market, which are frictional, structural, regional, seasonal, voluntary/involuntary, and cyclical. The main reasons for the emergence of these types of unemployment and their essence will be described below.

Figure 3: Types of unemployment

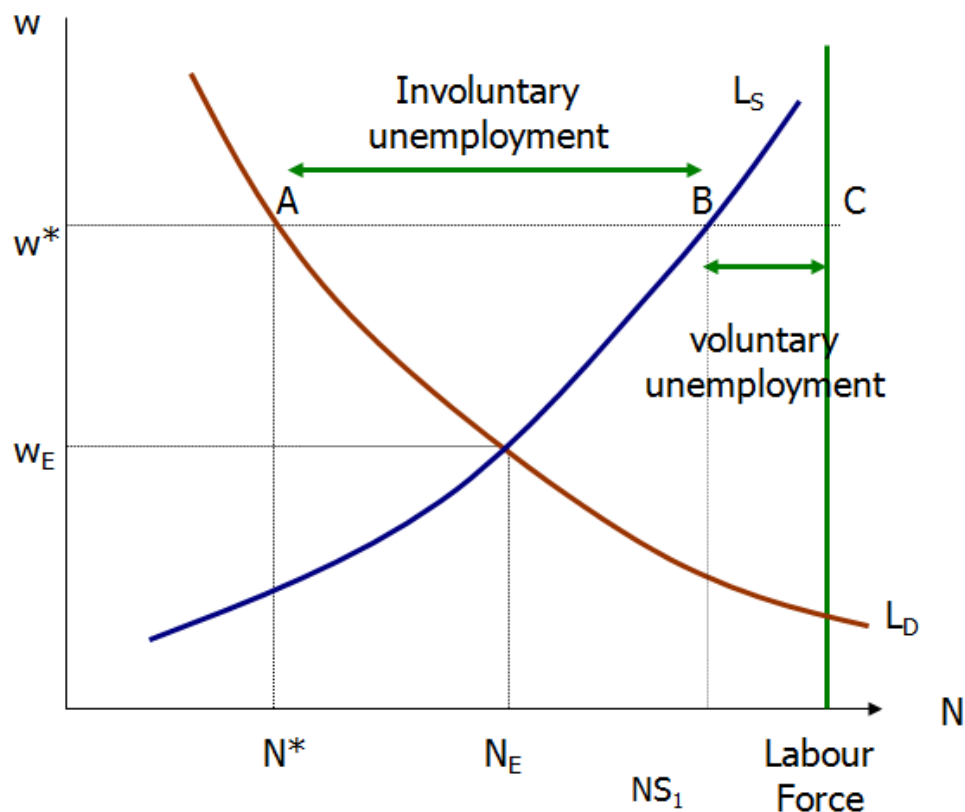


Source: own composition

According to the definition of the International Labour Organization-Unemployment refers to anyone who is currently unemployed, looking for a job and ready to start working. According to Russian law, an unemployed person is an able-bodied citizen without a job or income, has registered with an employment service agency in order to find a suitable job, looking for a job and ready to start working. Voluntary unemployment means that a person is consciously unwilling to engage in socially meaningful work. This unemployment is due to the fact that some part of the labour force does not want to work for a fixed wage rate, which is formed by the interaction of supply and demand in the market (flexible wages). (Romer, 2011, p. 468)

In the presented graph at Figure 4 voluntary unemployment is represented by the interval between the level that shows the number of labour force and the equilibrium point. When the total labour supply of workers willing to work exceeds their needs, involuntary unemployment occurs.

Figure 4: Voluntary unemployment



Source: own composition

In general, the criteria for distinguishing the types of unemployment are the reason of its appearance and duration:

- Frictional unemployment is inherently an inevitable phenomenon because it is related to the interruption of employment when workers move from one workplace to another for various reasons. Finding a new place to work usually takes some time, and sometimes requires moving to a new residence. In the economy, there will always be a certain number of workers temporarily out of work when transitioning to another job. Usually, the sign of frictional unemployment is that workers should receive sufficient education and training to find a new job.

- Structural unemployment is caused by the mismatch between labour force structure dynamics and working places structure. Technological progress is leading to changes in the work structure and requirements for worker qualifications and education. Generally, the

vocational qualification and geographic structure of the labour force cannot be changed simultaneously with the change of the working places structure. Consequently, there are always workers in the economy who have lost their jobs due to a decline in skill levels as a result of the introduction of new technologies or industry shifts. In general, structural unemployment means that workers are unemployed for long periods of time, requiring additional training, retraining or relocation. (Roik, 2012, p. 111)

Structural and frictional unemployment determines its natural level. In other words, frictional unemployment and structural unemployment constitute natural unemployment. Obviously, forms of unemployment such as frictional and structural unemployment cannot be eliminated, which is natural for a dynamically developing economy. Therefore, the characteristic of full employment is natural unemployment.

Natural unemployment reflects the equilibrium state in the labour market with absolute employment, in this case the number of people looking for work is equal to the current vacancies. If the unemployment rate exceeds the natural one, the balance in the labour market is disturbed, cyclical unemployed appear who want to work, but do not find a place due to a decrease in demand for workers during periods of production decline. In this case cyclical unemployment takes place.

–Cyclical, conjunctive or demand-deficit unemployment as a consequence of the decline in production reaches its maximum during the transition period. Cyclical unemployment is caused by the decline in the production cycle. The decline in this stage of the economic cycle is characterized by insufficiency of overall costs. When the total demand for goods and services decreases, employment opportunities decrease, and the unemployment rate rises. A recession is a cyclical decline in business activity that causes people to lose their jobs places till that period, when demand picks up and business picks up. Therefore, overall, the overall level of unemployment may exceed its natural level (the state of the labour market, in which there is a rough balance between the number of vacancies and the number of skilled workers seeking jobs). (Joens, 2014, p.70)

Seasonal is a forced (unnatural) form of unemployment in certain industries. This type of unemployment is typical for the tourism business, agriculture and the construction industry. It is associated with natural factors and uneven production volumes in different periods of time and is easily predictable due to its cyclical nature. Seasonal unemployment belongs to the category of predictable, but not amenable to adjustment towards a decrease in the parameter characterizing it. (Roik, 2012, p. 118)

Cyclical and seasonal unemployment have similarity, since the reasons for its occurrence in both situations are the same and are associated with the variability of demand for labour over a certain time period. The seasonal phenomenon can be predicted with great accuracy, however, in order to predict cyclical unemployment, it is necessary to constantly monitor the values of economic indicators in order to assess the general situation in the country and the demand for activities by its representatives.

Regional unemployment is a specific type for the Russian Federation due to the regional structure of the country.

–Regional unemployment is a form of unemployment associated with a mismatch between the demand and supply of labour in a given region due to the uneven socio-economic development of certain territories (labour surplus regions). (Roik, 2012, p. 127)

As of February 2020, the level of carelessness in Russia is 4.6%, but if this indicator considered by subjects (regions), it varies from 1.5% to 26%. Such a large difference between the highest and lowest values of the unemployment rate indicates the uneven distribution of labour across regions. Therefore, regional unemployment is one of the most important areas of the state's regional policy.

Russia still has a specific labour market, and unemployment data do not always reflect the real picture. In contrast to Western countries, such a phenomenon as "hidden unemployment" is widespread in the Russian Federation, when a person did not formally quit, but he or she is only registered, but does not work and does not receive wages, or even worse - works, but does not receive wages.

–Hidden unemployment in the Russian context refers to workers who have not formally interrupted the labour-management relationship and are regarded as employed, have no job, no salary or work part-time job (few days, weeks). In international practice, this situation is called "underemployment", and the hidden unemployment is people who do not belong to the economically active population at a given time but want to be if the offered job is appropriate for them. (Kapelushnikov, 2013, p. 28)

Until March 2020, with an overall low unemployment rate in the regions, the unemployment data differed several times.

Thus, the lowest unemployment rate was in Moscow (1.5%), Yamalo-Nenets Autonomous District (1.8%) and the highest in the republics of the North Caucasus Federal District - 26.3% in Ingushetia, more than 13% in Chechen republic, Dagestan, North Ossetia - Alania.

3.2.2 Causes of unemployment in Russia Federation

Modern unemployment in the Russian Federation is a phenomenon generated by the stage of development in the process of establishing market relations. Despite the specifics and peculiarities of Russian unemployment, it has features that are characteristic of all countries. The attitude to unemployment as a socio-economic criterion of the state of society has changed over time, but the damage caused by unemployment entails a significant lag in the country's economic development.

There is no uniform point of view among economists on the causes of unemployment. The following main reasons for unemployment can be identified:

- surplus population (in general, the world economy is surplus to labour, and the rapid growth of population contributes to this);
- the establishment of wage rates above the equilibrium level under the pressure of the actions of trade unions and the socio-economic activity of the population;
- the displacement of labour by capital in the era of the scientific and technological revolution;
- the presence of monopsony in the labour market (monopsony enterprises dictate the terms of wages and underestimate the amount of employment);
- low effective demand (the lack of demand for goods and services reduces the demand for labour, since the demand for labour is of a derivative nature, and as a result, unemployment arises). (Korovkin and Polezhaev, 2003, p. 61)

There are also a number of reasons for the occurrence of frictional unemployment:

- geographical displacement of the population: a person moves to a new place and may be unemployed at the time of the move and for some time before and after the move;
- change of professional interests, retraining, retraining;
- the onset of new stages in a person's personal life: study, the birth of children, etc.

The causes of structural unemployment arise as a result of technological progress, reducing the demand for workers in some professions and increasing the demand for workers in other professions.

The reasons for hidden unemployment at Russian enterprises can be divided into two groups: the reasons why the heads of firms do not go to mass layoffs of workers, and the

reasons why workers themselves do not leave their enterprises, although earnings often barely reach the subsistence level; and wages are delayed for months. (Kapelushnikov, 2013, p. 29)

The first group of reasons for the persistence of hidden unemployment includes the following points. First, even in the context of a drop in production, company managers are trying to retain staff for the future by introducing part-time employment, paid (and unpaid) vacations. Secondly, the retention of personnel allows us to hope for financial support from the state. Thirdly, firms often simply do not have the funds to pay redundant workers benefits and wages for the period of employment in accordance with labour legislation. Therefore, layoffs occur, as a rule, with the stamp "of their own free will," provoked by ever worsening working conditions and low wages. (Korovkin, 2014, p. 120)

The second group of reasons for the persistence of hidden unemployment is associated with the reluctance of workers to leave their previous jobs, even despite the miserable wages. Firstly, in small settlements people simply have no other opportunity to find work. Secondly, for the older age group of the able-bodied population, it is very important to have continuous work experience in order to receive pensions. Third, unemployment benefits, even if they can be obtained, do not compensate for the loss in wages. Fourthly, in the minds of workers, such a factor as employment stability very often prevails. Despite the fact that many people earn extra money in the shadow economy, as well as in personal subsidiary farming, they do not lose touch with their main place of work, voluntarily preferring part-time employment. (Korovkin, 2014, p. 121)

Thus, in contrast to economically developed countries, the persistence of hidden unemployment in Russia is associated not with the active regulatory position of the state and trade unions, but rather with the absence of such against the background of a crisis in production.

All these reasons, one way or another, cause unemployment or contribute to its further development. The uncontrolled development of this phenomenon can have serious macroeconomic consequences.

3.2.3 Socio-economic consequences of unemployment in Russia Federation

All these reasons, one way or another, cause unemployment or contribute to its further development. Uncontrolled development - This phenomenon can have serious macroeconomic consequences.

As a result of high unemployment, incomes of the population fall, that is, effective demand falls. The fall in incomes of the population due to unemployment causes a reduction in real savings. Since savings are a source of investment, the government receives less tax revenues to the budget.

The burden of unemployment affects different social groups to varying degrees.

In addition, it must be remembered that unemployment is not just an economic, but a socio-economic phenomenon. The social costs of unemployment include:

- an increase in social pessimism;
- an increase in psychological tension;
- an increase in bursts of social activity (strikes, rallies, mass demonstrations);
- an increase in crime. (Kochergin 2019, p. 46)

In conditions of unemployment, the state is faced with the need to solve a complex task aimed at resolving a number of socio-economic problems.

Registration of the unemployed in Russia is carried out in two ways: on the basis of appeals to the employment service, and according to the population survey on employment problems, which is carried out in the amount of 0.06% of the population. On a quarterly basis, 65 thousand people aged 15-72 years old are surveyed in Russia as a whole, in an annual volume - about 260 thousand people.

According to Rosstat, the unemployment rate since 2020, over the past 10 years, has fluctuated from 5.3% in 2019 to 8.2% in the crisis year of 2009, generally changing towards a decrease in unemployment.

The unemployment rate within 3% is observed only in Moscow and St. Petersburg. It is in the central part of Russia that the unemployment rate either does not exceed or slightly exceeds the national average of 5.8%. In a significant part of the territory of Russia, unemployment reaches 6-8% of the economically active population, the average value is 7%.

Another reason for this regional difference in the unemployment rate (the unemployment rate in Moscow is 18.7 times lower than in Ingushetia) is the weak regional development and distribution of finances, most of which goes to the federal budget. As a result, the regions do not have sufficient funds to invest in infrastructure development and the creation of new jobs. This is especially true for the republics of the North Caucasus with a high proportion of young people in the population structure (from 20.7 to 34.8% of the population under the working age), which will soon need jobs and also for the regions of Siberia and the Far East due to the high distance and insufficient development of communications between these regions and the Central economic region of Russia. Because of these factors, the regional economy is developing at an extremely low rate. (Elkin, 2018, p. 86)

As of January 1, 2020, 3.5 thousand citizens looking for work were registered with the employment service of the Sakhalin region, of which 2060 citizens have the status of unemployed with the right to receive unemployment benefits.

The level of registered unemployment in the Sakhalin Region in relation to the number of the economically active population was 0.7%. For municipalities of the region, this indicator varies from 0.2% to 3.8%.

From January to December 2019, 22.5 thousand citizens looking for work were employed in permanent and temporary jobs, which are at the level of 2018 (74.8% of those who applied). 941 contracts were concluded with employers for the organization of temporary forms of employment, in which 10.7 thousand people participated, of which 2.7 thousand were in public works, 7.5 thousand teenagers aged 14 to 18 worked in their free time from school.

In order to adapt to the labor market and gain work experience, 442 graduates from among young people were employed, including 50 - aged 18 to 20 years with secondary vocational education, 109 - for quota jobs under the Sakhalin Oblast law "On job quotas for certain categories of youth".

387 disabled people were employed (58.2% of those who applied to the employment service), including 34 - for equipped (equipped) workplaces and 52 - for subsidized workplaces.

Assistance in organizing self-employment was received by 973 unemployed, 499 - learned how to do business in the clubs "Introduction to Entrepreneurship", 156 of them - created their own business with financial support from the regional budget.

Under the order of employers, local authorities, 1.8 thousand people were sent for vocational training and advanced training in a profession that is in demand in the labor market, including 1.4 thousand unemployed, 147 women during parental leave under three years, 120 citizens of retirement age, 85 participants in the compatriots resettlement subprogram.

A set of measures is being taken to develop a vocational guidance environment in the Sakhalin Oblast. 32.2 thousand unemployed, unemployed citizens, general education students received vocational guidance services. 2.5 thousand unemployed citizens received psychological support and social adaptation.

The unemployment problem is aggravated by the difficult financial situation, which pushes housewives, pensioners and students to look for work.

The increase in the number of unemployed will be the presence of the following factors:

- suppression of unemployment (early departure for retirement of 58 men, 53 women);
- partial involuntary unemployment (shorter working hours, shorter working weeks, lengthening holidays);
- conditional unemployment (intermittent work);
- temporary unemployment (maternity leave, child care, for disabled children, seriously ill and elderly people, leave without pay);
- potential unemployment (due to disability);
- structural unemployment (reorientation, closure, bankruptcy);
- unemployment of young people (graduates of schools, vocational schools, technical schools, universities);
- unemployment of young people expelled from educational institutions or graduated of their own free will;
- unemployment of insufficient professional qualifications;
- subjective unemployment, refusal or inability to retrain and get another profession;
- unemployment of forced migration (refugees);
- unemployment returning from places of imprisonment;
- unemployment of those who, after a long break, want to resume work;

–unemployment in catastrophic disasters and extreme situations (accidents, earthquakes, floods, destruction of enterprises and institutions as a result of explosions or hostilities). (Zhuravleva, 2011, p. 164)

Not all the real reasons for the emergence of unemployment and acceleration of its dynamics in growth have been identified above.

Unrecorded refers to several population groups. As in every state, in Russia there is a certain part of the population that does not want to work. This group is a permanent dependent of the state; it will not go to the labor exchange and will not be registered as unemployed. Nevertheless, this system of people is achieved, reaching according to some estimates several million people, without putting pressure on the labor market, nevertheless, the system of pressure on the budget is effective, especially when the law on poverty benefits is used. The second group is directly or indirectly connected with the criminal world. As the state is fighting crime, people belonging to criminal groups will join the ranks of the unemployed. The third group consists of people who are wealthy, but officially do not work anywhere, and are also formally unemployed.

4 Practical Part

4.1 Dynamics of unemployment by selected parameters

The topic of unemployment is somehow quite relevant for most people, since even being employed at the moment, they cannot be insured against losing their jobs and changing their status. Unemployment is one of the most important macroeconomic problems, the solution of which ensures not only economic, but also social stability in society. In turn, the state of the labor market and the sectoral structure of the national economy are very strongly interrelated phenomena, since it is structural changes in the economy that often cause the release of labor and an increase in unemployment, which will only increase in the age of high technologies and robotization. At the same time, the problem of increasing employment and the quality of the labor force is a permanently urgent problem of state regulation.

In recent years, one of the main problems in the global economy is unemployment, which in developed countries ranges from 4% to 10% (in the United Kingdom – 3.75 %, in the USA – 3.67%, in France – 8.44 %) and in Russia 7 % (over the past 10 years). As of December 2019, the unemployment rate in the Russian Federation is 4.5 % comparable to that of developed countries and amounts to 4.5% (% of total labor force).

In this paragraph, an attempt is made to study the state of the labor market in the Russian Federation and analyze this unemployment in terms of the reasons for its occurrence, types and trends of its dynamics since 2005. Table 2 presents statistical information on changes in the unemployment rate as the ratio of the labor force and the number of unemployed.

Table 2: Indicator of change in the number of unemployed population in the Russian Federation in %

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Unemployment rate, %	8.3	7.3	6.5	5.5	5.5	5.2	5.6	5.5	5.2	4.8	4.6	4.6

Source: Federal State Statistics Service.

The data presented in the table indicate that the unemployment rate since 2009 has tended to decline throughout the study period. Unemployment reached its highest value in 2015, when the Russian economy was subjected to sanctions.

The study of the causes of unemployment allowed us to come to the conclusion that the most frequent cause of its occurrence was fluctuations in energy prices, in particular, oil, which, as you know, is the country's main export commodity and, in addition, oil revenues are the main source of formation of the state budget of the Russian Federation.

Another reason for unemployment is a change in the sectoral structure of the economy and an increase in the level of technological equipment of the production process, automation and robotization.

An equally important issue in solving the problem of employment is the objectivity and reliability of statistical information on the state of the labor market, namely, to what extent the real situation is reflected in statistical data.

First of all, it's should be noted that not all unemployed seek to register with the employment service, since excessive bureaucratic delays reduce the economic interest of the unemployed population in registering and issuing social benefits, the amount of which often does not cover the costs associated with its registration and receipt.

The study of such an indicator as the share of registered unemployed in the total number of unemployed in dynamics allowed us to come to reasoned conclusions. (Table 3)

Table 3 :The statistic of unemployment and registered unemployment in thouthands people

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
The number of unemployed aged 15-72, thousand people	6 284	5 544	4 922	4 131	4 137	3 889	4 264	4 243	3 967	3 657	3 581	3 461
The number of unemployed registered with the employment service, thousand people	1 426	1 914	1 417	1 110	925	820	784	875	761	660	632	554
The ratio of the number of unemployed in the employment	22.7	34.5	28.8	26.9	22.4	22.7	21.1	20.6	19.2	19.5	18.1	16.1

service to the total number of unemployed, %												
--	--	--	--	--	--	--	--	--	--	--	--	--

Source: Federal State Statistics Service, own calculation

According to the presented statistical indicators, for the period from 2009 to 2020, the number of unemployed decreased by 2 828 thousand people, or 45 %. And the number of unemployed registered in the state employment service decreased by 872 thousand people. This trend finds its logical explanation, as mentioned above, in the excessive bureaucratization of the registration procedure and low economic interest in receiving unemployment payments, the average value of which ranges from 4.5 to 8.5 thousand rubles, with the officially established the amount of remuneration of 12 130 rubles.

When studying the problem of unemployment and its economic costs, researchers pay attention to such an indicator as the economically potential labor force, which means people who are not currently employed, with a high interest in getting a job with decent wages, but limited by certain circumstances and not having the ability to start working immediately.

In this case, unemployment is considered as the ratio of the sum of the number of unemployed to the number of potential labor force, calculated as a percentage. (Table 4)

Table 4: Population structure by level of participation in the labor force in 2019

Indicator	Total	Men	Women
Labor force population, thousand people	75 225.7	38 692.5	36 533.2
- employed	71 764.6	36 848.4	34 916.2
- unemployed	3 461,1	1 844.1	1 617
Persons outside the labor force, thousand people	37 638.2	13 974.7	23 663.6
- of which potential labor force	1 346.4	597.7	748.7
Participation rate of labor force, %	66.7	73.5	60.7
Employment rate, %	63.6	69.9	58.0
Total unemployment and potential labor force, %	6.4	6.3	6.5

Source: Federal State Statistics Service, own calculations, 2020

The number of able-bodied men is higher than that of women, which is typical for Russia. At the same time, persons who are not part of the labor force are higher among the

female half of the population. This is due to the fact that it is more difficult for women to get a job, both after university, after a degree, and at retirement age.

The overall unemployment rate is generally almost the same. If we take it as a percentage, then the unemployment of men and women is very similar and every year it is leveled more and more. Over the years, women are allowed to occupy men's positions, they are also considered for leadership positions, which was not yet literally in the last century.

An equally important problem is the study of unemployment from the point of view of various grounds and research criteria. Initially, it is necessary to study the indicators of unemployed men and women in dynamics from 2009 to 2020. (Table 5).

Table 5: Gender composition of the unemployed in the Russian Federation

Indicator	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of unemployed												
-thousand people	6 284	5 544	4 922	4 131	4 137	3 889	4 264	4 249	3 967	3 657	3 461	3 464
- %	100	100	100	100	100	100	100	100	100	100	100	100
Men												
-thousand people	3 227	3 034	2 711	2 365	2 315	2 123	2 296	2 269	2 102	1 915	1 844	1 851
-%	51.4	54.7	55.1	57.3	56.0	54.6	53.8	53.8	53.0	53.0	53.3	53.4
Women												
-thousand people	3 057	2 510	2 211	1 766	1 772	1 766	1 968	1 975	1 865	1 742	1 617	1 613
-%	48.6	45.3	44.9	42.7	44.0	45.4	46.2	46.2	47.0	47.0	46.7	46.6

Source: Federal State Statistics Service, own calculations, 2020

If to analyzed the process of unemployment from a gender point of view, then the variation is quite small and, in general, the ratio of the number of unemployed among men and women does not differ much. But it will be fair to say that the unemployment rate among men is slightly higher, which is explained by the fact that the female sex has physiological reasons to be temporarily unemployed while on maternity leave.

Gender characteristics make its own influences in the nature of such a phenomenon as unemployment, in particular, such a qualitative parameter as the ability to quickly find a

job. As practice shows, it is somewhat easier for a man to do this, which is relative gender discrimination, which necessitates the female sex to be more closely tied to work. Continuing the analysis of employment opportunities in terms of social status, it is also difficult to find work for full-time students, retirees, and residents of rural areas. (Table 5).

Table 6: The number of unemployed according to the most vulnerable criteria of citizens in thousand people

Indicator	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
The number of unemployed aged 15–72 years	6 284	5 544	4 922	4 131	4 137	3 889	4 264	4 243	3 967	3 657	3 461
Students, pensioners	645	683	619	604	582	561	599	579	617	511	509
Women	3 057	2 510	2 211	1 766	1 772	1 766	1 968	1 975	1 865	1 617	1 493
People living in rural areas	1 881	1 947	1 806	1 693	1 533	1 408	1 438	1 438	1 426	1 402	1 387

Source: Federal State Statistics Service, own calculations, 2020

The social status of the unemployed also influences employment opportunities. In particular, at present, students and people of pre-retirement age have much more job opportunities. This is due to the opportunities for part-time employment and work on remote conditions. However, as practice shows, social tension among the designated groups of the population is increasing every year, which justifies the objective need for more active government intervention in the process of regulating the labor market.

The state employment policy in the context of Russian realities should be more active and, in our opinion, unambiguously targeted. If we analyze its results from the period of radical reform of economic relations, then it can be noted that, in general, there was an urgent need to take into account the sectoral nature of unemployment and implement a macroeconomic stabilization policy in this direction. In particular, rural unemployment has long been one of the most pressing problems of the labor market. According to statistics from the 1990s to the early 2000s, the unemployment situation was a direct reflection of the state of the agricultural economy in the Russian Federation. At the same time, the proper policy of the state had its results by the beginning of the 2000s. the number of unemployed rural residents has tripled. Since 2014, the unemployed population in rural areas has been approximately at the same level, and compared to 2009, its number has decreased by 26,3% at 2019.

In 2019, among young people aged 15-24, 860.8 thousand people were unemployed. And their share in the total number of unemployed was 24.5 % (Table 7).

In the youth group, the highest rates are at the age of 15-19, and in percentage terms it is almost 20%. This is explained, firstly, by the lack of prior work experience among urban youth, and by the lack of jobs for this age of the workforce among youth in rural areas. In principle, we can identify such a pattern as the older the age, the lower the unemployment rates, but this is typical only up to the pre-retirement age.

Table 7: Structure of the unemployed population depending on age in %

Indicator	Total	Including ages, years										
		15-19	20-24	25-29	30-39	40-44	45-49	50-54	55-59	60-64	65-72	
Unemployment, Total												
2015	100	4.7	19.8	16.1	23.0	8.8	8.1	10.4	6.4	2.2	0.6	
2016	100	4.2	19.1	16.5	24.0	9.0	7.9	9.8	6.4	2.4	0.7	
2017	100	3.8	17.9	16.4	23.8	9.3	8.4	9.4	7.4	3.4	0.1	
2018	100	3.9	18.5	16.2	24.7	9.5	8.4	8.7	6.7	2.5	1.0	
2019	100	3.4	18.3	15.4	23.7	9.5	8.6	8.9	8.6	2.5	1.0	
Men												
2015	100	4.6	19.9	16.0	22.2	8.8	7.8	10.4	7.7	2.0	0.5	
2016	100	4.5	19.4	15.8	23.2	9.1	7.7	9.5	7.9	2.4	0.6	
2017	100	3.9	18.5	15.7	22.8	9.5	8.0	9.4	8.8	3.3	0.1	
2018	100	3.9	19.1	15.8	23.6	9.1	8.0	8.9	8.4	2.4	0.7	
2019	100	3.2	17.9	15.1	23.4	9.3	8.4	8.7	8.4	2.2	1.0	
Women												
2015	100	4.7	19.6	16.3	23.9	8.7	8.4	10.5	4.9	2.3	0.7	
2016	100	3.9	18.7	17.4	24.8	8.9	8.2	10.3	4.6	2.4	0.8	
2017	100	3.7	17.2	17.3	25.0	9.0	8.9	9.3	5.8	3.4	0.2	
2018	100	3.8	17.8	16.3	26.1	9.8	8.7	8.6	5.2	2.6	1.2	
2019	100	3.3	18.4	15.6	23.9	9.5	8.6	8.9	8.5	2.3	1.0	

Source: Federal State Statistics Service, own calculations, 2020

No less interesting is the question of the age of the unemployed, who most actively apply to employment services and undergo state registration. As a rule, this is the population aged 20-40 years. Skilled employment services are a small number of citizens, and services are mainly for training and retraining.

Thus, summarizing the study, we can conclude that unemployment in the current Russian practice conditions demonstrates a gradual decrease and for this period it is less in comparison with the values of unemployment in countries far and near abroad policy, which indicates the effectiveness of the employment and macroeconomic stability in general.

4.2 Brief overview of the main influencing factors on unemployment in Russia Federation

The majority of modern scientists (Elkin, 2008; Zhuravleva, 2001) in their studies distinguish three groups of factors influencing unemployment, which act respectively at the macro-, meso- (regional) and micro-levels. A characteristic feature of the Russian Federation is the regional division of the territory. It should be noted that a distinctive feature of the meso-level (regional) is that most of the factors operating at this level are factors of the macro-environment (macro-level).

Thus, at the macro level, Russian economists distinguish six main groups of factors influencing the labour market:

1) demographic factors, which include migration processes, the existing type of population reproduction, natural growth, birth and death rates, the level of urbanization, i.e. the ratio of rural and urban residents, gender and age structure of the population;

2) economic factors. This group of factors includes inflationary processes, the investment activity, pricing policy, changes in the economic structure, as well as the formation of the B2C (consumer) market;

3) social factors affecting the income of the population, social infrastructure, the level of social security and social protection;

4) organizational and technical factors that serve as an indicator of the development of the material and technical base of the organization, identify the existing level of labour organization and management at the enterprise, show the quality of the employment service of both state and non-state services that solve problems of employment and retraining of personnel;

5) national and ethnic. The study of this group of factors shows the structure of the population, its homogeneity, i.e. division of the population by ethnicity, as well as the ratio of national groups and their distribution over the territory of the state;

6) administrative and legal factors that help to identify the degree of development of the current legislative framework, especially the laws and regulations governing labour relations (labour regime, regulations, dismissal, discipline). (Zhuravleva, 2001)

At the same time, in addition to macro factors, a significant influence is exerted by the geographical location, the sectoral structure of the economy, natural and climatic conditions, the degree of development of economic sectors, and the investment policy of the region.

The migration growth of population, urbanization level, real wages, inflation and investment activity as quantitative indicators were chosen as the main macroeconomic indicators that affect the dynamics and development of unemployment.

4.2.1 The migration growth of population as influencing factor

The migration phenomenon is one of the key concepts of the demographic process, since the functioning of the state is directly dependent on this action. Migration affects the population of the state, determining its economic situation.

The concept of migration growth is indicated in the form of a difference between those who come to any country (area, territory) for permanent residence, and those who irrevocably leaves her. Formula for calculation of migration growth:

$$MG = A - R,$$

where MG – migration growth, A – arrived, R – retired.

Migration can be considered as one of the factors that significantly affect the unemployment rate. It is represented by both: the outflow of highly qualified specialists from Russia (mainly in the field of science in the region) and the entry into Russia of workers from the CIS countries, Turkey and other neighboring states (their share is especially significant in the construction).

The migration growth is calculated to assess the results of migration movement in a certain territory (Table 8). It is the difference between the number of people who arrived in a given territory and the number of people who left it for a certain period n industry and in the service sector. (Everett, 1996)

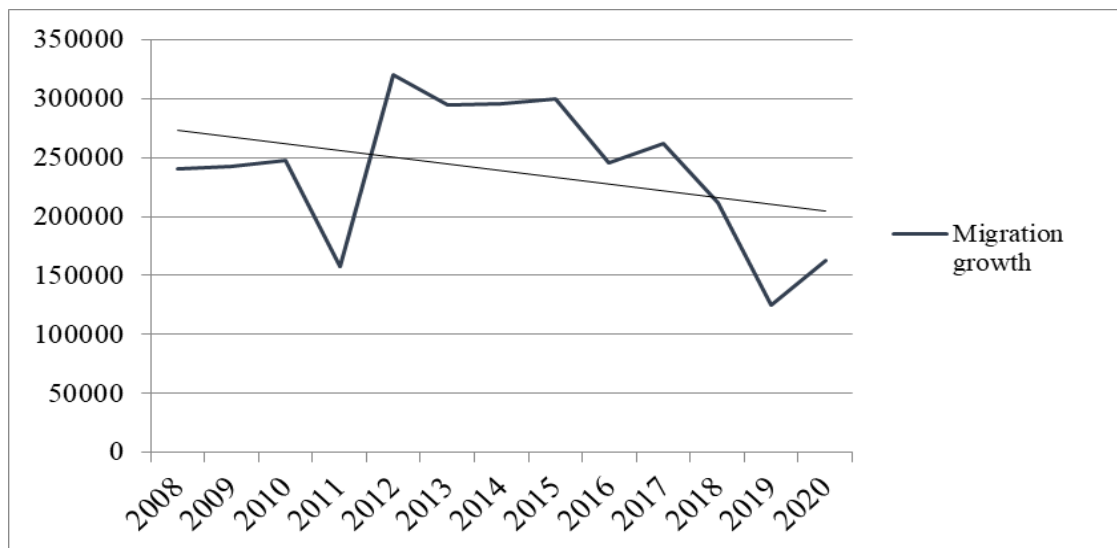
Table 8: Dynamic of arrived, retired population and migration growth in years 2008-2020, people

Years	Arrived	Retired	Migration growth
2008	2 284 936	2 044 993	239 943
2009	2 294 862	1 973 839	321 023
2010	2 030 203	1 740 149	290 054
2011	2 199 923	1 944 226	255 697
2012	3 311 858	3 095 294	216 564
2013	4 120 911	3 901 213	219 698
2014	4 402 334	4 201 002	201 332
2015	4 592 602	4 363 437	229 165
2016	4 706 701	4 489 139	217 562
2017	4 647 627	4 444 463	203 164
2018	4 740 169	4 561 622	178 547
2019	4 942 333	4 786 712	155 621
2020	5 036 081	4 839 848	196 233

Source: Federal State Statistics Service, own calculations, 2020

Thus, there is an increase in the number of migrants (arrived) in Russian Federation. In the dynamics from 2008 to 2020 (Figure 5) there has been a decrease in migration as you can see at trend line. The decrease started at 2009 after world crises. In 2012 and 2014 there were upward jumps, but since 2015 there has been a decline. It could be mentioned that in 2019 the migration highly rose due to Covid-19 situation in country.

Figure 5: Dynamic of migration growth in years 2008-2020, people



Source: Federal State Statistics Service

According to the data provided, it can be concluded that the number of international migrants tends to increase. In the period from 2008 to 2020, the number of migrants to Russia decreased from 239 943 to 196 233 people. It is noticeable that the indicator of migration growth in 2018 has decreased. For example, in 2018 it was equal to 178 547 people, in 2019 – 155 621 people. The main reasons for this phenomenon should be considered a reduction in the flow from Ukraine (13,776 people in 2019, against 178,274 in 2018) and a massive return of Ukrainians from Russia (122,954 people in 2019, against 59,455 in 2018).

The data are averaged over Russia, from which we can conclude that although the inflow of international migration is decreasing, but the number is declining at a moderate pace, there are no jumps. This indicates that the state is able to regulate the inflows and the number of migrants, which is undoubtedly a positive trend and does not pose a particular threat to the population. Also, based on the statistics and the presented graph, it can be argued that if the state is able to regulate the inflows and the level of international migration, then the local population is sufficiently protected from replacing them with labor migrants, there is no competition between labor migrants and the local population, or it is not so significant. The analysis of migration dynamic includes information and data from World Migration Report 2020.

The economic situation in Russia during the crisis, the degradation of the social living conditions of the population in the country, the decline in the prestige of a number of professions - all this is the reason for the emigration of people, as a result of which there is a “brain drain”. The population and the number of able-bodied people is increasing due to the counter flow of immigrants who come to Russia to work in those regions where there is unemployment due to a lack of labor resources, and not due to a lack of jobs.

So, population migrations are one of the reasons for frictional unemployment, and an increase in migration gain (migration gain is the difference between the number of people who arrived in the territory of the subject and the number of people who left it for a certain period, per thousand people) reduces the unemployment rate.

4.2.2 Brief overview of the average monthly real wage of population as influencing factor

Also, from the influencing factors, it is possible to assess the dynamic of average month real wages processes in Table 9. So, the reason for the existence of unemployment is the unwillingness of workers to work for the offered wage rate. The level of wages is inversely related to the level of unemployment, that is, with an increase in wages, the unemployment rate decreases.

The average monthly real wage is increasing annually. Its volume increased by 30 577 rubles, which is 76.8% in percentage terms for the period 2009-2019. Such increase can be defined as significant, but it is necessary to take into account the inflation of the ruble and the fall in oil prices, which has a strong impact on the value of the ruble. The average monthly real wage is calculated on the base of year 2010.

Table 9: Dynamic of average monthly real wage of population (rubles) and growth rate (%) in years 2008-2019

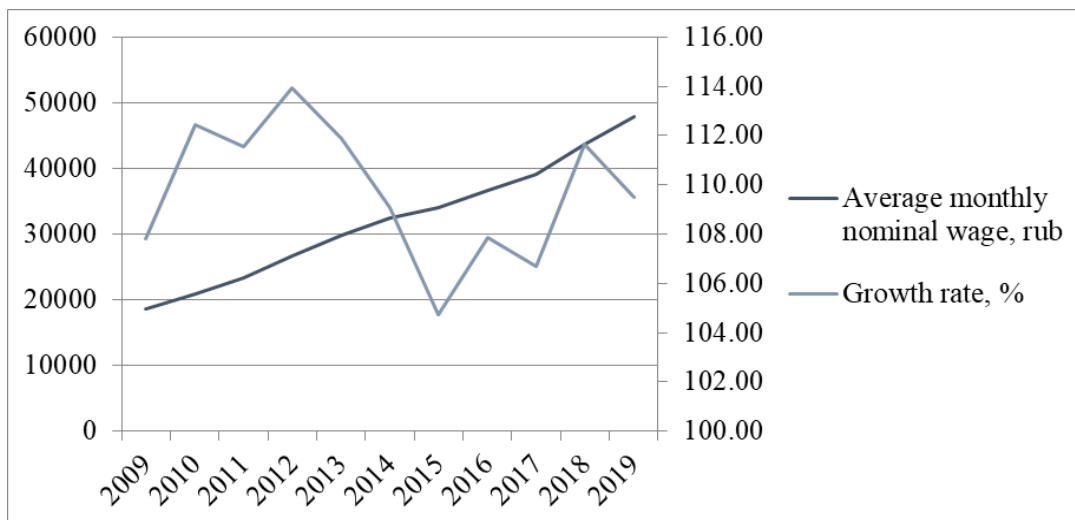
Year	Real wage, rub.	Growth rate, %
2008	16 426	-
2009	17 706	107.80
2010	19 904	112.42
2011	22 201	111.54
2012	25 298	113.95
2013	28 302	111.88
2014	30 870	109.07
2015	32 282	104.57
2016	34 874	108.03
2017	37 209	106.70
2018	41 538	111.63
2019	41 747	100.50

Source: Federal State Statistics Service, own calculations, 2020

Due to the socio-economic differentiation of the subjects of the Russian Federation, it is logical to assume that at the regional level, new specific features of the relationship between real wage, unemployment, and inflation, as well as factors that determine the

dynamics of the studied indicators, appear. However, the annual increase rate is not so stable as shown in the Figure 6.

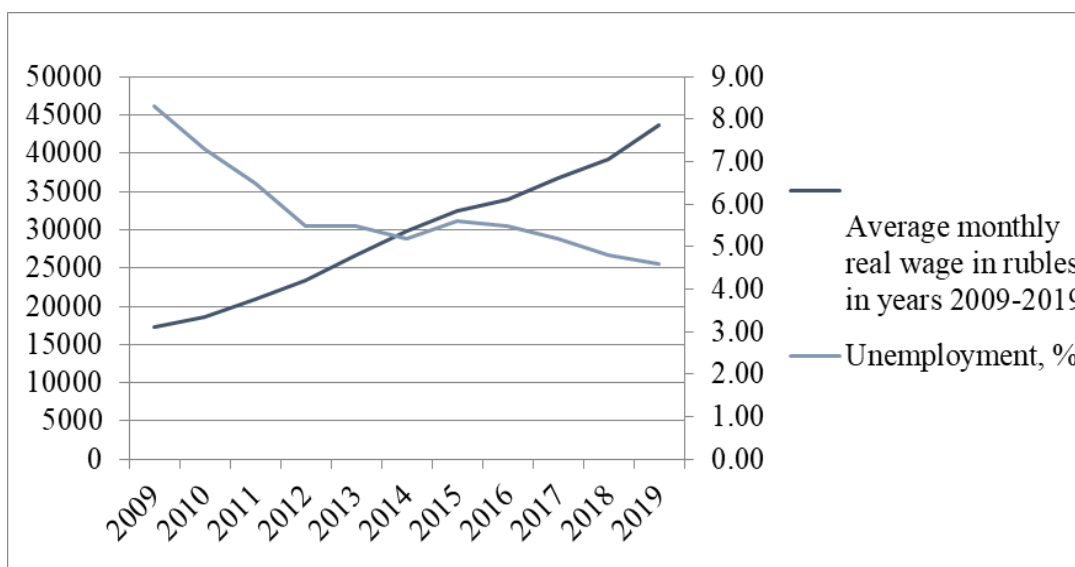
Figure 6: Dynamic of average monthly real wage (rubles) and a growth rate (%) in years 2009-2019



Source: own calculations, Federal State Statistics Service

The highest growth was in 2012, when the growth rate was 113.95. The next three years, there has been a low increase in the average monthly real wage rate during the internal crisis of the Russian Federation. The lowest growth is observed in 2015 (the year after the annexation of the Crimean Republic) equal to 4.72 %.

Figure 7: Dynamic of average monthly real wages (rubles) and unemployment (%) in years 2009-2019



Source: Federal State Statistics Service

The English economist Alban Phillips analysed the relationship between the real wage rate and unemployment in 1958 and obtained the well-known "Phillips curve". As a result, he concluded that if the demand for a product or service grows, then prices rise. Accordingly, supply also grows, which leads to an increase in employment and a decrease in unemployment. Because of this, salary rates are also rising. On the contrary, if unemployment rises, then wage rates fall. (Phillips, 1967, p. 260)

This gives us reason to analyse the influence of the dynamics of real wage rates (as a macroeconomic indicator) on the dynamics of unemployment.

The unemployment rate is greatly influenced by wage and migration growth of the population. So, depending on the change in these factors, the change in the unemployment rate will depend. Having identified the main influencing factor in the region, it is possible to create specific methods of combating unemployment. It is more expedient to define such methods for each subject specifically. Obviously, different methods are needed in different situations, so it is impossible to work out a single way to combat unemployment. If we look at the country as a whole, then in order to reduce the unemployment rate, it is necessary to increase wages and support migration within the country to regions with high unemployment.

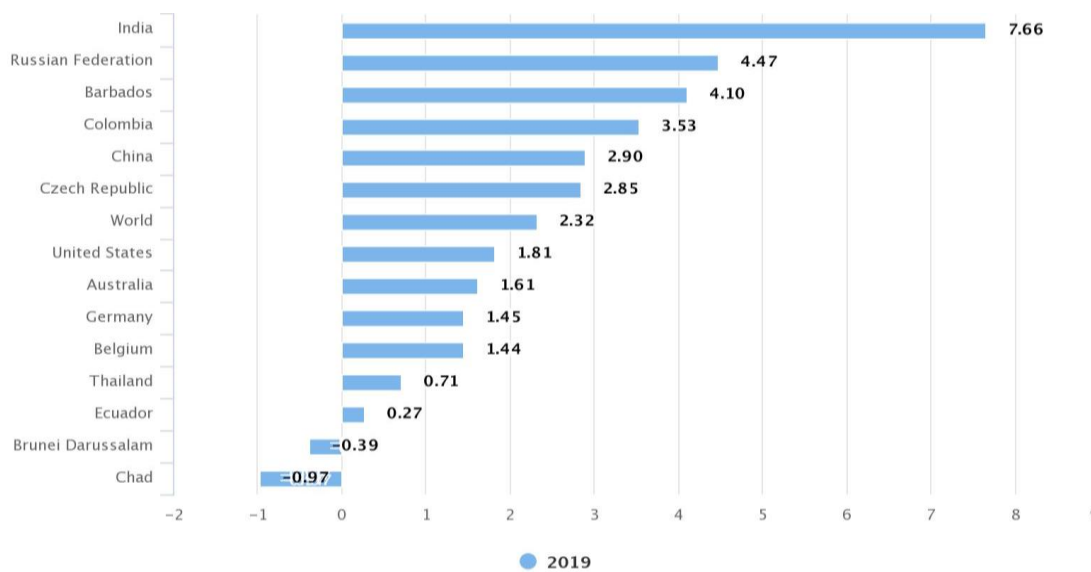
4.2.3 Brief overview of the inflation as influencing factor

The relationship between inflation and unemployment lies in the high level of unemployment, wages will be kept low, which will undoubtedly cause a slow rise in prices. According to the Phillips curve, the author found that an increase in unemployment in England of more than 2.5 - 3% led to a slow rise in prices and wages. In this case, the government is unable to use the rise in inflation (Lipsi, 1997). Later, this conclusion was theoretically substantiated by the economist R. Lipsi. A modification of the Phillips curve was developed by Solow and Samuelson, replacing the wage rate in this curve with the growth rate of commodity prices. Using this curve, the relationship between inflation and unemployment was calculated as a balance between a sufficiently high level of employment and production and the corresponding stability in the entire economy. (Samuelson and Solow, 2012, p. 93)

Inflation, as you know, is an indicator that reflects the rise in prices for goods and services in a particular country. As of the end of 2018, the country with the highest

inflation rate in the world were South Sudan and Venezuela with inflation around 477 % in annually. For example, in economically successful countries this indicator fluctuates in the region of 1.5 - 2.5%. By the way, there are countries where there is practically no inflation (Ecuador - 0.68%, Thailand - 0.54%, Brunei - 0.5%), and moreover, there is even deflation (negative price growth) as shown at Figure 8.

Figure 8: Inflation in selected countries in 2019, consumer prices (annual %)

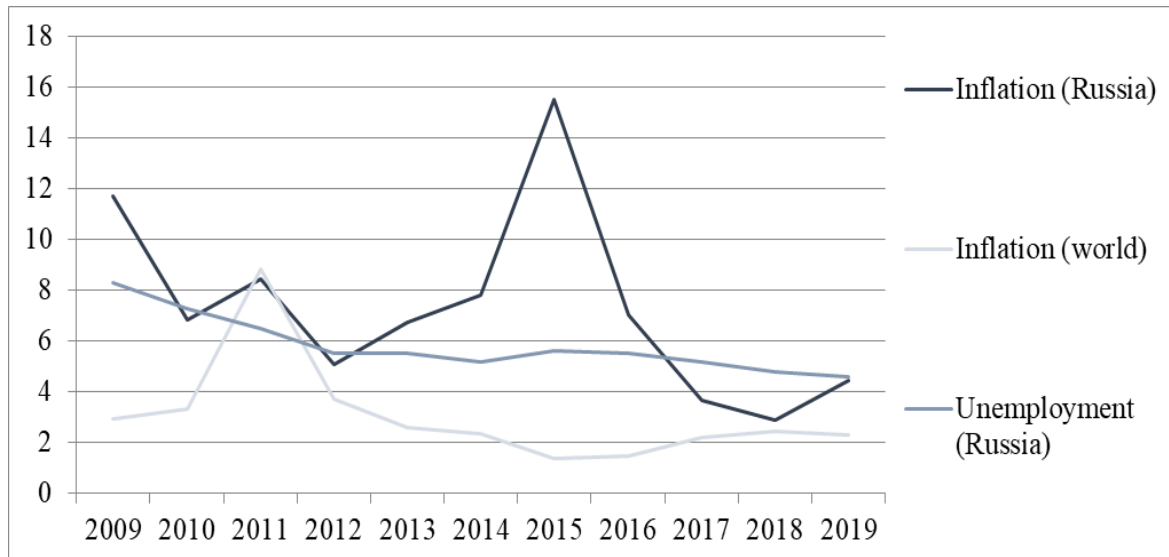


Source: World Bank

For example, in a country like Barbados, at the end of last year, it was equal to zero, and in Chad, it is generally minus (-2.35%). As for Russian Federation, the country is in 64th place in the overall rating with inflation rates around 4.47%, which is twice higher than average world inflation rate.

In general, the relationship between inflation and unemployment has an inverse relationship, that can be seen at Figure 9, but only in the short term - this means that during a rise in prices, unemployment decreases (in other words, at the stage of development of the inflationary process, employment temporarily increases), however, in the long-term time horizon, the relationship between inflation and unemployment gradually disappears. The line of unemployment in Russia is steadily declining without sharp ups and downs, which cannot be said about the inflation curve. As can be seen in the graph, two sharp increases because of internal crisis are observed during analysing period.

Figure 9: Dynamic of inflation (%) and unemployment (%) in Russian Federation in compare to average world inflation in %



Source: World Bank, Federal State Statistics Service

To conclude it can be said that the relationship between the rate of unemployment and inflation is represented by the Phillips curve. Inflation acts as a payment for low unemployment and high employment. The state, using budgets, economic policy instruments, transfers the economy to the position of the optimal inflation rate and unemployment rate.

4.2.4 Brief overview of the level of investment activity as influencing factor

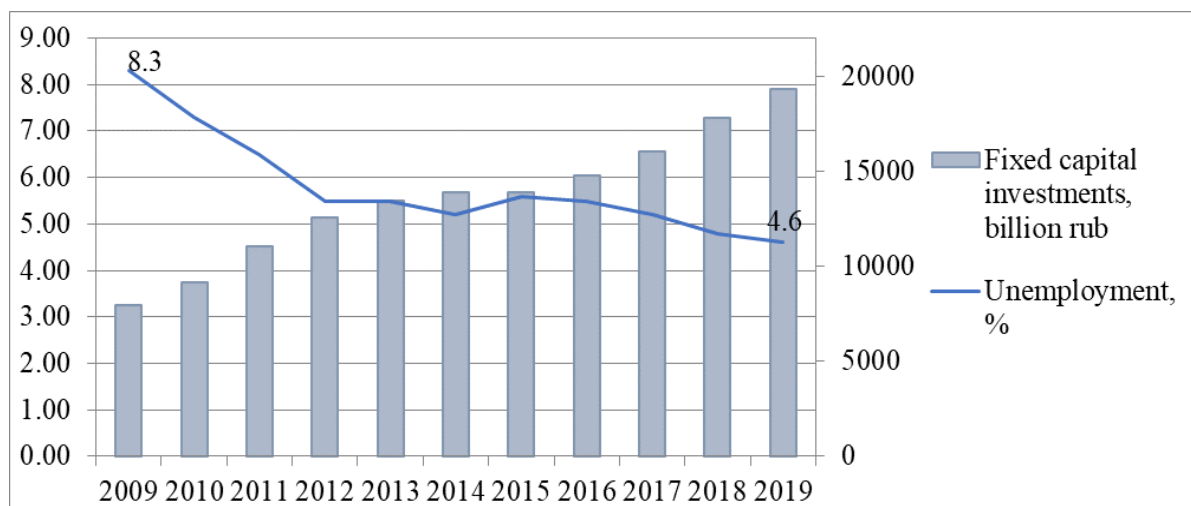
Slow economic development of the country contributes to unemployment. One of the key factors in reducing the number of unemployed is considered to be the government's measures to increase the number of jobs by opening new industries. In other words, investments in fixed assets should lead to a decrease in the number of unemployed.

Fixed capital investments are aggregate expenses that are designed to expand or update fixed assets, carry out certain construction work or do any other action. The amount of invested funds can accelerate the level and growth rate of a particular enterprise, the global situation in the industry and strengthen the country's economy as a whole. (Kalecki,

1943, p. 325) Therefore, it is necessary to study the impact of investment activity on unemployment as a macroeconomic factor.

Analyzing this indicator (Figure 10), we can note the presence of an inverse relationship, according to which with an increase in investment in fixed assets decreases unemployment. This may indicate investment in enterprises and the development of production activities and the creation of a significant number of job places, which increases employment.

Figure 10: Dynamics of investments in fixed assets (bil. rubbles) and unemployment (%) in the period 2008-2019



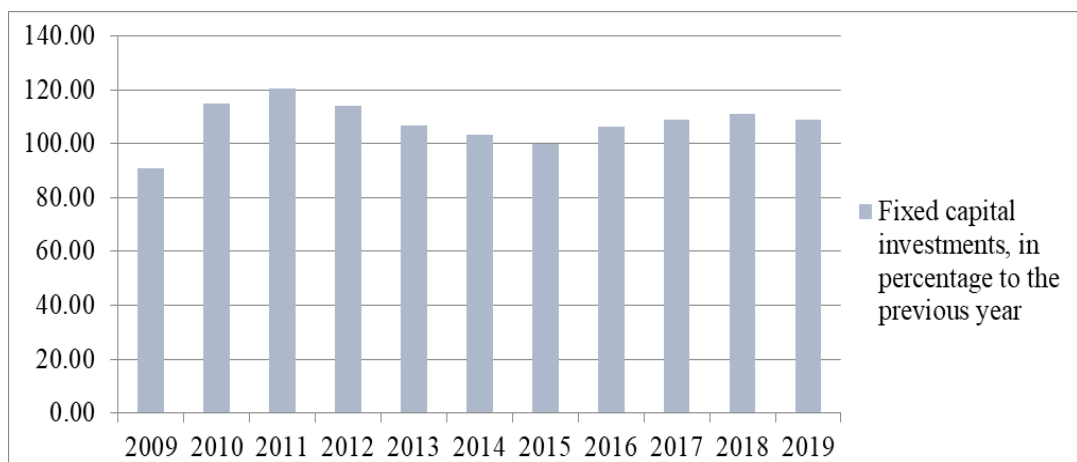
Source: Federal State Statistics Service

As it can be seen that the lowest flow of amount to fix capital was in 2009 and relatively the highest unemployment ratio (8.3 %) among analysing period of years 2009-2019. these indicators was influenced by World Crises. The opposite situation is in the year 2019 when was mentioned the lowest unemployment equals to 4.6 % according to the valued amount of fixed capital investments (19 329 bil. rub). The increase of fix capital investments is equal to 11 353 billion rub, that in percentage is 142.3. During the period of 2009-2019 the decrease in unemployment is 44.6 in percent value. The sharp increase of 68.6 % during period 2009-2014 in fixed capital investments can be connected with Olympic games in 2014 at Russian Federation, that attract a valued amount of foreign direct investments. Also, can be mentioned stagnation in years 2014-2015 of internal crises, when the fixed capital investment was around 13 billion rubbles, but situation was

stable same as unemployment ratio. At 2014-2015 the unemployment was equal to 5.2 % and 5.6 % respectively.

Considering the dynamics and structure of investments in fixed assets in Russia (Figure 11), both in the form of long-term investments and short-term investments, it is worth noting the following figures issued by the Federal State Statistics Service. In 2010, as a percentage of the previous year, this amount was 114.75%. In 2011, the amount was already 120.58%. By 2012 - 114.05%. 2013 showed a decline to 106.87%. 2014 continued to show a decline of 103.36%. But in 2016 the situation remained in the red – 99.96 %. But in 2016, the situation had changed. The growth was 106.13%. 2017 showed almost the same indicators as the previous reporting period - an increase of 108.6%. In 2010 there is a highest increase in fixed capital investments, which equal to 110.95 %

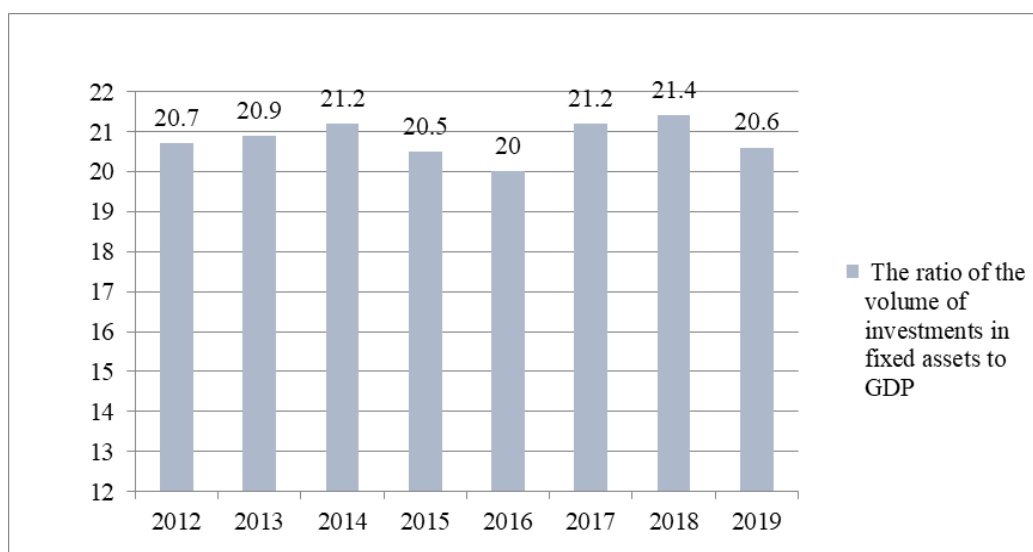
Figure 11: Dynamics of investments in fixed assets in % compared to the previous year in the period 2008-2019



Source: Federal State Statistics Service

When considering the share of investment, it is important to take into account the gross domestic product produced in the country per capita. This marker helps to assess the development of the economy in the country. So, considering the share of investment in fixed assets in relation to the state's GDP, it is worth indicating the following figures in percent. The information is given in the form of a graph for better understanding (Figure 12).

Figure 12: Dynamics of the ratio of the volume of investments in fixed assets to GDP in %



Source: own calculation

Considering this indicator, it should be noted that the state policy has no effect and does not have a significant impact in this area. But, since there is a certain economic and political instability, as well as a crisis in the financial sector at the world level, the development of the economic sector cannot be called favorable. Most likely, it is in a transitional period.

It is interesting that despite the increasing investments in fixed assets in ruble terms, in relation to GDP it grows insignificantly. There is a paradoxical situation in which investments grow rather quickly. GDP does not show such high-speed parameters. But if we compare these two parameters, then the amount invested in investment activities decreases in relation to GDP.

4.2.5 Brief overview of the degree of urbanization of the population as influencing factor

Considering the level of urbanization in Russia, it should be noted that over the past 10 years, these indicators have fluctuated around the 70% mark. This is the number of residents registered in cities of various sizes and urban-type settlements (urban-type settlements). This number alone will not be enough. After all, there are certain

characteristics of the features of the migration movement of the population of Russia. Moreover, the density in the Central region is much higher than in the Northern regions. The highest and lowest levels of urbanization are also distributed taking into account the regional factor in Russia. This is due to several points and features:

- Difficult climatic conditions in some regions of the country.
- The unevenness of infrastructure and other various benefits.
- Cultural characteristics. (Farmer, 2001, p. 180)

Analyzing Rosstat data, the dynamic of level of urbanization in the Russian Federation since 2008 showed at Table 10. Russia belongs to the countries with a high level of urbanization, which continues to increase. For 2013-2019 the share of the urban population in the total popular

tion of Russia increased by 0.6%, which is associated with “rural-urban” migrations (Table 10).

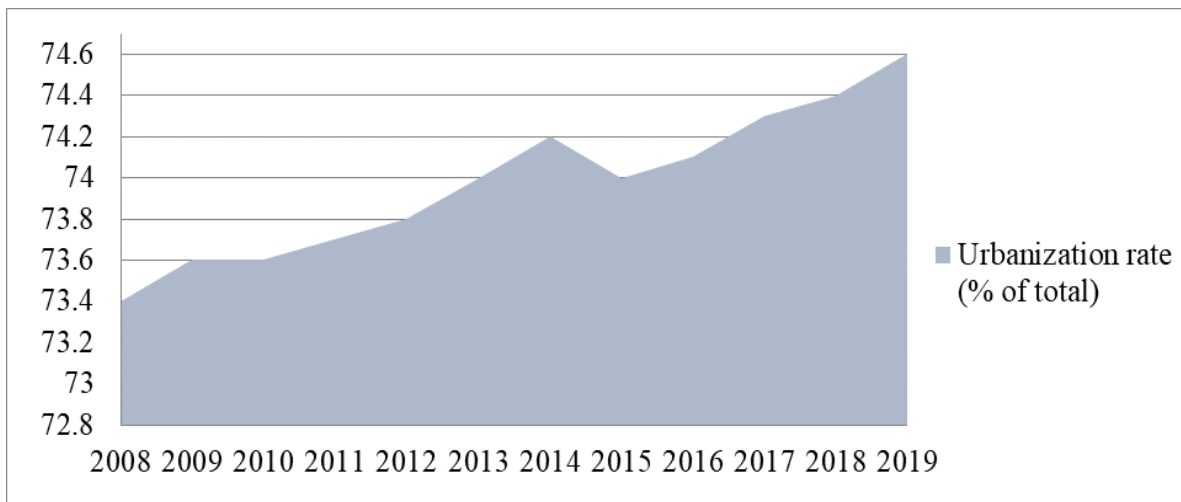
Table 10: Urbanization rate since 2008 to 2019 in % of total

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Level of urbanization, %	73.4	73.6	73.6	73.7	73.8	74	74.2	74	74.1	74.3	74.4	74.6

Source: World Bank (citing: United Nations, World Urbanization Prospects.)

As you can see, this indicator changes upwards, although the rates are rather low (Figure13). It is worth noting that if there are no global shocks, both in terms of the political situation in the country and taking into account economic factors, in no other country in the world do these indicators in percentages or absolute numerical values change quickly enough. Even where there is a fairly high level of urbanization, sharp jumps were not observed over a short time interval.

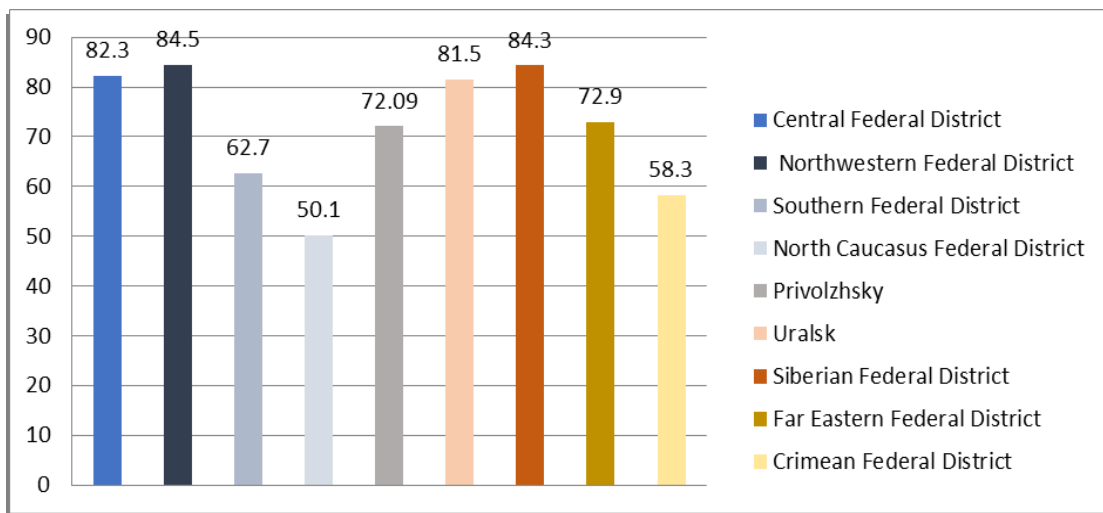
Figure 13: Dynamic of urbanization rate in period 2008 to 2019 in % of total



Source: World Bank (citing: United Nations, World Urbanization Prospects.)

If we consider the level of urbanization in the regions of the country (Graph ??), then the most urbanized territories of Russia are the Northwestern, Siberian and Central Federal Districts. The average Russian level of this indicator is noted in the Uralsk, Far Eastern Federal District and Privolzhsky district. The lowest level of urbanization is characteristic of the Crimean Federal District, South and North Caucasian districts. The situation in 2019 looks like this, according to Rosstat:

Figure 14: Urbanization by district at 2019 in % of total



Source: Federal State Statistics Service

It can be concluded that there is territorial inequality in Russia, which is receiving much less attention. This leads to the view that policies to support areas with depressed economies are considered ineffective in eliminating unemployment and income inequality among people. Territorial inequality has not only grave socio-political consequences but can also negatively affect national economic growth.

In most cases, the highest unemployment rates are found in countries where the economy is dependent on agriculture or natural resource exports and has underdeveloped industrial production.

Therefore, among European and American development funds, the topic of creating and supporting small and medium-sized businesses (SMEs) as a source of employment and economic growth of the country is very popular.

4.3 Analysis of selected macroeconomic factors influencing on unemployment in Russian Federation. One-equation model. Ordinary least squares method.

To analyze the impact of macroeconomic indicators on unemployment, a linear regression analysis was performed on time series data from 2008 to 2020 to determine the correlation between unemployment and migration growth, urbanization level, inflation, average real wages and investment activity.

In addition, an analysis was conducted to understand whether unemployment depends on the selected indicators, if so: - How they effect?; - Do indicators have the positive or negative impact on unemployment. The first ordinary least squares method (OLSM) was used order to estimate these parameters. The main idea of this method is that the sums of the squares of errors, which they strive to minimize, are considered as the criterion for the accuracy of solving the problem. The main element of such model is a time series, which is a set of some characteristics, whose values depend on time and number of other factors. The created model at this diploma thesis includes 13 observations (time period from 2008 to 2020) and 5 indicators (migration growth, average real wages, inflation, investment activity and urbanization level). The advantage of the OLSM model is universality, which allows to be used to evaluate the coefficients of structural model in every kind of subject area.

If the system is super identifiable, then the OLS is not used, because it does not give unambiguous estimates for the parameters of the structural model. In this case, can be used other assessment methods.

As it was mentioned before the analysis is carried out with the program Gretl. The Gretl program was chosen for calculating the presence of special econometric tests. For example, test on autocorrelation or heteroscedasticity was applied to the analysed model. The Gretl program contains commands that allow you to carry out the necessary procedures with minimal time. To check the model on heteroscedasticity in Gretl there the White's test, and for the autocorrelation is the Durbin-Watson test.

The following stages of constructing an econometric model should be highlighted:

1. Model specification:

- determination of the purpose (dependent variable Y);
- determination of potential explaining variables X;
- preliminary reduction in potential variables X;
- selection of the analytical form of the model;
- formulating the simulation hypothesis.

2. Evaluation of the structural parameters of the model.

3. Verification of the econometric model:

- assessment of the significance of the influence of specific explanatory variables on the dependent variable;

- estimation of the degree of compliance of the model empirical data;
- estimation of the normality of the distribution of residues;
- estimation of the homogeneity of the dispersion of residues - checking heteroskedasticity;

- estimation of the linearity of the analytical form of the model;

4. Formulation of conclusions and their interpretation.

At the beginning of analysis, an econometric model was used, which consists of assumptions, the application of mathematical and statistical models with endogenous, exogenous and random variables, parameters, variable declarations and units. All these data are listed in Table 11.

Table 11: The economic and econometric model for OLSM

Analysis is based on three assumptions:	- Is there a relationship between unemployment and selected macroeconomic indicators (migration growth and level of urbanization of the population, average real wage, inflation and the investment activity)? - What effect selected macroeconomic factors have on unemployment (no effect/ negative/ positive)?
The economic model of analysis is:	Unemployment in Russian Federation is dependent on migration growth, urbanization level, inflation, average real wages and investment activity (fixed capital investments). $y_{1t} = f(x_{2t}, x_{3t}, x_{4t}, x_{5t}, x_{6t})$
Analysis econometric model:	$Y_{1t} = \gamma_{12}x_{2t} + \gamma_{13}x_{3t} + \gamma_{14}x_{4t} + \gamma_{15}x_{5t} + \gamma_{16}x_{6t} + u_{1t}$
Endogenous (dependent, explained) variable (regressand)	Y_{1t}
Exogenous (explanatory) variables in time (regressors)	$x_{2t}, x_{3t}, x_{4t}, x_{5t}, x_{6t}$
Stochastic variable (residual term)	u_{1t}
Parameters	$\gamma_{12}, \gamma_{13}, \gamma_{14}, \gamma_{15}, \gamma_{16}$
Variable notation	Y_{1t} - Unemployment, % x_{2t} - Migration growth, people. x_{3t} - Urbanization level, % of total population. x_{4t} - Inflation, %. x_{5t} - Average real wages, rubles. x_{6t} - Investment activities (fixed capital investments), billion rubbles. u_{1t} - Random error, $\sim \text{nid}(0, \sigma^2)$

Source: own construction

It can be seen that there are five independent variables in this case, therefore, we will build a multiple regression model. Consequently, in table --- collected data set can be seen with the time series from 2008 to 2020.

Table 12: Data of macroeconomic factors (2008-2018) and unemployment rate of Russian Federation (2008-2018)

	Y	X ₂	X ₃	X ₄	X ₅	X ₆
Year	Unemployment, %	Migration growth, people	Average monthly real wage, rub.	Inflation, %	Fixed capital investments, billion rub.	Urbanization rate, % of total
2008	6.2	239 943	16 426	10.8	8 781.6	73.4
2009	8.3	321 023	17 706	11.7	7 976.0	73.6
2010	7.3	290 054	19 904	6.9	9 152.1	73.6
2011	6.5	255 697	22 201	8.4	11 035.7	73.7
2012	5.5	216 564	25 298	5.1	12 586.1	73.8
2013	5.5	219 698	28 302	6.8	13 450.2	74
2014	5.2	201 332	30 870	7.8	13 902.6	74.2
2015	5.6	229 165	32 282	15.5	13 897.2	74
2016	5.5	217 562	34 874	7.0	14 748.9	74.1
2017	5.2	203 164	37 209	3.7	16 027.3	74.3
2018	4.8	178 547	41 538	2.9	17 782.0	74.4
2019	4.6	155 621	41 747	4.5	19 329.0	74.6
2020	5	196 233	42 820	4.3	20 036.0	74.3

Source: Federal State Statistics Service, own calculation, 2020

Many scientific publications present a wide range of methods for selecting variables of an econometric model. To use one of the methods based on constructing a correlation matrix and calculating the critical value of the correlation coefficient, the corresponding functions of the GRETL software package are very convenient. An example of a correlation coefficient matrix for five variables with information on sales volumes and factors affecting them is shown in Figure 15.

Figure 15: The results of the output of the correlation matrix

Correlation Coefficients, using the observations 2008 - 2020
 5% critical value (two-tailed) = 0.5529 for n = 13

Y	X2	X3	X4	X5	
1.0000	0.9839	-0.8302	0.5267	-0.8638	Y
	1.0000	-0.8382	0.5710	-0.8775	X2
		1.0000	-0.5617	0.9824	X3
			1.0000	-0.6012	X4
				1.0000	X5
					X6
					-0.9223 Y
					-0.9291 X2
					0.9425 X3
					-0.5231 X4
					0.9363 X5
					1.0000 X6

Source: own my calculations using the program SW Gretl

The figure 15 shows the critical value of the correlation coefficient calculated on the basis of checking the significance of the Pearson linear correlation coefficient. Thus, the correlation analysis determined the correlation between unemployment and selected variables. The closer the correlation coefficient is to one, the stronger the correlation dependence between the variables. The most important is the correlation coefficient between the unemployment and migration growth; we also have high correlation coefficients between the average monthly real wage and fixed capital investment. Also can be mentioned the high correlation coefficient between the urbanization and the average monthly real wage. The same dependence between the urbanization and fixed capital investments. The high correlation of the dependent variable Y and the parameter X_2 may indicate the multicollinearity of the indicator.

Multicollinearity leads to instability of parameter estimates. Thus, the estimates of the parameters are obtained inaccurate, which means it will be difficult to interpret the influence of certain factors on the explanatory variable. When predicting future values of the dependent variable with a high determination coefficient ($R^2 > 0.9$), the presence of multicollinearity usually does not affect the forecast qualities of the model.

As the next step, use the OLSM in Gretl to estimate the parameters to determine the X matrix and the Y vector. Provide the results of Gretl's assessment. Let's build Model 1, in which the dependent variable is unemployment, and the explained variables will be migration growth, average monthly real wage, inflation, fixed capital investments and

urbanization. The results of multiple regression are presented in numerical form at Model 1 below.

Model 1: OLS results from GRETL based on matrix X and vector Y using observations 2008-2020

Model 1: OLS, using observations 2008-2020 (T = 13)
Dependent variable: Y

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	4.53489	52.0082	0.08720	0.9330	
X2	2.34210e-05	5.78646e-06	4.048	0.0049	***
X3	-1.00407e-05	5.67030e-05	-0.1771	0.8645	
X4	-0.0146446	0.0249470	-0.5870	0.5756	
X5	2.31677e-05	0.000124408	0.1862	0.8576	
X6	-0.0531663	0.696603	-0.07632	0.9413	
Mean dependent var	5.784615	S.D. dependent var		1.051068	
Sum squared resid	0.391210	S.E. of regression		0.236405	
R-squared	0.970490	Adjusted R-squared		0.949412	
F(5, 7)	46.04173	P-value(F)		0.000033	
Log-likelihood	4.326285	Akaike criterion		3.347430	
Schwarz criterion	6.737126	Hannan-Quinn		2.650694	
rho	0.052162	Durbin-Watson		1.832991	

Source: own my calculations using the program SW Gretl.

The variable X_2 on the quality of the model does not affect - it is recognized as statistically significant, even when all coefficients are insignificant (this is one of the signs of multicollinearity). In the Model 1, there is autocorrelation of residuals of random deviations. The simplest method of eliminating multicollinearity is an exception from a model of one or more correlated variables. Remove variable X_2 (migration growth) as multicollinear variable and after obtain Model 2.

Model 2: Solving the problem without multicollinear variable

Model 2: OLS, using observations 2008-2020 (T = 13)

Dependent variable: Y

HAC standard errors, bandwidth 1 (Bartlett kernel)

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	179.357	29.0684	6.170	<0.0001	***
X3	0.000142479	6.44559e-05	2.210	0.0271	**
X4	0.00781890	0.0237022	0.3299	0.7415	
X5	-0.000270601	0.000133435	-2.028	0.0426	**
X6	-2.35769	0.398705	-5.913	<0.0001	***
Mean dependent var	5.784615	S.D. dependent var		1.051068	
Sum squared resid	1.306795	S.E. of regression		0.404165	
R-squared	0.901425	Adjusted R-squared		0.852138	
F(4, 8)	26.92473	P-value(F)		0.000108	
Log-likelihood	-3.513286	Akaike criterion		17.02657	
Schwarz criterion	19.85132	Hannan-Quinn		16.44596	
rho	-0.320604	Durbin-Watson		2.512512	

Source: own my calculations using the program SW Gretl.

According to the method of selection of explanatory variables, it is assumed to eliminate variables with minimal (module) with the value of the T-statistics of Student. In the message issued after the estimation of the model, the sequence of exclusion of variables is assumed. In this model, it is necessary to exclude the variable X_4 . After similar procedures, we obtain the final model shown in Model 3.

In the Model 3, all variables are significant; This means that the model is suitable for practical use. The fulfillment of the f-test of the Snedecker suggests that the estimated model contains only significant variables.

In this example, the value of $R^2 = 0.867986$ or 86.8%, which indicates a rather high level of explanation. Meaning that the model explains changes in dependent variable for 86.8% and remaining 13.2 % is with stochastic variables.

Model 3: Solving the problem with statistically significant variables

Model 3: OLS, using observations 2008-2020 (T = 13)

Dependent variable: Y

HAC standard errors, bandwidth 1 (Bartlett kernel)

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	178.721	28.9455	6.174	<0.0001	***
X3	0.000144609	6.53741e-05	2.212	0.0270	**
X5	-0.000281271	0.000138197	-2.035	0.0418	**
X6	-2.34720	0.396503	-5.920	<0.0001	***
Mean dependent var	5.784615	S.D. dependent var	1.051068		
Sum squared resid	1.312571	S.E. of regression	0.381892		
R-squared	0.900990	Adjusted R-squared	0.867986		
F(3, 9)	35.23859	P-value(F)	0.000027		
Log-likelihood	-3.541952	Akaike criterion	15.08390		
Schwarz criterion	17.34370	Hannan-Quinn	14.61941		
rho	-0.324031	Durbin-Watson	2.521937		

Source: own my calculations using the program SW Gretl.

Therefore, due to using SW Gretl it was determined the result of OLSM, especially the equation of regression model, which it was equal to: $Y_{1t} = 178.721 + 0.000144609X_{3t} - 0.00281271X_{5t} - 2.34720X_{6t} + U_{1t}$

According to Ordinary Least Square Method (OLSM), the next step was economic verification of the model, it means that comparison of model assumptions with the results. It has been assessed the direction and intensity of the effect caused by explanatory variable on the explained variable i.e. the accuracy of the signs and the size of the numerical values of the estimated parameters.

$$Y_{1t} = f(x_{3t}, x_{5t}, x_{6t});$$

$$Y_{1t} = 178.721 + 0.000144609X_{3t} - 0.00281271X_{5t} - 2.34720X_{6t} + U_{1t}.$$

Based on OLSM results was also checked P-values and make statistical significance of parameters. If the significance level is 0.05 or higher, then the null hypothesis is accepted and the parameter is recognized as statistically insignificant, if lower, then it is rejected, then an alternative hypothesis about the statistical significance of the parameters is accepted. The outcomes of test may be interpreted with the use of P-value that measures the strength of evidence in support of H_0 . If the P-value $< \alpha$, then it is rejected the H_0 . For this reason it has been taken the P-values from Gretl for determining the level of significance (Table 13).

Table 13: The results of P-values

	P-values	Level of significance	Results
Constant	<0.0001	0.05	Parameter statistically significant
X_3	0.0270	0.05	Parameter statistically significant
X_5	0.0418	0.05	Parameter statistically significant
X_6	<0.0001	0.05	Parameter statistically significant

Source: own calculations

Based on assessment of the P-values from Gretl for determining the level of significance only one parameter, this describes the migration growth.

Also, it was used testing of Normality and Heteroscedasticity, which means: Null hypothesis (H_0): $y_{13} = y_{15} = y_{16} = 0$. All regressors X_i taken jointly are not significant (the entire model is false). Alternative hypothesis (H_1): Y_i . H_0 is not true. Normality tests are used to determine if a data set is well-modeled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. Therefore, in Table 14 shows how both results were approved in White's Test and Normality as well.

Moreover, in Figure * and ** there have been identified the quantity of P-value in both tests. To confirm heteroskedasticity, the P-value should be less than 0.05.

Table 14: The results of Normality and Heteroscedasticity for OLSM

Type	Test		
Heteroscedasticity	White's test		
Normality	Frequency distribution		
H_0 : Hypothesis	Normal distribution of random variable; Homoscedasticity		
H_1 : Hypothesis	Not normal distribution of random variable; Heteroscedasticity		
	P-value	Alpha	Result
Normality	0.0721	0.05	H_0 approved
Heteroscedasticity	0.3300	0.05	H_0 approved

Source: own calculations

To estimate the normality of the distribution of residues, a test of consent of the Zharke-Bera is used, which checks the hypothesis about the normality of the distribution of residues (Figure 16).

Figure 16: Checking the remnants of the model on the normality of the distribution

```

Frequency distribution for uhat4, obs 1-13
number of bins = 5, mean = -3.48439e-015, sd = 0.381892

      interval      midpt  frequency   rel.   cum.
      < -0.22494  -0.37730     3    23.08%  23.08% *****
    -0.22494 -  0.079778 -0.072581     5    38.46%  61.54% *****
    0.079778 -  0.38450   0.23214     4    30.77%  92.31% *****
    0.38450 -  0.68921   0.53685     0     0.00%  92.31%
    >= 0.68921   0.84157     1     7.69% 100.00% **

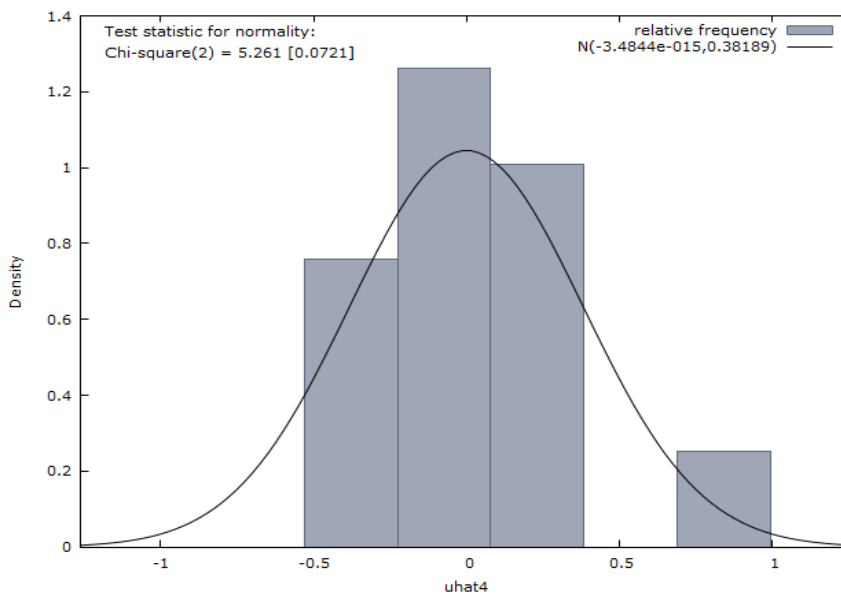
Test for null hypothesis of normal distribution:
Chi-square(2) = 5.261 with p-value 0.07206

```

Source: own calculations

GRET software package allows to perform a series of tests to verify the quality of the econometric model. All parameters are selected automatically, with the test results are displayed in graphical and text form (figure 17).

Figure 17: The result of testing of Normality



Source: own calculations

The data test indicates that the distribution of residues have the properties of normal distribution. Moreover, it was examined Testing of Homoscedasticity (White's test) in order to find out the variance of the error term is a function of the regressors. Null hypothesis (H_0): the error variances are all equal (homoskedasticity). Alternative hypothesis (H_1): the error variances are multiplicative function of one or more variables (heteroskedasticity). The homogeneity of the dispersion of the remnants of the model and the heteroskedasticity of the random component can be estimated using the White's test (figure 17). (White, 1980, p. 820)

Figure 18: Detection of heteroskedasticity residues

```
White's test for heteroskedasticity
OLS, using observations 2008-2020 (T = 13)
Dependent variable: uhat^2
```

	coefficient	std. error	t-ratio	p-value
const	-22648.5	20458.1	-1.107	0.3491
X3	-0.0355736	0.0375756	-0.9467	0.4136
X5	0.0107557	0.0567078	0.1897	0.8617
X6	625.307	564.633	1.107	0.3489
sq_X3	-4.58827e-08	7.71615e-08	-0.5946	0.5940
X2_X3	1.44911e-07	3.38043e-07	0.4287	0.6971
X2_X4	0.000492110	0.000517750	0.9505	0.4120
sq_X5	-1.37753e-07	4.08381e-07	-0.3373	0.7581
X3_X4	-0.000154797	0.000786982	-0.1967	0.8566
sq_X6	-4.31558	3.89598	-1.108	0.3488

Unadjusted R-squared = 0.789067

Test statistic: $TR^2 = 10.257868$,
with p-value = $P(\text{Chi-square}(9) > 10.257868) = 0.330016$

Source: own calculations

White's test on heteroskedasticity also shows P-value higher than 0.05. Data show that dispersion is heterogeneous (homoskedasticity).

Breusch- Pagan test (Figure 19) is one of the statistical tests to check the presence of heteroskedasticity of random errors of the regression model.

It is used if there is reason to believe that the dispersion of random errors may depend on some set of variables. In this case, a linear dependence of the dispersion of random errors from a certain set of variables is checked in this test.

Figure 19: Breusch-Pagan test for heteroskedasticity

Breusch-Pagan test for heteroskedasticity
 OLS, using observations 2008-2020 (T = 13)
 Dependent variable: scaled uhat^2

	coefficient	std. error	t-ratio	p-value
const	147.344	230.338	0.6397	0.5383
X3	0.000206017	0.000333515	0.6177	0.5521
X5	-0.000447804	0.000760558	-0.5888	0.5705
X6	-1.98130	3.18788	-0.6215	0.5497

Explained sum of squares = 10.0108

Test statistic: LM = 5.005398,
 with p-value = P(Chi-square(3) > 5.005398) = 0.171402

Source: own calculations

P-value for all factors is more than 0.05. Therefore, the results of model can be characterized as homoscedastic. In both of the scenarios, it has been gotten Normal distribution of random variable, namely Homoscedasticity in the simultaneous model. The P-probability of accepting the hypothesis of heteroskedasticity is 0.3300, which is greater than 0.05.

The data obtained as a result of the study suggest that advertising and consumer spending index have an impact on the volume of implementation. The determination coefficient indicates a fairly good quality of the multiple regression model studied. Nonlinearity tests indicate that there are grounds for the adoption of the power form of the model.

The resulting model can be considered adequate to the initial data, since in the model all the regression coefficients are statistically significant, the determination coefficient has a high value. The assumptions of the least squares method are fulfilled - the model lacks autocorrelation and heteroskedasticity.

$$Y_{1t} = 178.721 + 0.000144609X_{3t} - 0.00281271X_{5t} - 2.34720X_{6t} + U_{1t}$$

The estimated parameters showed how selected macroeconomic factors change it if any of the explanatory variable will be changed. Therefore, based on the results additionally were checked initial assumptions (Table 15):

Table 15: The results of OLS model analysis

Assumptions	Results from estimation
- Is there a relationship between unemployment and selected macroeconomic indicators (migration growth and level of urbanization of the population, average real wage, inflation, and the investment activity)?	Analysis proved relations between unemployment and three variables: urbanization level, investment activity, and average real wage. These variables were accepted as significant at final Model 3.
- What effect selected macroeconomic factors have on unemployment (no effect/ negative/ positive)? *positive - if one variable increase – unemployment decrease; *negative - if one variable increase – unemployment increase.	Based on received equation ($Y_{1t} = 178.721 + 0.00144609X_{3t} - 0.00281271X_{5t} - 2.34720X_{6t} + U_{1t}$), it can be argued that the influence of investment activity, that expressed with fixed capital investment, and urbanization level have an inversely effect on unemployment (positive), the real wage effect in direct ratio (negative). The selected factors migration and inflation are considered insignificant (no effect).

Source: own construction

The data obtained as a result of the study suggest that the average monthly real wage, investment activity and level of urbanization affect unemployment. The determination coefficient indicates a fairly good quality of the multiple regression model studied. Nonlinearity tests indicate that there are all grounds for making results.

Likewise, according to the final equation, the results can be interpreted like this: 1) if average monthly real wage will increase by 1 rubble, then unemployment rate will increase by 0.0001 % per year; 2) if investments in fix assets will increase by 1 billion rubbles, then unemployment rate will decrease by 0.0028 % per year; 3) if urbanization level will increase by 1 %, then unemployment rate will decrease by 2.3472 % pr year. The selected factors migration and inflation are considered insignificant.

5 Results and Discussion

The aim of the dissertation is to assess the impact of selected macroeconomic factors (migration growth of the population, the level of urbanization of the population, average real wages of the population, inflation, and investment activity) on unemployment and their relationship. During analysis were used various analytical methods, such as documentary and statistics review and econometric modeling. The implementing of OLS model in analysis will help to build an ordinary model to understand relations between main factors on macroeconomic level to eliminate their influence on economy of the Russian Federation This goal assumes the solution of the following research questions:

The first research question is to find out a relationship between unemployment and selected macroeconomic indicators (migration growth and urbanization level of the population, average real wage, inflation, and the investment activity).

Thus, at the macro level, Russian economists distinguish six main groups of factors influencing the labour market:

- 1) demographic factors (migration processes, population reproduction processes, urbanization);
- 2) economic factors (inflationary processes, the investment activity, pricing policy and etc.);
- 3) social factors (the income of the population, social infrastructure, the level of social security and social protection);
- 4) organizational and technical factors (the development of the material and technical base of the organization, the quality of the employment service);
- 5) national and ethnic;
- 6) administrative and legal factors (labour regime, regulations, dismissal, discipline).

At the same time, in addition to macro factors, a significant influence is exerted by the geographical location, the sectoral structure of the economy, natural and climatic conditions, the degree of development of economic sectors, and the investment policy of the region. At the same time the labour market is an important structural unit of economics in the country. Any changes in this sector have a significant impact on the main indicators of the economy, such as GDP, NP, import and export volumes. Roger Farmer in his work “Unemployment” mentioned influence of demographic factors such as migration processes and urbanization, birth, and death ratios. (2001)

This research analysed relationships between 6 macroeconomic factors. The unemployment was chosen as dependent variable that possibly could be influenced by five independent variables which are migration growth, urbanization level, average monthly real wage, inflation, and the investment activity, that presented by fixed capital assets. All variables can be quantity measured.

The data obtained as a result of the study suggest that the average monthly real wage, investment activity and level of urbanization affect unemployment. The determination coefficient indicates a fairly good quality of the multiple regression model studied. Nonlinearity tests indicate that there are all grounds for making results.

The author Haral Bauder determined migration as the main rigor in his study. He explained how migration processes affect the development of unemployment by explaining their close relationship. He mentioned that the unemployment will change at the same way as the migration growth. (2006, p. 15) It also can be proved by the analysis of relation between unemployment and migration growth at Russian Federation. The high linear correlation was found out between this two factors.

Michal Kalecki discussed inflation, trade flows (export and import), foreign direct investments, fixed assets investment like governmental instruments that can affect the unemployment in his work "Political aspects of full unemployment". Author was mainly concentrated at inflation. At the work was provided analyses on examples of USA, Great Britain, France, Brazil, China and was tried to find regularity. But at the end it was concluded that "there is no general intercorrelation system ... due to the dependence of inflation from more influencing indicators, that are different depending on the country and its level of development" (1943, p. 66) The common research was done by Miguel Sigrauski, who was analysing inflation and GDP, but at the same time highlighted few insights about relation of unemployment that effects both. It was written that "unemployment shows a percentage at which it can effect a GDP and inflation can influence it". (1961, p. 801) At current work inflation wasn't consider and was excluded because of correlation absence, that denies previous assumptions.

The obtained results can be called expected thus because assumptions were based on works of such scientists as Gerard Baker (2011), who was analyzing inflation as an economic instrument at Great Britain. "There is no sufficient dependency, but if the analysis used a long-term period data, which is more than twenty years, the inflation can be taken in consideration as influenced indicator". The economist Irvine Reed (1989, p. 136)

said that “Unemployment and inflation will always be interconnected, but this connection will be visible only in a long perspective”. Conducted in this work analysis did not find the relationship of indicators (unemployment and inflation). Data for 13 years was used in calculations, which cannot be called a long-term period.

Analysis proved relations between unemployment and three variables: urbanization level, investment activity, and average real wage. These variables were accepted as significant at final Model 3.

The resulting model can be considered adequate to the initial data, since in the model all the regression coefficients are statistically significant, the determination coefficient has a high value. The assumptions of the least squares method are fulfilled - the model lacks autocorrelation and heteroskedasticity. The selected factors migration and inflation are considered insignificant because of high multicollinearity and low collinearity between analyzed variables. It could be said that result was expected.

The second one is aimed to estimate an effect that selected macroeconomic factors have on unemployment (no effect/ negative/ positive).

Based on received equation ($Y_{1t} = 178.721 + 0.00144609X_{3t} - 0.00281271X_{5t} - 2.34720X_{6t} + U_{1t}$), it can be argued that the influence of investment activity, that expressed with fixed capital investment, and urbanization level have an inversely effect on unemployment (positive), the real wage effect in direct ratio (negative). The selected factors migration and inflation are considered insignificant (no effect). The estimated parameters showed how selected macroeconomic factors change it if any of the explanatory variable will be changed.

Likewise, according to the final equation, the results can be interpreted like this:

1) if average monthly real wage will increase by 1 rubble, then unemployment rate will increase by 0.0001 % per year;

2) if investments in fix assets will increase by 1 billion rubbles, then unemployment rate will decrease by 0.0028 % per year;

3) if urbanization level will increase by 1 %, then unemployment rate will decrease by 2.3472 % pr year. The selected factors migration and inflation are considered insignificant.

Stephen Broadberry and Ritschl Albrecht explained the influence of average real wage on unemployment on example of Great Britain and German and made a conclusion:

“If the salary is higher than the equilibrium value, the supply of labor exceeds demand. As a result, unemployment occurs, the main reason for which is considered a high level of wages. The unemployment growth causes an increase in labor supply, which objectively leads to a decrease in the level of wages until the equilibrium price is established”. (Broadberry and Albrecht, 1995) According to the obtained results, it can be said that in the labor market of the Russian Federation, the average real wage is higher than the equilibrium wage, which leads to the negative impact of this indicator on unemployment. This means that with the increase of the average real wage, unemployment is also increasing.

No less interesting conclusions were presented by Hulten and Wykoff: “First of all, an effective demand should be improved, reducing the loan percentage and increasing investments”. (1980) In their work, they analyzed the influence of investments in the middle and small business on unemployment and concluded that "business investment certainly has a positive effect on the reduction of the number of unemployed, and the state economy as a whole." The same result is also observed in the final model, where the growth of investments in fixed capital assets has a positive effect on unemployment - reduces it.

An increase in the sample of the analyzed indicators and the number of observations will give more accurate results. It is recommended to take a long-term period, that is, more than 20 years. Also, it's appropriate to take into account factors which are included in one group. For example, as was implemented in this research work: migration and urbanization. The death and birth level can be also analyzed.

6 Conclusion

Unemployment has economic, political, and social consequences, which are mainly negative. But in spite of the non-negative aspects to liquidate it is completely impossible and inexpedient. A certain level of unemployment is even useful for the country - a natural unemployment rate.

A large role in the prevention of unemployment, reducing, mitigating the negative socio-economic consequences should be played by the state, one of the functions of which is to conduct relevant policies.

It is possible to allocate the usefulness of this study. Analysis of macroeconomic indicators is important in trading since they have a significant impact on the movements of stock markets. That is why the fundamental analysis usually includes macroeconomic indicators. Most macroeconomic indicators are published in certain dates, so traders and investors can prepare for market volatility after the outcomes of statistics, that can help to protect the country's economy.

The most important this study can be for public administration. The basis of activities on the effects of unemployment should be a study of influencing factors. An increase in the sample of the analyzed indicators and the number of observations will give more accurate results. Thus, understood the interaction of unemployment and other macroeconomic factors, it is easy to regulate unemployment as an economic phenomenon. Therefore, recommendations for regulation and reducing unemployment can be allocated according to the results of the study.

Based on the analysis of the interaction of unemployment and the selected macroeconomic indicators (migration growth and urbanization level of the population, average real wage, inflation, and the investment activity), it can be concluded that for the period 2008-2020 in the Russian Federation there is observed:

- relations between unemployment and three variables: urbanization level, investment activity, and average real wage;

- the influence of investment activity, that expressed with fixed capital investment, and urbanization level have a positive effect on unemployment, the real wage effect unemployment negatively. The selected factors migration and inflation have no significant effect on unemployment.

As a result of the analysis, it can be seen that the most influencing factor is urbanization. An increase in this indicator greatly reduces unemployment. It could be assumed that the change in regional policy will lead to acceleration and increase in urbanization, that will be positively affects unemployment.

One of the reasons for such a relationship is globalization. One of the often mentioned consequences of globalization is territorial inequality. Territorial inequality bears heavy socio-political implications and negatively affects the national growth of the economy. Territorial inequality is one of the main problems of the Russian Federation, which arose as a result of a large territory of the country and ineffective regional policies.

Can be considered real steps, that the state can apply to reduce unemployment according to received results. Next recommendations can be applied:

1. elimination of factors that reduce labor mobility. For this, first, needed:
 - the creation of a developed housing market;
 - an increase in the scale of housing construction;
 - cancelation of administrative barriers to move from one settlement to another (more precisely, from rural territory to urban).
2. improving information support for the labor market. In all countries, this function is performed by employment organizations (labor exchange). They collect information about existing vacancies from employers and report it to the unemployed.

Thus, it can be concluded that the state should focus on demographic factors that include migration processes, population reproduction processes and especially urbanization.

7 References

Applegate, Evan "Macroeconomic Mystery: U.S. Unemployment Subverts Okun's Law".
Bloomberg. 2013.

Article 3 of the Law of the Russian Federation "On Employment of the Population in the
Russian Federation",

Avdeev L. G. Long-term unemployment as a socio-economic phenomenon / L. G. Avdeev
// Labor and employment. - 2010. - № 1. - P. 5-7.

Baker, Gerard (January 19, 2007). "Welcome to 'the Great Moderation'". The Times.
London: Times Newspapers. ISSN 0140-0460. Retrieved April 15, 2011.

Blaug M. Economic Theory in Retrospect , 5th Edition. — Cambridge University Press ,
1997.

Breys, B.D. Unemployment in modern Russia, M.: Science, 2005. – p. 203,

Bauder, Harald. Labour Movement: How Migration Regulates Labour Markets, New
York: Oxford University Press, 2006.

Broadberry, Stephen N., and Albrecht Ritschl. "Real Wages, Productivity, and
Unemployment in Britain and Germany during the 1920's." Explorations in Economic
History 32.3 (1995): 327-349.

Burgen Emily, Meyer Brent, and Tasci Murat "Labor Markets, Unemployment, and
Wages: An Elusive Relation between Unemployment and GDP Growth: Okun's Law".
Economic Trends (Federal Reserve Bank of Cleveland). 2012. – P 13-16.

Chekmareva M.V. Unemployment: its types and analysis // ECON. Sciences. - 2016. - №
46-51

Elhorst J. P. The Mystery of Regional Unemployment Differentials: Theoretical and
Empirical Explanations // Journal of Economic Surveys. 2003. Vol. 17. № 5. P. 709-748.

Elkin S.E. Economic and social consequences of unemployment // Bulletin of Omsk
University, 2018. - p. 85-88.

Everett S. Lee "A Theory of Migration". Demography. 3. 1996. (1): 47–57.

Farmer, Roger E. A. (2001). "Unemployment". Macroeconomics (Second ed.). Cincinnati:
South-Western Publishing. pp. 173–192.

Fisher S., Dornbush R., Shmalenzi R. Economy. - M.: Case LTD, 1993. - 602 p.

Galbreit J. New Industrial Society. - M.: LLC "Publishing House AST", 2004. - 602 p.

Gujarati, Damodar N.; Porter, Dawn C. (2009). *Basic Econometrics* (Fifth ed.). Boston: McGraw-Hill Irwin. pp. 55–96.

Hulten, C. R., Wykoff, F. C. *The measurement of economic depreciation*. Urban Institute. 1980.

Harrod R. *To the theory of economic dynamics*. M., 1999.

IOM. "Migration and migrants: A global overview." Ch. 2 in *World Migration Report 2020*.

Joens C. *Macroeconomics* (англ.). — W. W. Norton & Company, 2014. — 640 p

Kalecki, Michał (1943). "Political aspects of full employment" (PDF). *The Political Quarterly*. 14 (4): 322–331.

Keynes J. M. *General theory of employment, percentage and money*. M., TD "Williams", 1998.

Kovalev N.V. *Unemployment. Surfaces of unemployment. Unemployment in Russia // The role of information in the transformation of modern science: Sat. Art. Intern. scientific study. conf. - Ufa, 2014. - P. 151-153.*

Kapelushnikov R. *Russian Labor Market Model: What is ahead? // Questions of the economy, No. 4, 2003. – P. 23-39.*

Kleiber, Christian; Zeileis, Achim (2008). *Applied Econometrics with R*. New York: Springer. pp. 101–102.

Korovkin A.G., Polezhaev A.V. *Analysis of the dynamics of the Russian labor market, taking into account the cost of working time // Problems of forecasting. 2003, № 5. – P. 56-74.*

Korovkin A.G. *Dynamics of employment and labor market: macroeconomic analysis and forecasting issues*. M.: Max Press, 2014. - p. 117-130.

Kochergin M. A. *Unemployment and its consequences for the country's economy*. *Journal: Economic News*. 2019. - p. 45-49.

McConnell C. R., Brue S. L.. — *Economics: Principles, problems and policies / New York, 1990. — T. 1. — p. 399.*

Malthus TR *Experience about the law of population*. In 2 volumes. T. 2. SPB: K.T. Soldatenkov, 1868.-p. 854.

Myrdal G. *The Political Element In The Development Of Economic Theory*, 1956.- p. 427.

Okun, Arthur M. (1975), *Equality and Efficiency: The Big Tradeoff*. Washington, D.C.: Brookings Institution, 1975, pp. 91–92.

Phillips A. Curves, expectations of inflation and optimal unemployment over time // *Economica*. — 1967. — C. 254—281.

Prachowny, Martin F. J. (1993). "Okun's Law: Theoretical Foundations and Revised Estimates". *The Review of Economics and Statistics*. 75 (2): 331–336.

Razali, Nornadiah; Wah, Yap Bee (2011). "Power comparisons of Shapiro–Wilk, Kolmogorov–Smirnov, Lilliefors and Anderson–Darling tests" (PDF). *Journal of Statistical Modeling and Analytics*. 2 (1): 21–33.

Reed, S. A. (1989). A Historical Analysis of Depreciation Accounting—The United States Steel Experience. *Accounting Historians Journal*, 16(2), 119-153.

Sigrauski, Miguel (1961). "Inflation and Economic Growth". *Journal of Political Economy*. 75 (6): 796–810.

Samuelson, Solow "Phillips Curve" and the Great Inflation. *History of Economics Review*. - 2012. # 55(1). – p. 62- 113.

Roik Valentin. Economics, finance and law of social insurance. *Institutes and Insurance Mechanisms*. - M.: Alpina Publisher, 2012. - 258 p.

Say Zh.B. *Treatise on political economy*. - M.: Direct Media, 2007. - 67 p.

Verbeek, Marno (2008). *A Guide to Modern Econometrics* (Third ed.). Wiley. pp. 99–100.

Vogt W. *People! Challenge to Survival*. NY, 1990.- P. 43- 52.

Zhuravleva G. P. *Economy: Tutorial*. M.: Lawyer, 2011. - P. 574

Wilcox, Rand (2012), *Introduction to robust estimation and hypothesis testing*, *Statistical Modeling and Decision Science* (3rd ed.), Amsterdam: Elsevier/Academic Press, pp. 1–22

"World Migration Report 2018" (PDF). International Organization for Migration. 2019. p. 15.

White, H. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity". *Econometrica*. (1980). 48 (4): 817–838.