University of Economics, Prague

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Study program: Economics

THE MYSTERY OF RUSSIAN'S LOW UNEMPLOYMENT RATE

Bachelor's Thesis

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Year: 2017

I hereby confirm that this bachelor's thesis is the result of my own work. All sources used are acknowledged and declared in the reference section.

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BACHELOR THESIS TOPIC

Author of thesis: **Ekaterina Vlasova**

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Topic: **The Mystery of Russia's Low Unemployment Rate**

Guides to writing a thesis:

1. The aim of the thesis is to dispel myths about low unemployment rate in Russia. In the past five years unemployment rate has fallen drastically in the country. However, in reality unemployment is much higher than official statistics shows. This thesis uncovers mystery of officially low unemployment rate in Russia and explains why there is a large gap between registered and real unemployment.
2. Accounting for the unemployed in Russia is carried out in two ways — data collected from the Russian Federal Employment Services and information based on surveys which are held for a mere 0.06% of the population. In order to obtain more accurate information this text will analyse structure of labour market in Russia, including unemployment benefits, severance pays and government subsidies. It will also show the difference from socialist countries and what unemployment rate would be under "normal" circumstances.
3. Furthermore, it looks closely at political and physiological aspects as a part of the mystery. On this basis, I will build an econometric model using a time series spanning from 1999 until 2016, while to account for a possible counterfactual, I will opt for difference-in-differences method.

Length of thesis: 45

Selected bibliography:

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Abstract

This thesis focuses on the mystery surrounding the low unemployment rate in Russia and looks into the significance of factors like unemployment gap, output gap, labour productivity index and demographics which might influence the unemployment rate.

The aim is to use standard econometric tools to process my own estimated data, and combine this with known publicly available quarterly time-series statistics to build a model to disclose the myth surrounding the relationship between the unemployment rate and the business cycle in Russia. Furthermore, it will look into additional factors, discussed in the theoretical part, which play a role in keeping the unemployment rate as low as it is.

The findings of this thesis lead to the conclusion that macroeconomic indicators are less significant when it comes to interpreting the behaviour of the Russian unemployment rate. During this process I discover that the unemployment rate is misleading because it is hiding the real situation in the labour market. Therefore, the primary hypothesis that the Russian unemployment rate highly depends on demographic factors is further rejected.

Abstrakt

Tato bakalářská práce se zaměřuje na tajemství kolem nízké míry nezaměstnanosti v Rusku a zkoumá význam faktorů jako je mezera v nezaměstnanosti, produkční mezera, index produktivity práce a demografie, které by mohly ovlivnit míru nezaměstnanosti.

Cílem je použít standardní ekonometrické nástroje pro zpracování vlastních odhadovaných dat a kombinovat je s veřejně dostupnými čtvrtletními statistikami časových řad pro vytvoření modelu, který by zodpovídal vztahu mezi mírou nezaměstnanosti a hospodářským cyklem v Rusku. Navíc se podívám na dalšími faktory, o nichž se diskutuje v teoretické části, které mužou hrat roli v udržení míry nezaměstnanosti tak nízké, jakou je.

Výsledky vedou k závěru, že makroekonomické ukazatele nejsou dostačující pro významnou interpretaci chování ruské míry nezaměstnanosti. Během psaní této bakalářské práce zjišťuji, že míra nezaměstnanosti je zavádějící, protože nereflektuje skutečnou situaci na trhu práce. Proto primární hypotéza, že míra nezaměstnanosti v Rusku velmi závisí na demografických faktorech, je dále zamítnuta.

Klíčová slova
míra nezaměstnanosti, trh práce, zaměstnanost, produkční mezera, Ruská federace

JEL klasifikace
J21, J64, J65, C32, E32

Acknowledgement

Acronyms

ADF	Augmented Dickey–Fuller
CPI	Consumer Price Index
DW	Durbin-Watson
EPL	Employment Protection Legislation
FITUR	Federation of Independent Trade Unions of Russia
GDP	Gross Domestic Product
GNP	Gross National Product
HP	Hodrick-Prescott
ILO	International Labour Organization
JEL classification	Journal of Economic Literature
KPSS	Kwiatkowski–Phillips–Schmidt–Shin
LC	Labour Code
LCRF	Labor Code of the Russian Federation
LMR	Labour Market Regulations
LPI	Labour Productivity Index
NAIRU	The non-accelerating inflation rate of unemployment
NKPC	New Keynesian Phillips Curve
OECD	The Organisation for Economic Co-operation and Development
OL	Okun's law
OLS	Ordinary Least Square model
PC	Phillips Curve
Rosstat	Russian Federal State Statistics Service
RUB	Russian Rubles
SVAR	Structural Vector Autoregressive Model
TU	Trade unions
VIF	Variance Inflation Factors
WB	World Bank
€	EUROS

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INTRODUCTION

Since the beginning of the twenty-first century, Russia has gone through two major crises. The first was the Global Financial Crisis that struck the world economy in the beginning of 2008, followed by the second between the years 2014-2015, caused by the international sanctions against Russia and the rapid drop in oil prices. Any economic crisis, regardless of its cause, is often accompanied by the decline in production. For the firms to stay competitive, they have to adjust the quantity and framework of jobs to be at the optimum for their current output. The most common way of adjustment is to lay off the operating personnel which consequentially will lead to an increase in unemployment. However, the recent performance of the Russian economy shows a rather low rate of unemployment, despite all the economic challenges.

It is known that the labour market in developed countries adapts to shocks through employment. In other words, when there is a rapid economic growth more people are employed. On the other hand, if a crisis occurs people lose their jobs. Therefore, in a situation of economic downturn or recession the natural reaction of suffering industries should be to involve in a massive layoff. Surprisingly, the Russian labour market has adapted to the economic crises in a very unusual way compared to Western society. Already in the nineties, people notice that the Russian labour market works differently. The unemployment rate did not increase up to the levels predicted by economists despite the reforms and banking crisis. One of the most famous British economist Richard Layard said that The Russian Labour Market is very flexible (Layard and Richter, 1994). OECD also accepted the idea of a unique adjustment model in 2011.

Accounting for the unemployed in Russia is carried out in two ways; data collected from the Russian Federal Employment Services and information based on surveys which are held for a mere 0.06% of the population.

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According to The Federal State Statistics Service (Rosstat), the unemployment rate in Russia for the last 15 years has almost never exceeded 10 percent even during the deep recession. Currently, the average unemployment rate in the EU is slightly below 10 percent, whereas in Russia it is 5.3 percent as of the end of 2017 (Rosstat, 2017). In the peak of the global financial crisis in 2009, countries like Greece and Spain had an unemployment rate of almost 30% percent and a youth unemployment rate of over 40% (World Bank, 2015). Based on the data from Rosstat, the unemployment rate over the last 10 years ranged from 5.3% in 2016 to 8.3% in the crisis year of 2009, an overall change towards a decrease of the unemployment rate.

During the search for sources, I have noticed a lack of literature and statistical data relating to the topic of unemployment in Russia. There exist various papers analysing the unemployment rate and labour markets, however, only a few cover the specificity of the Russian labour market. The most interesting and inspiring articles were from professor Gimpelson and his colleagues at the Higher School of Economics in Moscow (Gimpelson and Kapeliushnikov, 2011).

In my work, I will answer the question about how Russia manages to maintain the low unemployment rate. The aim is to use standard econometric tools to process my own estimated data, and combine this with known publicly available quarterly time-series to build a model without downgrading the reliability of statistics. Furthermore, I will discuss the political and physiological aspects as a part of resolving the mystery regarding the behavior of the unemployment rate.

The thesis is organized in two parts; the first part being theoretical and the second part being empirical. The theoretical part contains a framework for unemployment analysis and specificity of the Russian labour market such as cultural, demographic, legal and institutional factors. The empirical section includes methodology, estimating and collecting available data, building and testing the model. The final part summarizes the results where the conclusion also is elaborated.

THEORETICAL PART

1.   BACKGROUND

1.1. Types of unemployment

Unemployment is one of the most visible indicators of economic activity. In this part of my work, I would like to define who is considered to be unemployed and the most common types of unemployment.

An unemployed individual by definition of the ILO (International Labour Organization) is a person who:

1) does not have a job at the moment, i.e. was not on paid employment or self-employment during the reference period.

2) Currently available for work, i.e. were available for paid employment or self-employment during the reference period.

3) Seeking work, i.e. had taken specific steps in a specified recent period to seek paid employment or self- employment (OECD, 1983).

Economists view unemployment as a natural and essential part of the market economy.

Frictional unemployment is associated with the search process of work. Some people voluntarily change their place of work due to changes in their professional orientation, change of place of residence or to obtain the best positions in other firms. Other people are looking for a new job due to dismissal or because of a bankruptcy of the firm. Young people, who are looking for a job for the first time, are also included in this category. Frictional unemployment is even desirable, as it allows employees to improve their working conditions and find higher wages.

Structural unemployment is caused by substantial structural changes in the economy, when society gets rid of obsolete enterprises, sub-sectors, sometimes even whole industries, which entails the disappearance of a large number of jobs for those who worked there before. Structural unemployed people find it difficult to get a new job due to insufficient or incomplete qualifications. Even during periods of high employment, there is disproportionately high amount of structurally unemployed people. Avoiding structural unemployment is impossible.

A recession causes **cyclical unemployment**, that is, the phase of the economic cycle, which is characterized by a lack of total expenditure. When aggregate demand for goods and services decreases, employment declines and unemployment increases. A recession is a cyclical decline in business activity, as a result of which people lose their jobs, at that time until demand again increases and business activity revives. To alleviate the negative consequences of this type of unemployment, it is necessary to develop and adopt special programs to provide employment for the population, subsidized by the state.

Another type of unemployment is **seasonal unemployment**, which is generated by the temporary nature of the performance of certain types of activities and the functioning of economic sectors. These include agricultural work, fishing, picking berries, rafting, hunting and some other activities. In this case, individual citizens and even entire enterprises can work intensively for several weeks or months a year, drastically reducing their activities in the rest of the time. In the period of hard work there is a massive recruitment of personnel, and in the period of the curtailment of work - mass layoffs.

There is also **partial unemployment**, which arises as a result of a decline in demand for products. In this case, two options are possible; the firm retains the opportunity for some employees to work full time, but some employees are fired. The other option gives all employees the opportunity to work part-time, which leads to the emergence of partial unemployment, were no one is fired.

Registered/official unemployment indicates the number of unemployed citizens looking for work and that are registered with the state employment service.

Hidden unemployment is also important, which includes workers employed in production, but in fact are "redundant." It's based on the fact that during economic crisis companies do not use it`s full resources and at the same time do not fire workers. Instead they transfers them either to reduced working hours or they are required to take unpaid leave. Formally, such workers cannot be considered unemployed, but in fact, they are. This indicates that one position is superfluous, and the level of hidden unemployment can reach a high percentage.

Voluntary unemployment is associated with a reluctance to work, and comes to be when there are vacant jobs where the potential employee does not like the level of

wages, or the very nature of the work (hard, uninteresting, not prestigious work), leading to them quitting voluntarily.

Involuntary unemployment arises from the lack of raw materials, lack of energy or even components, which led to the shutdown of the firm, and forcing employees to search for a new job.

Real wage or classical unemployment happens when wages are higher than the equilibrium of supply and demand. The result is that firms increase wages for employees. Therefore, they can afford fewer workers and this leads to an increase in unemployment. There are several situations when such unemployment can occur:

1. The government sets high minimum wage;
2. Unions negotiate higher salaries and benefits;
3. Due to a recession, wages from long-term contracts appeared to be much higher than an equilibrium wage (Amadeo, 2017).

1.2. Theory of unemployment

Unemployment cannot be explained by one or a few models alone, but there are some unemployment fluctuation that are central to discuss. These are the search theory, contract theory, efficiency wage theory and the insider/outsider model.

Search model

The first approach to explain unemployment fluctuation is the search model, which highlights the process were heterogenic workers are searching for an optimal strategy while choosing from a series of potential opportunities between jobs with unique characteristics. The search model has three parts where each part discusses a different aspect of the labour market according to the theory. All of them combined determine the behaviour of the overall labour market. Wages are explained and determined in the initial part, followed by the vacancies made available by the individual firms, were the third and final section discusses the creation of jobs, where unemployed workers and vacancies are watched together. The search models examine the tendency of employers and job searchers to achieve matches and how tendencies varies over time.

In the search model approach, fluctuation of natural unemployment is due to changes in the efficiency of matching workers and jobs in the economy. For instance, when there is a structural shift in the economy it will be more difficult to match a potential worker with a corresponding vacant job, therefore matching will be less efficient and costly. Finding a good job with good conditions, benefits and high wages is difficult, because workers are always seeking more and better; more money, better jobs. This means people need to move and adapt to the opportunities, making the process resource intensive and time consuming. Therefore, even when the number of unemployed will equal the number of jobs unemployment will still exist.

Contract theory

Central in contract theory is the existence of an exchange between at least two parties, implementing advice and guidelines towards the goal of achieving the best possible outcome. It is based on the assumption of a short term contract between employer and employee which prevents firms from changing wages in the short run, but allow them to respond to variations in their need for labour through layoffs and overtime.

Businesses and employees have an implicit agreement which guarantees the employee the fact that they will have a job no matter what for a specified time period. In exchange employees agree to work for wages that are lower than a stable economic situation would allow. For instance, when a firm employs a worker on a contract with a set wage, this person is expected to meet the criterias in the contract in exchange for wage. The employer is paying for performance and are giving incentives for the employee to meet the employers expectations.

Contract theory explains why a lot of people are fired during a recession, and also why unemployment rate fluctuates around natural level. In contrast, search theory explains that the unemployment rate fluctuations are caused by misinformation in regards to the demand of labour; how much labour is needed (Bolton, Dewatripont, 2005).

The efficiency-wage

The efficiency-wage model is based on the assumption that companies will increase wages to a level higher than normal, in order to keep or attract qualified workers. There are different variants of models describing businesses` reasons for doing this. One of

these are incentives like higher wages which may encourage employees to be more productive. Another is that a higher wage offer may attract more qualified applicants. If all firms offer an efficiency wage, then aggregate wages in the economy excess the market-clearing level and a general supply of labour. The efficiency-wage theory often maintains the assumption that labour is a homogeneous good and that there is an imbalance between demand and supply in the single labour market. The workers may not be completely satisfied with their jobs, but when the company offers wage way higher than other employers are paying, the employee is more likely to stay. For example, in 1914 Henry Ford doubled the wages of workers to keep them from seeking jobs elsewhere.

Because of efficiency wages being higher than average, some workers will get a higher salary whereas others will find themselves without a job. From Figure 1 it is clear that efficiency wages creates unemployment in the labour market.

Figure 1: Efficiency Wage.
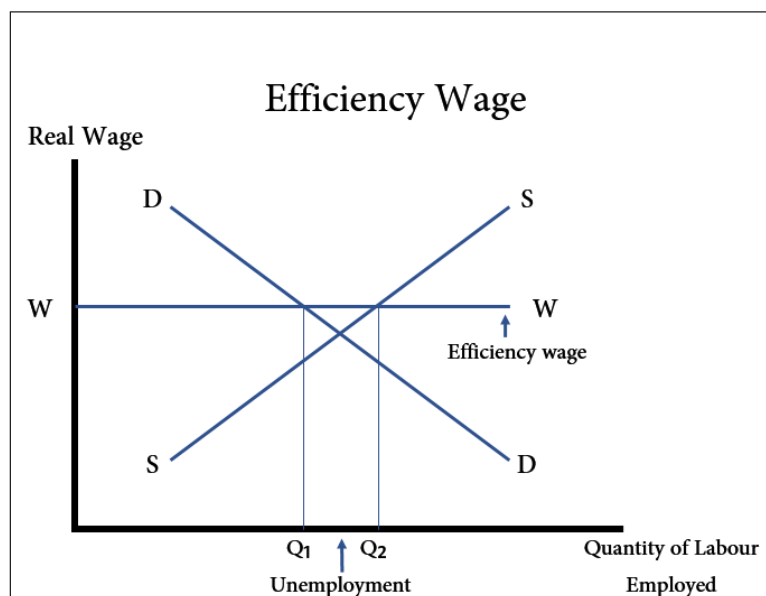
Source: Customized by author

Insider-outsider model

The insider-outsider model is used by economist to discusses and separate the workforce in two groups, the insiders and the outsiders. There are no practical differences between insiders and outsiders in the model, but insiders have a higher degree of influence compared to the outsiders. This gives people in the two groups different starting points when it comes to bargaining for their own interests and rights. Insiders are the employed, the group participating in organized work and the outsiders are the unemployed, standing outside the workforce or having temporary positions or being a part of the informal sector, in addition to people in a starting position looking to become an insider.

The insiders have a greater degree of influence; they can participate in negotiations, have more rights and more weight when it comes to issues surrounding their situation. Insiders get empowered by regulations as well as market power. Also, they have power based on among others the EPL rights. Outsiders have less protection and do not participate in the same degree as the insiders, by far. It is expensive for a company to let a member of its workforce go, or to replace the worker with another, both because of the mentioned reasons but also because of the forming of unions in the work space and their collective experience.

Wage rigidity

The concept of wage rigidity is based on companies reacting to changes along with the demand of their product or service. Wages do impact the labour market through the economical aspects of its nature. Adjusting wages downwards is found not to work and this is an important factor in the labour market engine. However, looking at the Russian labour market in particular, this concept is found not to work. The rigidity of wages are also important for the dynamics of output determinators, in their ongoing cyclical adjustment, along with all the available jobs and unemployment within a flexible wage model which is applicable for Russia.

1.3. Unemployment and Output Gaps - Okun's law and NAIRU

Phillips curve

The relationship between unemployment and other macroeconomic variables has always been arousing interest among economists. Traditionally, the relationship between inflation and unemployment were explained by the Phillips curve (Phillips, 1958). In theory, it is supposed to be an inverse relationship between unemployment and inflation. However, in a real-world situation, it is not very useful to draw a conclusion based on the Phillips Curve (PC). For instance, *Figure 2* shows the relationship of PC indicators in Russia between 1995-2016.

Figure 2: The relationship of Phillips curve indicators in Russia
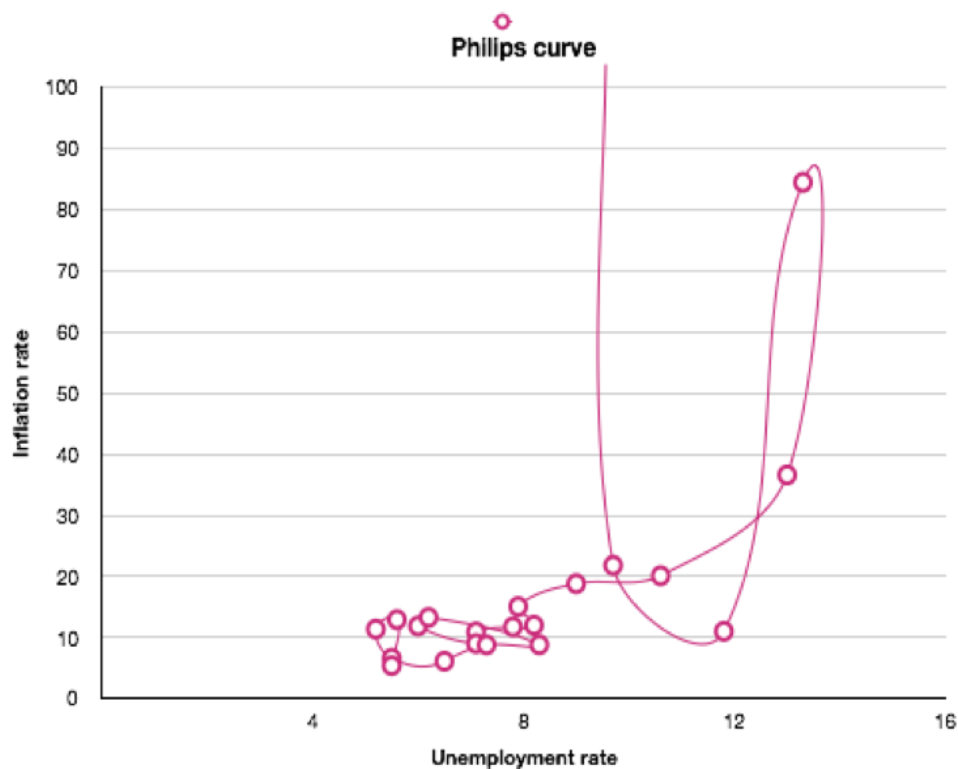
Source: Customized by author

In the second half of the 1980s and up until the end of the twentieth century, the literature on the Phillips curve has been drastically expanding and has been spread into two directions. Gordon (2009) provides an excellent overview of the historical evolution of the

Phillips curve, where he focus on two branches of these developments. On one hand, we have the concept of the so called New Keynesian Phillips Curve (NKPC) which emphasised the absence of inertia. In other words, NKPC excludes the ability of inflation to react on supply shocks. On the other hand, we have a more empirical approach, the so-called "triangle" model (Gordon, 1998) which includes three components: demand, supply and inertia. This branch emphasis the importance of current and lagged values of variables and sensitivity to macro shocks. Further research has shown that the "triangle" model creates forecasting error because of the false assumption that the natural rate of unemployment was fixed.

NAIRU

Nowadays, the idea of a natural rate of unemployment that is changing over time is well known as NAIRU (The non-accelerating inflation rate of unemployment). This indicator better reflects the real-life situation. The model shows that the economy is moving towards its equilibrium. At the same time the unemployment rate at its natural level and the inflation rate is stable.

Okun's law

Okun's law express the relationship between cyclical unemployment rate and GDP growth rate. The natural unemployment rate and the potential output is related thru this law, allowing visualization thru the Phillips curve thru the inflation and output gap relation.

This law can be written using the following formula;

$$Y_t^* = Y_t \left[1 + 0.011(U_t - U_t^*)\right]$$

Here Y_t is the actual real GDP, U_t the actual unemployment rate, *0.011* is the estimated Okun's coefficient for Russia, U_t^* is the NAIRU, and Y_t^* the potential output.

According to Okun's law, GDP declines as unemployment rate grows and GDP grows when unemployment rate falls below its natural rate (NAIRU). In most economies, it has empirical support and fits quite well. However, Russian economy works quite differently.

2. THE RUSSIAN LABOUR MARKET

2.1. Specificity of Russian labour market

Russia has during the last two decades developed its own model of the labour market which is quite different from the market in the Western world, according to director Tatyana Maleva of the Institute for Social Analysis and Forecasting at the Russian Presidential Academy of National Economy and Public Administration (Kuvshinova, 2015).

It is assumed that the Russian Labour market has a very high level of hidden unemployment. One of the main reasons for this is recend to be that many unemployed are not receiving unemployment benefits, and therefore are not being registered with the Russian Federal Employment Service. The most interesting fact though is that during economic downturn companies instead of firing workers prefer lowering wages. Moreover, people accept this, due to fear of being unemployed and the lack of alternative options. Russia has a tradition deriving from the Soviet era to keep employees no matter what, to prioritise social stability at the expense of market economy. Thanks to this heavy cultural influence, the unemployment rate is very low compared to Eastern Europe (Goodrich, 2016).

Minimum wage

The discussion about minimum wage laws and how high it should be is still on-going in many countries. The basic concept is to establish a price floor, so that firms can not pay its workers lower than this amount. Some classical and neo-classical economists argue against near all forms of government interventions in competitive markets. They argue that minimum wage not only lead to unemployment but also harms people which it is claiming to help. Their logic is that instead of paying more to unskilled workers, businesses would rather hire skilled workers. And instead of earning a minimum wage, unskilled workers will end up without a job earning nothing. Institutionalists, however, recognise several benefits of implementing the minimum wage law and argues that the labour market isn't as competitive as classical economists suggest. Some of the benefits are for example:

1. Balance the bargaining power between employees and employers;

2. Support macroeconomic stability and stimulate employment;

3. Promote long term efficiency and growth;

4. Integrate into the analizis social cost of labour and externalities (Kaufman, 2010)

But even among economists who support the minimum wage, there is a disagreement on how high it should be and what raising the minimum wage might do to the economy.

According to art. 133 of the Russian Federation Labour Code, minimum wage is established at federal and regional levels. In 2000, the law on the minimum wage was officially implemented in Russia. The minimum wage rate in Russia has been changed 16 times since the year 2000. From 01.01.2018 the minimum wage will be 9489 RUB ($148) and for comparison, the living wage (cost) for the second quarter of 2017 was 10329 RUB ($161) (TASS, 2017). That means that the minimum wage in Russia covers on average only 90% of the minimum cost of living in the country. The evolution of the minimum to the average wage is presented in *Figure 3*. Starting from January 1, 2009, the minimum wage almost doubled and the amount was increased from 2,300 RUB to 4,330 RUB. According to the minister of labour, towards January 2019 the minimum wage in Russia will reach 100% the subsistence level.

Figure 3: Evolution of nominal and minimum wage in Russia
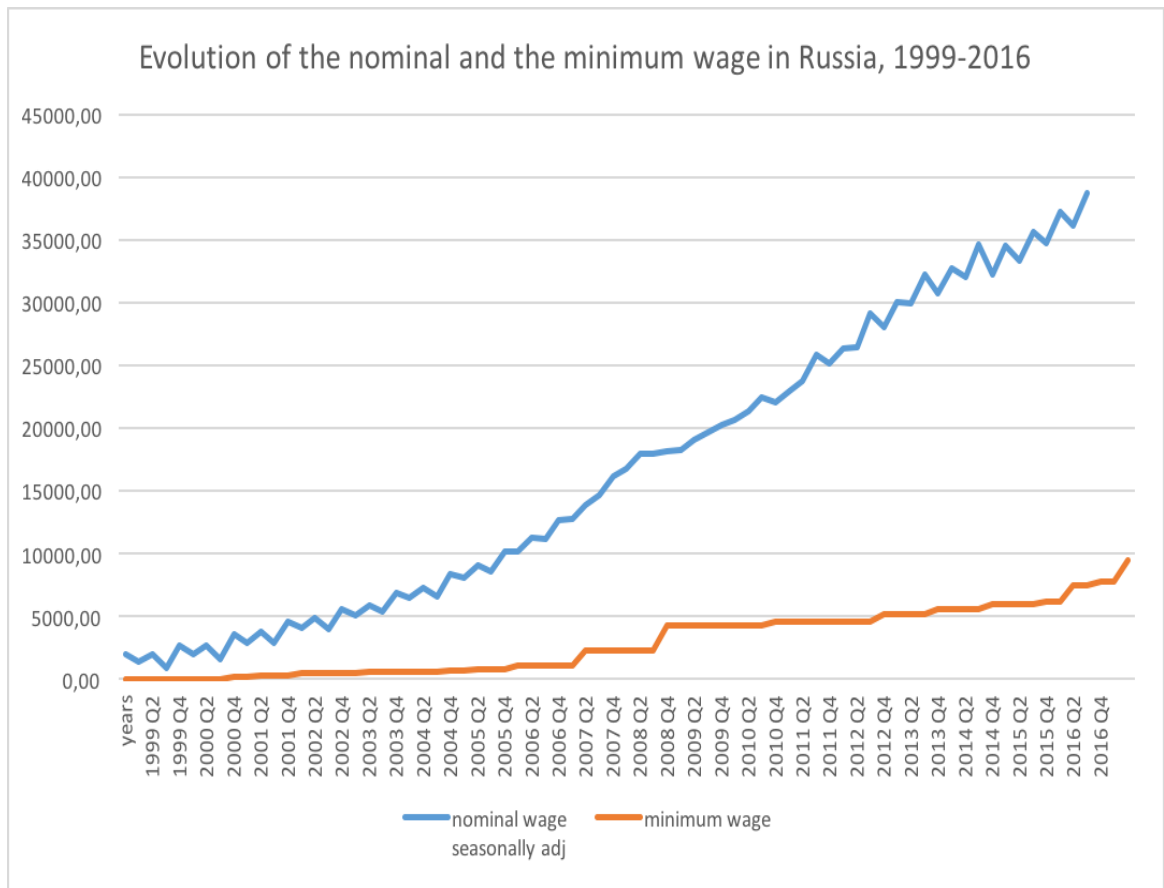
Source: Customized by author

Unemployment benefits

Unlike most government payments which are annually adjusted for inflation, unemployment benefit did not increase since 2009 and is today 850 RUB, which when converted by todays exchange rate is slightly more than 13 Euros. The maximum amount for unemployment benefit is today 4900 RUB, which is approximately 77 Euros.[1] Each year, the Russian government decides on the minimum and maximum amounts regarding benefits, but unemployment benefits has stayed unchanged. This situation is confusing because even the size of the maximum unemployment benefit is far below the subsistence

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[1] The Government, *Resolution № 1326 "About the size of the minimum and maximum values of the unemployment benefit for 2017"* [http://pravo.gov.ru] [published 12.12.2016, accessed 3.01.17] Retrieved from:

level in the country, which is 8000-10000 RUB (125-156 €).[2] This might be some of the explanations why many workers choose to have their salaries reduced instead of losing their job and have the poor unemployment benefit as their only income. Workers choose to rather have reduced salary than staying without a job and living on the poor unemployment benefit alone.

Severance Pay

Severance or redundancy payment is the compensation that an employee receives in the case of being laid off. The amount depends on the grounds for termination and is equal to the average monthly salary of an employee. The calculation is made on an individual basis, taking into account the income received and the reason of leaving the job. If the organisation has decided to reduce the number of employees, it is necessary to take into account that each worker who falls under the reduction is entitled to the employment benefits. According to articles 127 and 178 of the Labor Code of the Russian Federation, the termination of an employment contract with an employee provides for the following payments:

1. Severance pay in the amount of the average monthly earnings (paragraph 1 of Article 178 of the Labor Code of the Russian Federation);
2. Compensation for all unused holidays;
3. The average monthly earnings for the period of employment, but not more than two months from the date of dismissal - after deduction of severance pay) (paragraph 1 of Article 178 of the LC RF).

Employees terminated due to liquidation of the firm or redundancy are entitled to a severance payment equal to their average monthly wage. Payments gathered for the previous 12 calendar months are divided by the number of actual working days during that period, and multiplied by the number of days in the following month. The employer must pay this during the period employees are looking for a new job, but for no longer than two months from the date of termination. In case the employee does not find a job within the

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[2] The Government, Resolution № 1275 *"On establishing the minimum subsistence per capita and for the main socio-demographic groups in the Russian Federation for the III quarter of 2016"* [http://pravo.gov.ru] [published 05.12.2016, accessed 3.01.17] Retrieved from:
http://publication.pravo.gov.ru/Document/View/0001201612050015

first 2 months, they are entitled to one additional month. Exceptionally, an employee from far northern regions can receive their average monthly salary up to 6 months following the date of termination, based on decision from the firm.

An employer also has to follow the minimum requirements set by law, but do have the possibility to settle on a severage pay higher than minimum in cases where for instance the parties agree to end the cooperation prematurely. In such cases both the employer and the employee might be gained with the employee stepping away from a position on a short notice or before the end of an agreed term, in exchange for, for instance, an agreed upon 6 months salary.

Two-tier wage structure

Another specific feature of the wage flexibility in the Russian Labour Market is so-called two-layer wage (двухъярусная зарплата). The first layer is a fixed part included in the contract, whereas the second layer is a form of bonus or reward depending on both company and employee performance. This last part gives the company more room for adjusting its cost instead of laying off personnel. These factors, in addition to the very low minimum wage[3] of 7500 RUB per month help companies quickly and at a relatively low cost adapt to the situation.

In both the private and public sector in Russia, the individual wage typically consist of a two- tier structure, the first tier being a fixed, basic and tariff-based salary which is rigidly contracted, whilst the other one is variable and therefore more flexible. This second tier includes the different bonuses or wage premiums which both depend on and come as a result of the firm's specific performance and the economic trend, fluctuating with the up and down periods the firm might be experiencing. The second tier with it`s flexible character means there are risks involved, both for the worker and for the firm, especially in uncertain economical situations. Regardless it is clear that most risk is taken on by the employee, wich stand to make far less in down times then when the economy is blooming.

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[3] Federal Law № 164-FZ "On Amendments to Article 1 of the Federal Law" On the Minimum Wage″ [http://pravo.gov.ru] [published 02.06.2016, accessed 3.01.17] Retrieved from:
http://publication.pravo.gov.ru/Document/View/0001201606020022?index=1&rangeSize=1

In the public sector, such as federal or local funded public schools and universities, hospitals etc., regulations are much stricter and more closely regulated by the government than in the private sector. Even so, they follow much of the same logic when it comes to the two-tier wage settings, were the variable part is connected to revenues of the regional or local budgets, which in case gets richer benefits the public sector workers in which budget they are funded.

At the same time, temporary employment is another common solution which employers propose. The number of temporary workers is growing, especially in the automotive industry. Workers are transferred onto a shortened working week and put on unpaid leave. One of the biggest automotive manufacturer in Russia "AvtoVAZ" in effect from February 15 2016, transferred its employees to a four-day working week for a period of six months, according to the TASS newspaper (Sokolov, 2016).

Even so, the Russian Labour Market seems to be able to adapt and stabilize the situation. The unemployment rate has been decreasing and even though the unemployment rate is one of the key indicators to determine the overall state of the economy, GDP has continued to decline and by the end of the third quarter 2016 had an annual GDP growth rate of -0,4 %.

2.2. Nominal Wages and Labour Productivity

Nominal wages

Nominal wage is wage which is not adjusted for inflation. It does not accurately represent the purchasing power the wage. Ideally, the concept of wage rigidity is hold and wages are not sensitive to the business cycle. However, the wages in Russia are adjusting to shocks. If wages do not fall during adverse shocks, this may increase layoffs and opposite; If wages adjust in response to shocks, the unemployment rate will not increase.

Labour Productivity in Russia

The Federal Service for State Statistics is responsible for calculating and generating statistics in regards to the economy and economic market-priced activities, and also the dynamics of labour productivity in Russia. Changes in total labour input (full employment) and indices when it comes to the physical volume of GDP is quotientally divisioned to find

the economic change in the labour productivity index.

From 2010 the labour productivity index has been calculated as a quotient from the division of the index of physical volume of added change and value in total labour costs of "Economic" activities, as of which it before 2010 instead was for output and changes in "pure" activities. In regards to GDP, added value and output is calculated from these indicators at constant prices and their absolute values. When it comes to the total labour costs and its change index, labour cost for all types of work are included, here also work and production for own consumption, were full employment are reduced to conditional employees, a methodology approved by the Order of the Federal State Statistics Service in 2013. For instance, during the recession in the nineties the shortening of work hours brought labor costs down, but not enough to adjust for the GDP fall.

2.3. Protection legislation and enforcement mechanism
Labour Market Regulations and enforcement mechanism

The Employment Protection Legislation (EPL) in Russia is strict, reminiscent of the socialist past, and has not been revised much since its implementation, with only small revisions and additions. The labour legislation is enforce regionally, even though it fall under federal law and jurisdiction, being valid across Russia. The main regulations within EPL in Russia are formed and stated in the Labour Code(LC), lastly revised in 2002. This new LC revision was deeply based on the prior Labour Code, but was intended to produce a more organic legislative in regards to the labour market, along with bringing employment issues into the light of the public eye.

Stating several key point stipulations for the labour market, the LC among other covers the firing of employees for reasons of an economic character, were workers employed have to get a minimum of two month warning in advance before the termination are set into effect. In addition, they must be given compensation in the form of severance pay, which are to be equivalent to minimum 2 months average salary, and up to six months average salary for workers living in remote regions, along with regions with an unfavorable climate. In some cases the severance pay can reach as high as a full 9 month average pay based on the monthly wage. Firing cost are also equal across employee preferences, making it just as costly to fire a long-time employee with much accumulated

experience as it will be firing a newcomer. This in contrast to rigid labour markets countries in the OECD, were it will be much more expensive to fire a long-time employee compared to a short term, recently hired worker.

There are also other important regulations in the EPL, like the regulations of contracts with a limited time span, also called fixed-term contracts. These are strictly limited and does not offer much flexibility, witch interpretation was further limited by the Russian Federation Supreme Court in 2006, with clarification and additions to the LC.

Enforcement

The differences of enforcement in regards to EPL are huge across the different regions of Russia, were different trends have emerged. For instance is there a lower chance of EPL violations in economically diversified regions and areas with a more collective labour marked. In contrast violation reports is seen more frequently in ethnic minority groups as well as territories in the north of Russia. Efforts have been made to study the EPL enforcement by looking into the roles of judiciaries in different regions, were findings are pointing to inconsistencies in the enforcement of Labour market regulations (LMR) depending on the size of company, region and law segment introduced. There have also been efforts in looking into this variable enforcement of the labour market regulations in regards to bankruptcy regulations and the oncoming result of this, concluding with the existence of politically motivated bias, wich again plays an important role in restructuring companies performance preferences.

Even so, inefficient and targeted interventions show the weaknesses of the regional institutions in Russia, with enforcement organs being relatively reticent. The result of this variable enforcement is more likely to show a low unemployment rate, as stricter enforcement of the already strict legislation is shown to impact the unemployment rate in the other direction, showing it increasing in regions with strict EPL enforcement. This calls for diversity in social and economic sectors of the regions, as well as the political, shown to make the enforcement of EPL more hentrogenic.

One of the key features that makes the Russian labor market special is that there is a weak enforcement mechanism. Normally it is assumed that rules and engagements are followed and contracts are enforced, if not, actual outcomes would become quite different

than expected. Weak enforcement destabilize the labor market and increases uncertainty for businesses and their employees. Poor enforcement is typical for many countries, especially with the transition economies. The Russian labour market is highly heterogeneous with a lack of a tradition of obedience to the law. This may explain the puzzling association between stringent regulations (on paper) and remarkable flexibility (in practice). Non-observance of laws and rules is a key element of the observed flexibility.

It could be argued that weak enforcement reflects a weakened capacity of the state, and this will therefore be viable for all of the major wage and employment regulations. The lack of observance of the law is well known by labor market agents, with many enforcers believing that EPL observance is posing problems. Despite plans from the Russian authorities in the early 21. century to bring more law and order into most aspects of the Russian economy, a opposite effect was seen were businesses started seeking less regulated and less monitored areas instead. Even so, the new regulations did bring some positive additions to the labour market, helping to slow the wage arrears epidemic, and for instance made it a crime not paying wages on time, even punishable with imprisonment. Despite this, it did not bring any order to other areas of the economy, but on the contrary created uncertainty for both businesses and workers.

2.4. Demographic and Migration

There are several analysis of the causes of unemployment, but one of the first, developed by the economist T. Malthus in the paper "An Essay on the Principle of Population in the late 18 century states that demographic reasons causes unemployment, with the result that the population growth rate exceeds the production growth rate.

When it comes to migration flows there are very little regular and consistent statistics collected, but comparing the year 1989 with 2002 shows that there were nearly 11 million immigrants coming to Russia during that period, which equal to 15% of the workforce in the Russian Federation. But this official statistics only capture a small share of the temporary labour migrant, and estimations made by the Federal Migration Service also shows that more than 95% of immigrant don't go through the official channels, therefore avoiding the scope of statistics. Furthermore, it is estimated that around 3-5 million, or 2-3,5% of the total population in Russia consist of undocumented immigrants (Andrienko and Guriev, 2005).

Slowing the natural population growth rate would require a net immigration of around 1-1,5 million people a year (United Nations, 2008). Even though Russia didn't have any migration policy before 2007, it is evident that migration play an important role in slowing the population decline. Despite this, the Russian government in 2010 cut the quota for foreign employees in half. Until 2006 the number of work permits given was very limited, only valid for three months at a time, which meant migrants had to leave and re-enter the country to be eligible for a new permit. A work permit is also needed for all foreigners with a temporary residence permit in Russia. However, for Soviet citizens, there are no requirements when it comes to visa.

The aspect of internal migration is also an important factor, re-distributing the labour resources of Russia more efficiently, of which there are great improvement potential given the Soviet legacies, helping miligating the huge inter-regional imbalances within employment in the country. A low estimate recons that there are around 2,3 million unemployed in Russia, given a natural unemployment rate of 5,5%, of which could find jobs in the many regions with high unemployment and lower wages. There have been some reallocations already, but still there are millions to move.

Eksternal immigration along with internal migration are critical factors for the economic and social development of Russia, and the country is currently in the midst of a crisis when it comes to demographic. Depopulation are likely to continue for decades, and so is the aging population. This means that Russia imminently will have the problem of a shortage of people within the working age demographics. The 1-1,5 million required immigration estimate mentioned is therefore an important factor to compensate for these factors, with the additional potential of tens of millions skilled residents of former Soviet Union countries, of which are willing to migrate and already know and use the Russian language.


2.5. Shadow economy and unemployment

Other potential reasons for such a low unemployment rate can be the missing percentage in GDP which is called the grey economy, where substantial amount of people might be "employed". Hence, these people do not appeared in official statistics of unemployment. Figure 4 below shows the estimated missing percentage of GDP in

different countries. Even in countries with well established institutions and strong administrations there will still be a significant level of shadow economy. For example looking at the UK which in 2017 had an estimated shadow economy of 12.5% or Germany with about 16%. The estimated shadow economy of Russia makes out more than 40% of GDP, which may evolve a higher % of working population. Therefore, a significant part of the active population which we consider being unemployed, can possibly be working in informal sectors.

"Russia's underground economy blows away other major countries in terms of the size of the underground economy relative to GDP." (Business Insider, 2013)[4].

*Figure 4: Shadow Economy as share of GDP, %*
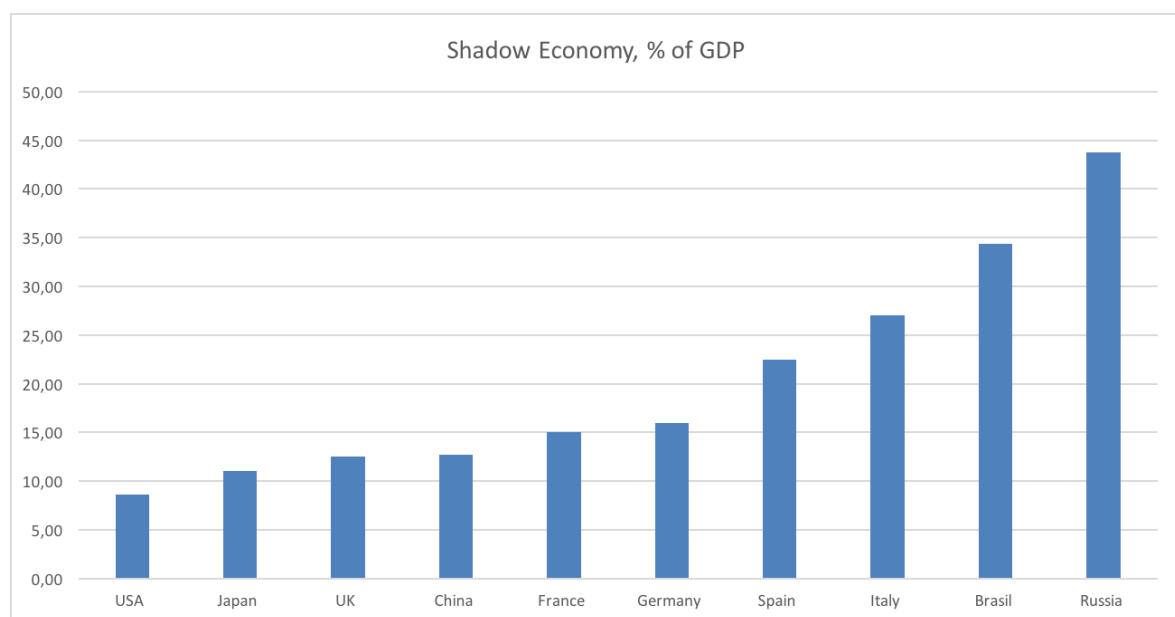
Source: Business Insider 2013, Customized by author.

Some studies determines the number of employees in the informal sector to be around 15 million people, or around 20% of population (Veredyuk, 2016).

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[4] KELLEY, Michael B. Russia's Underground Economy Is Massive. Business Insider, 2013.[published 15.02.2013, accessed 3.12.17] Retreated from: http://www.businessinsider.com/russia-largest-underground-economy-in-the-world-2013-2?r=US&IR=T&IR=T

One would assume the government sector in Russia to be quite substantial, but it turns out that the private sector is the largest. AS shown on *Figure 5*, the private sector accounts for the largest employed economy, followed by government and the mixed, then international sector.

Figure 5: Average % of employed in the economy by ownership type in 2015.

Average % of employed in the economy by ownership type in 2015

- Government
- Private
- Property of public and religious organizations
- Mixed
- International
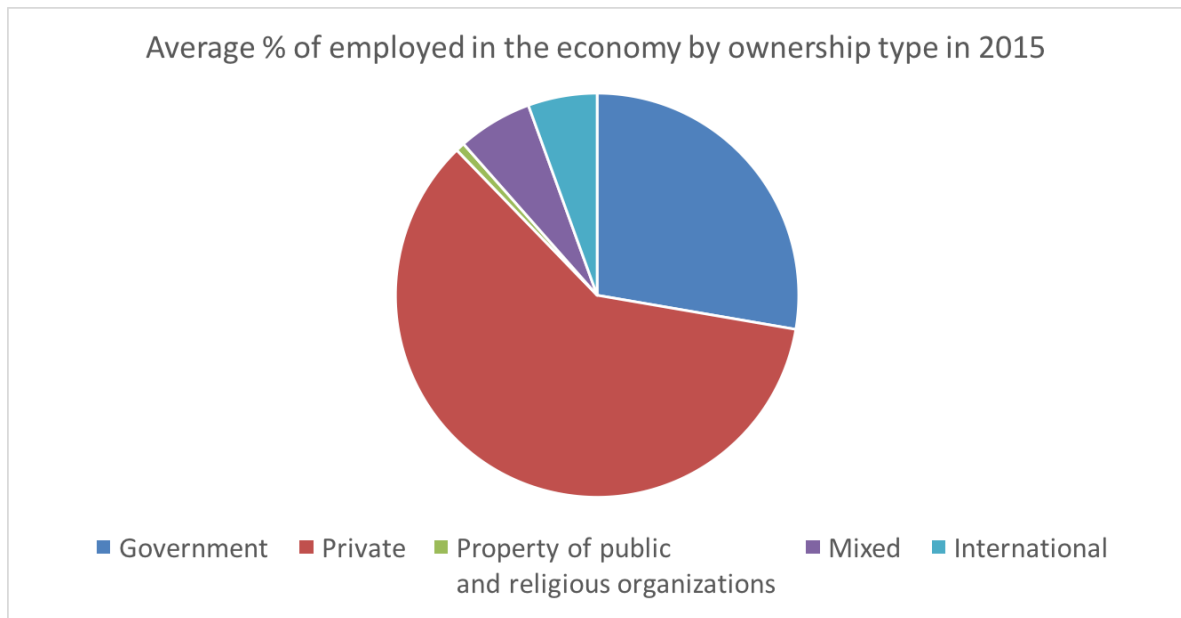
Source: Rosstat 2016, Customized by author.

2.7. Trade unions and wage agreements

Trade unions (TU) will, if containing enough members, be powerful enough to influence and constrain the flexibility of wages. When negotiating wages, they normally empower managers on the topic of employment adjustment, even though this is governed by EPL. The wage-setting in Russia seem to be highly centralized, seen from a conventional standpoint, even though it`s Soviet past might suggest quite a rigid corporatist arrangement (Cazes, 2000). It consist of a multi-layer structure of negotiation with adopted tripartite agreements of national levels. With the Tripartite Commision as first layer, it is followed by employers' associations, industry level tariff agreements and sector-specific trade unions as well as tripartite agreements at regional level.

According to some reports, as much as one third of the total wages are not fixed in

contracts, remaining contingent upon performance. Also, government can easily block TU initiatives at any level, which will only be accepted if agreed upon by the government, making the whole corporatist structure shallow and mostly just a facade (Clarke, 2007).

The number of trade unions has slowly gone down even though it still remains quite high in corporate sectors. The Federation of Independent Trade Unions of Russia (FITUR) reports to represent around 70% of the workers in both large and medium companies in Russia, showing it self at the largest trade union in the Russian Federation. There are, though, some controversy to these numbers, claiming many of these workers only to exist on paper, with an annual loss of members of around 5% in the 2000`s (Clarke, 2007).

Looking past the segment of medium and large firms employing around 50% of the workers within the Russian economy, trade unions bearly exist. In part this is because of changes in labour force structure, going from large scale industries to the service sector, where small firms has prevailed in light of rising heterogeneity without the need of TU and their segmentation, but also due to high wage inequality in the TU sector, showing signs of low TU capacity in the large upper tier of the two-tier wage system and low strike activity. The opposite results and effects would be expected if the trade unions were stronger and more influential.

EMPIRICAL PART

3. Methodology

The second part of my thesis is an empirical analysis. In order to unveil the pieces of the puzzle, this thesis empirically analyses potential reasons which can explain the behaviour of the Russian labour market, in particular, the unemployment rate. Firstly, I will define research-questions and methodology of data used. Secondly, I will build and test a model of Russia unemployment rate. Then, I will interpret the results and draw the conclusion.

Aims of research

The primary goal of this thesis is to dispel the issues surrounding the low unemployment rate in Russia by implementing variables which might have a significant effect on the Russian labour market. The aim of this work is to analyse factors influencing unemployment rate by using standard econometric tools, as well as to evaluate to what extend these factors influence the behaviour of the unemployment rate. I will not be questioning quality and reliability of data collected, but will look into the amount of data collected. Therefore, my basic assumption is that we can rely on the data and statistics collected thru official sources.

Hypothesis: The low unemployment rate in Russia depends on demographic factor and output gap.

Auxiliary hypothesis: It can be explained using a standard economic tools.

Figure 6: GDP Growth and Unemployment Rate
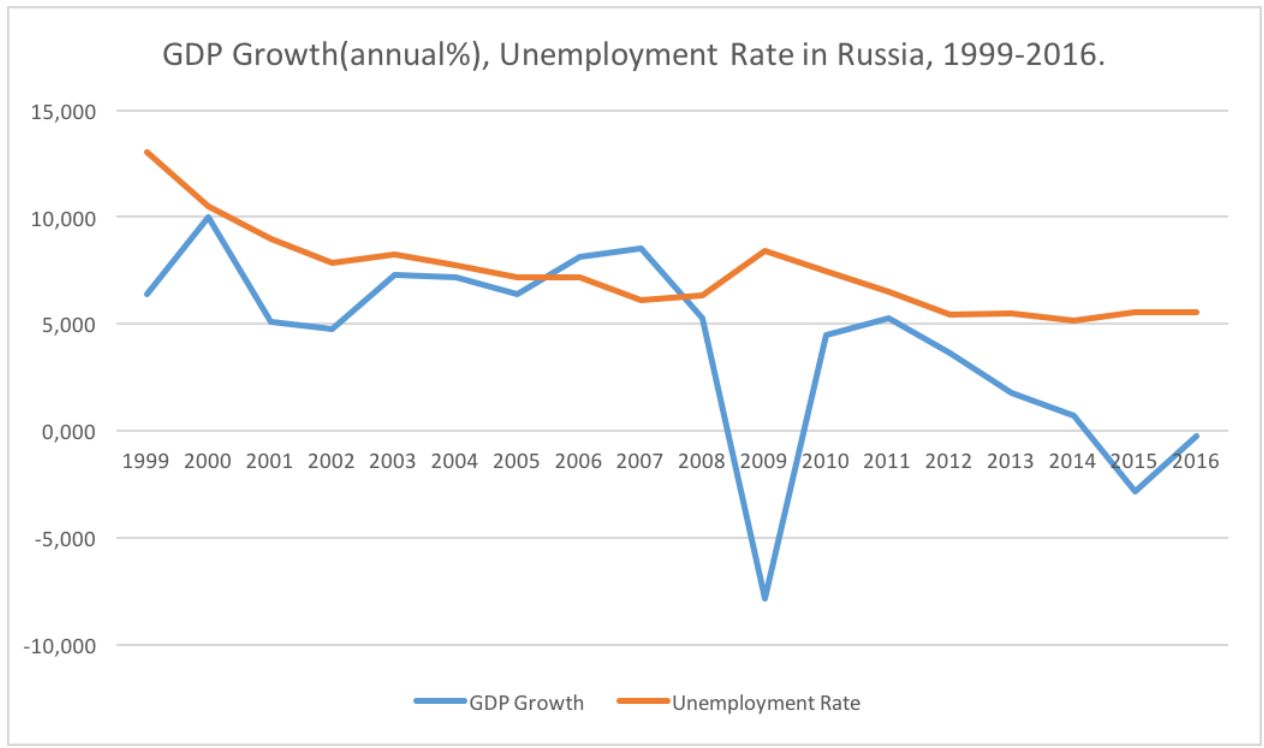
Source: Customized by author

4. Data

Statistical data for Russian macro- and microeconomics indicators has evolved differently due to the history of the Russian Federation. It is very difficult to find any registered statistical information about Russia's economic performance before the 1990`s, mainly because of the lack of statistical gathering and recording of data in that period in time.

There were several issues with both collecting and the consistency and availability of data:

- Availability of data before the year 1993 was scarce. Some of the indicators such as CPI and Labour Productivity was only available from 2005.
- Indicators such as Potential Output and NAIRU was not calculated by Statistical Office for Russian Federation.
- Net Migration, Labour Productivity Index and Population Growth have only annual frequency.

In my thesis I employ quarterly observations of selected indicators covering the period from first quarter 1999 to fourth quarter 2016. The length of this time-frame has been selected because of accessibility of data, highly necessary for the estimations themselves. The data are sourced from Federal Statistic Service, World Bank and my own estimations. In total, 72 observations on the following 8 variables are used for parameter estimation and test.

During the data collection process I faced difficulties obtaining necessary information. Considering that Russia is not a member of the Organisation for Economic Co-operation and Development, and the fact the Russian Statistic Service doesn't record information about NAIRU, Potential GDP and Output Gap, I decided to estimate these variables by using the Hodrick-Prescott filter.

Hodrick-Prescott filter (1997)

Hodrick-Prescott (HP) filter is one of the most frequently used methods of estimation NAIRU, Output Gap and Potential Output. It is used by many national and international institutions, such as for example OECD.

The HP filter minimises the sum of squared distances by removing the cyclical component of a time series from the initial dataset. The adjustment is happening by modifying a multiplier λ lambda. The parameter λ performs as a constraint and captures the importance of cyclical shocks relative to trend shocks. A smaller value of λ indicates a smaller magnitude of cyclical shocks. The result is used to obtain a curve which is sensitive to trend fluctuations. This makes a time series smooth and flexible, one that is more sensitive to long-term than to short-term volatility. This tool is very useful and attractive because of its simplicity. However, it is important to mention that the estimates are dependent on the assumption of normal distribution of error elements.

Estimating NAIRU using HP Filter

NAIRU is an unobservable variable and to estimate it is necessary to apply econometric tools. There are several methods to estimate NAIRU. As mentioned above, I selected HP filter which divides the unemployment rate into two components; the trend, or NAIRU, and the cyclical component. At the last part of the calculation, the Hodrick-

Prescott filter was used with the lambda coefficient of 1600 for quarterly frequency data as suggested in the literature (Hodrick, 1997). The results of the sensitivity analysis presented in *Figure 9* demonstrated that the NAIRU series follows an extremely smooth path when estimating with the HP filter. Accordingly, the unemployment gap series estimated with the HP filter is the difference between the unemployment rate and NAIRU. From *Figure 7* we see that in the end of the twenties century there is a relatively high positive unemployment gap, which turns negative in the beginning of 2000 and is slightly growing until the middle of 2002. Turning positive in 2003, it narrows considerably until 2007. In between 2007-2008 there is large negative gap which turns significantly positive in 2009.

Figure 7: Unemployment Gap
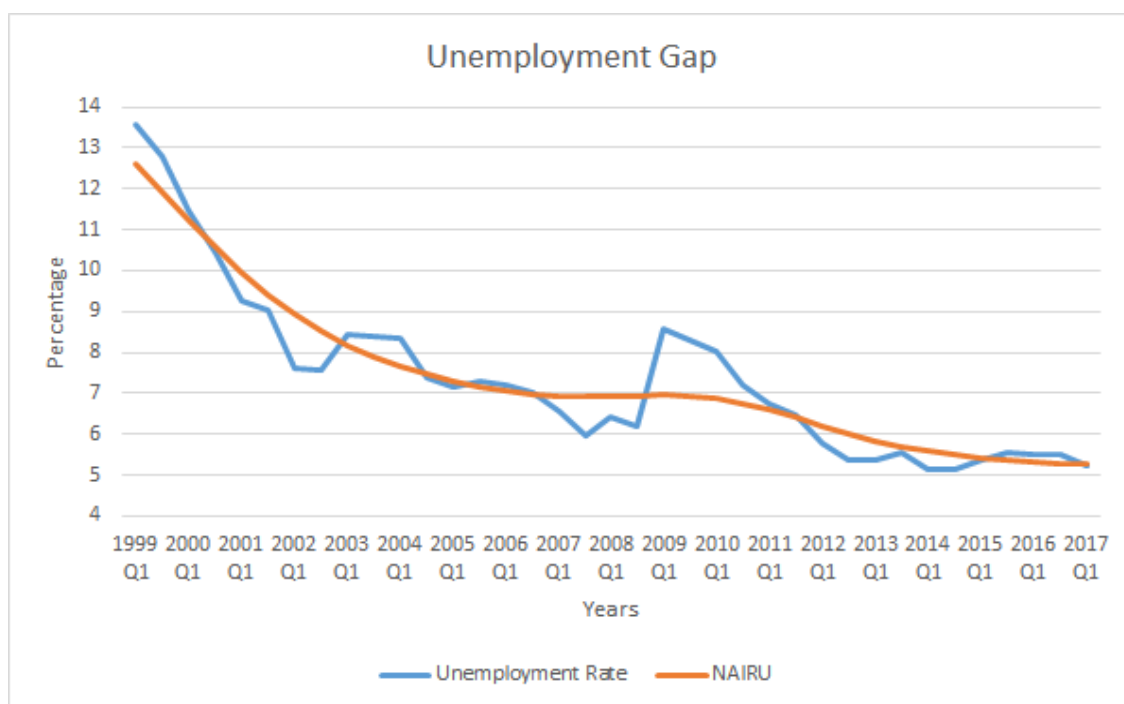
Source: WB and own calculations.

Estimating Potential GDP and Output Gap using HP Filter

The real GDP data were collected from Rosstat in quarterly frequency, meassured in billions of RUB. The series I worked with is for the years 1999–2016. I estimated potential output by applying HP filter in an econometric software called R studio, and the calculated output gap is the difference between potential and real GDP. By applying this method, the GDP time series are decomposed on trend and cyclical components, where its trend part represents potential output. I have generated my own set of data using a simple method, however, it is important to mention that Russian economy is large and complex, and the results can only be used as approximation of the time series. A study from Dana Kloudova in 2016 regarding estimation of output gap and potential output for Russian's economy shows a good graph including several method calculating output gap.The *Figure 8* represents output gap in percent of potential output.

Figure 8: Estimates of output gap according to the selected methods
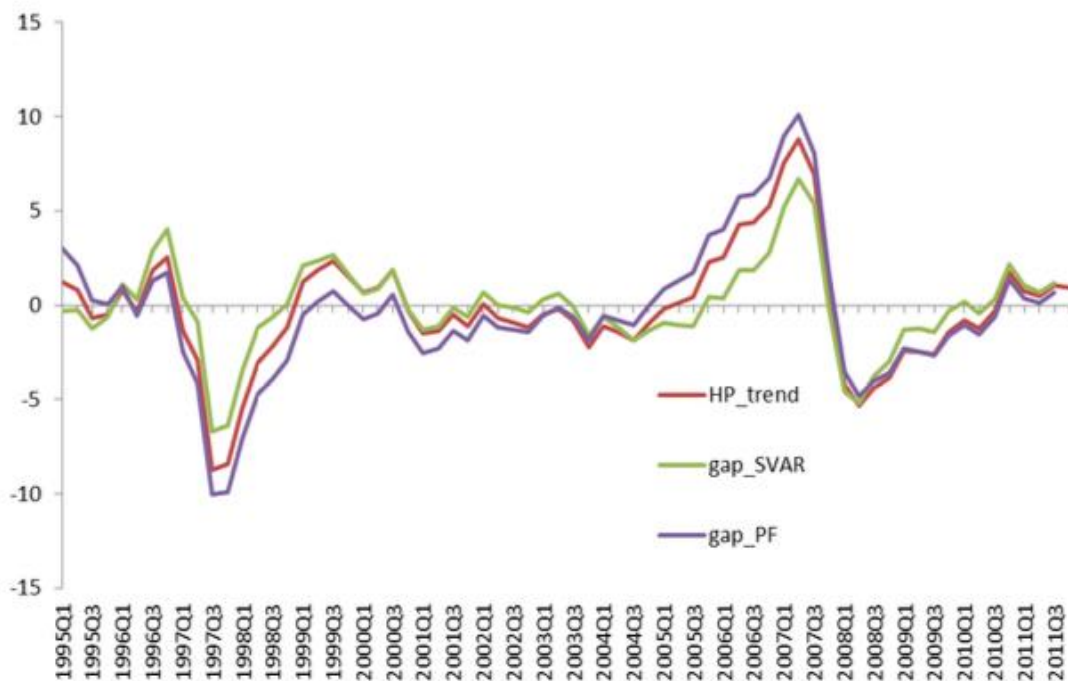
Source: Kloudova, 2016

I derived this series using annual data of GDP per person employed, which was made available in the World bank database. The formula for calculating LPI is as followes:

$$LPI = \frac{(GDP\ per\ person\ employed)\ t}{(GDP\ per\ person\ employed)\ t-1} * 100\%$$

The results are summarised in the *Table 1* and visualized in the *Figure 9*, where it is compared to unemployment rate.

Table 1: Results of the regression model

Year	GDP per person employed	Labour Productivity Index
1999	27963,76758	99
2000	29760,73047	106
2001	31305,54688	105
2002	31951,4668	102
2003	33724,84766	106
2004	35513,4375	105
2005	37153,41797	105
2006	39970,28125	108
2007	42271,85547	106

2008	44345,5625	105
2009	41872,32031	94
2010	43523,17188	104
2011	44764,48828	103
2012	45875,65234	102
2013	46773,32422	102
2014	47134,95703	101
2015	45760,17969	97
2016	45831,50781	100
2017	46741,99219	102

Source: WB and own calculations.

If we take a look at the *Figure 9*, we can notice negative correlation between variables. We also know that LPI is related to GDP and the number of employed people in the economy. We can spot 3 falls in LPI; at the end of 90s, between 2008-2010 and in 2015. These drops in values can be explained by economic challenges which Russia went through in those periods.

Figure 9: Labour Productivity Index and Unemployment rate in Russia
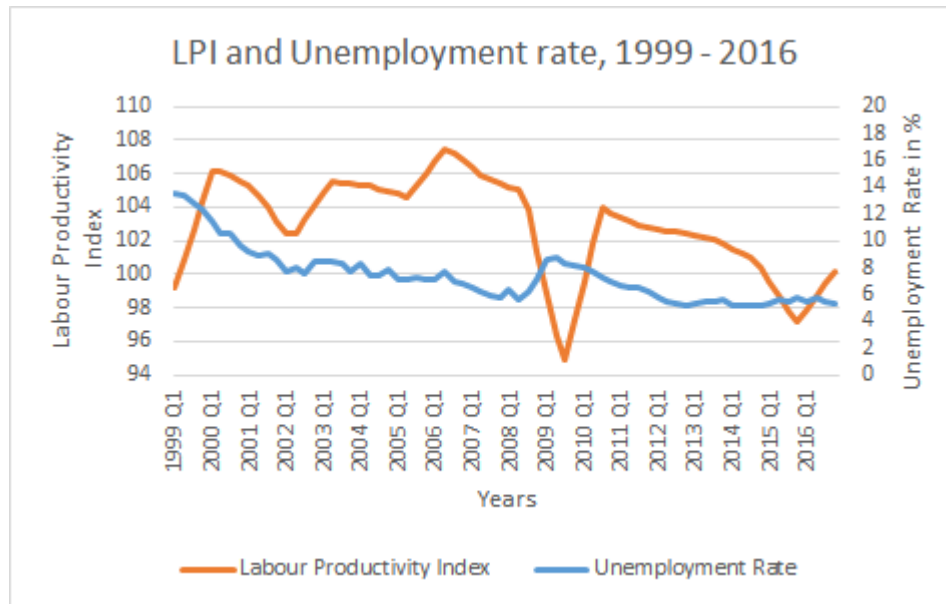
Source: customized by auter.

Interpolation

Some of the indicators such as Net Migration, Labour Productivity Index and Population Growth were available only in annual frequency. Therefore I used the approx() function in R studio to interpolate the data.

5. Model

I have chosen the OLS model because I would like to test the drivers which are significant in defining unemployment rate.

5.1. Assumptions

It is important for the OLS model to hold the Gauss-Markov assumptions of best linear unbiased estimators. Thus, for time series analysis it is necessary to check the variables on stationarity, heteroskedasticity, autocorrelation, multicollinearity, as well as on seasonality and trends.

Normality of residuals

In order to test normality of residuals, I used the The Shapiro-Wilks test. This test rejects the hypothesis of normality when the p-value is less than or equal to 5% of significance.

Hypotheses of this test are the following:

H_0 – normal residuals;

H_1 – non-normal residuals.

1) If $p > 0,05$, then we can accept H0 and conclude that residues have normal distribution;
2) If $p < 0,05$, we can't accept hypothesis of normality.

P-value of the test I have conducted is 0,2232. Therefore, I accept H0 on 5% level of significance and can conclude that the distribution of residuals is normal.

Seasonality and Trends

Most of official statistics do not have seasonal patterns because they are seasonally adjusted before they are reported for public use. However, Consumer Price Index and Nominal Wage were not seasonally adjusted. I applied "decompose" function in R studio and eliminated both trends and seasonal patterns from my time series.

Multicollinearity

Before building a regression model, it has to be tested whether there is a correlation between independent variables, and how high this intercorrelation is. I used Variance Inflation Factors (VIF) method to measure multicollinearity. In this model, the critical value is 10, which express perfect multicollinearity. As *Table 2* shows, none of independent variables exceed the critical value. Even though the variables such as seasonally adjusted CPI and population growth rate have high values, multicollinearity in the model is considered to be within acceptable level. By adding variables such as net migration and labour force, the values of VIF rise significantly for almost all the parameters.

Table 2: The result of VIF, Collinearity test

lag_UG	OG	dif_LPI	adj_CPI	PG
1,16	1,20	2,58	9,80	9,34

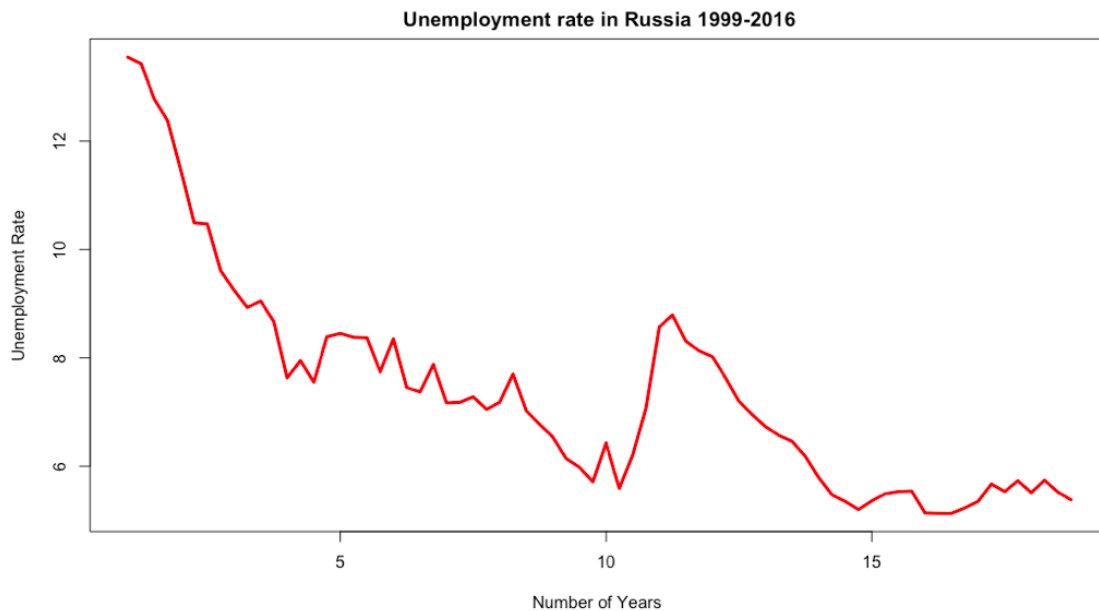*Source: R studio, Customized by author.*

Autocorrelation

To determine whether or not there is autocorrelation in the series I applied the Durbin-Watson test. The Durbin-Watson values are between 0 and 4 where numbers close to 2 indicate that there is no autocorrelation, numbers approaching 0 shows positive autocorrelation and numbers approaching 4, negative autocorrelation. According to the results of the test DW=2,3377 and p-value is 0,8136, which indicates that there is no autocorrelation in the model. It can be easily explained by the lagged unemployment gap variable.

Stationarity

Before we can build an OLS model, the time series has to be stationary. Time series is considered stationary if its mean level and variance stay constant over time. *Figure 10* presents the graph of the Russian quarterly unemployment rate series for the period January 1999 to December 2016. In *Figure 15* and *Figure 16* placed in the Appendix, a summary of statistics for unemployment rate are presented.

Source: Plot from R studio, Customized by author.

As for the stationarity I have used two tests: Augmented Dickey–Fuller test (ADF) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests.

Hypothesis for ADF test:

H0: non stationary

H1: stationary

1) p < sign. level - reject H0 - stationary

2) p > sign. level - can't reject H0 - non stationary

According to ADF tests for the unemployment rate and the differenced unemployment rate, both of the variables have a p-value higher than the significance level. Since the results of ADF tests were ambiguous, I decided to use another test to level stationarity KPSS.

Hypothesis for KPS test:

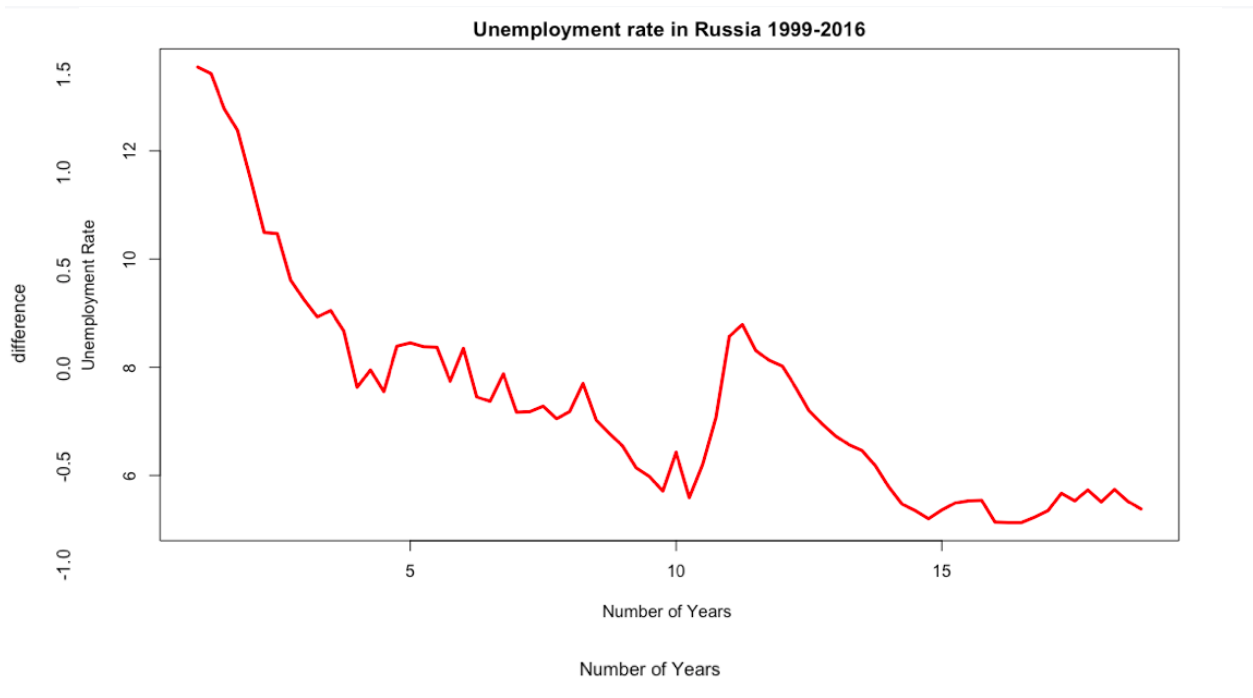H0: stationary

H1: non stationary

1) p < critical value - reject H0 - non stationary

2) p > critical value - can't reject H0 - stationary

The results of the KPSS tests showed that the unemployment rate has a p-value smaller than 0,01, therefore, we can say that the variable is non stationary. However, the differenced unemployment rate with p-value greater than 0,1 and KPSS level equals to 0,2, can be interpreted as weakly stationary.

Figure 11: Differenced Unemployment Rate in Russia, 1999-2016

Source: Plot from R studio, Customized by author.

Stationarity appeared in the variables like nominal wage, labour force and net migration as well as in their differences. Therefore, I decided to omit these variables in developing a further model. The rest of the variables have also been tested and confirmed to be either stationary or weakly stationary.

Heteroskedasticity
I have chosen to use White's test to find whether the variance of the errors in my regression model is constant.

H0: homoskedascisity

H1: heteroskedasticity

1) p < significance level - reject H0

2) p > significance level - can't reject H0

According to the White's test for heteroskedasticity, p-value of the model is 2,492e-05, and we can reject H0 about the constant variance of the errors. Even though we detected presence of heteroskedasticity in the model, it does not impact estimators. In order to correct the standard errors, I used HC3 adjustment tool in R studio:

$$coeftest(regression, vcov = vcovHC(regression, type = "HC3"))$$

The results of this correction are shown in the *Figure 3*. After the correction, the robustness of standard errors is confirmed and I can use them in my final model.

5.2. Regression analysis

Based on studied literature, information collected from official statistics and own estimations, I created a model which analyses how chosen variables influence the behaviour of the differenced unemployment rate. For examining the dataset, I am going to use simple regression analysis by establishing OLS model. The following equation is represents the model, and ε expresses a random variable:

$$UR\_dif = \beta_0 + \beta_1\ lag\_UG + \beta_2\ OG + \beta_3\ dif\_LPI + \beta_4\ adj\_CPI + \beta_5\ PG + \varepsilon$$

Dependent variable

The endogenous proxy is *UR_dif* which expresses differenced unemployment rate. The difference was selected because of stationarity issues discussed above. It is performed in between the first quarter of 1999 and the last quarter of the year 2016.

Independent variables

lag_UG = Unemployment Gap with the lag of one quarter

OG = Output Gap

adj_CPI = Seasonally adjusted Consumer Price Index which measures the average change over time in a basket of consumer goods and services.

dif_LPI = Labour Productivity Index which was estimated by own calculations

PG = Population growth rate

Table 3: Results of the regression model

Dependent variable: *differenced unemployment rate*		
	coefficient	**std. error**
Intercept	9,410(***)	1,1202
lag_UG	0,3357(.)	0,2016
OG	0,0002(*)	0,0001
dif_LPI	-0,063	0,1942
adj_CPI	-0,0274(**)	0,0105
PG	-0,3189	1,4277
n	72	
R-squared	0,691	
Adjusted R-squared	0,6661	
P-value (F)	*1,243E-14*	

(***) – variable is significant on 0,1% level of significance
(**) - variable is significant on 1% level of significance
(*) - variable is significant on 5% level of significance
(.) - variable is significant on 10% level of significance
     Source: results of OLS analysis, R studio, customized by author

5.2. Interpretation of the results

Six coefficients in total were tested in the model. The intercept is significant on the 0,1% level of significance, the lag of unemployment gap is significant on the 10% level, output gap is significant on the 5% level of significance and seasonally adjusted CPI is significant on 1% level of significance. However, variables such as differenced labour productivity index and population growth appeared to be statistically insignificant.

According to p-value, the model is significant on a 1% significance level, and the model explains 66% of the variability of the endogenous variables. The fact that output gap is positively correlated with the difference of unemployment rate indicates poor specification of the model.

I suspected the impact of omitted variable bias and will set this as X variable. In addition, I subtracted the insufficient variables and denoted them with Y. The final the model received is:

$$UR\_dif = 9,410 + 0,3357\ lag\_UG + 0,0002\ OG - 0,0274\ adj\_CPI + X + Y + \varepsilon$$

The hypothesis is not confirmed, because the demographic factor, in my case population growth, according to the tests does not have a significant impact on the behaviour of the difference of unemployment rate. However, since some of factors specified in the model are significant, thus influencing the difference of unemployment rate, I can partially confirm that the dependent variable is influenced by unemployment and output gap, as well as CPI.

Conclusion

The Russian labour market is ambiguous and complex. Despite of all the economic challenges the country has been facing during the last 20 years, the labour market has been performing surprisingly well. Uncovering the mystery surrounding the low unemployment rate has shown to be a rather complicated issue, and its nature cannot be explained by a few factors alone. The specific features of the Russian labour market discussed in this thesis` theoretical part are likely to be reproduced and improved on in the future, as more data becomes available. The labour market seems to adapt to economic inflictions smoothly and in a flexible way, allowing it to maintain an unemployment level which does not fluctuate appreciably along the NAIRU.

There are several mechanisms of adjustment that are suspected. Unfortunately, these are almost impossible to test due to lack of available data. Some studies confirmed that Russian has a shadow economy, which represents a sufficient percentage of GDP. In Russia, less productive workers are not outsiders from the labour market and may look for an alternative job with lower wages, often in the shadow economy itself. Another aspect is that the minimum wage and unemployment benefits are much lower than the substance level in the country. Because of this, workers prefer lowering the wages and having a secure job, rather than risk living below the poverty line. Due to weak enforcement concerning EPL and employees rights from the Russian government, workers have little bargaining power towards higher wages, even if members of a TU.

The model I built was intended to test the significance of selected macroeconomic indicators, which potentially could influence the behavior of the unemployment rate. Even though the model in general gives 66% of the variability of the endogenous variables, I rejected the initial hypothesis about importance of demographic factors. The explanatory power is rather average because it is hard to interpret why the output gap is positively correlated with the difference of the unemployment rate. There might be an issue with omitted variable bias such as, for example, political dummy.

I have confirmed that the Russian unemployment rate can be partly explained with a standard econometric model. However, this model has to be further developed. This can be improved by using additional variables and implementing more reliable data.

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Figures

Tables

Appendixes

Figure 12 - The OLS model

```
Call:
lm(formula = UR_dif ~ lag_UG + OG + dif_LPI + adj_CPI + PG, data = df)

Residuals:
    Min      1Q   Median      3Q     Max
-1.63168 -0.62911 -0.04757  0.48342  2.50043

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.4108705  0.8724578  10.787 7.38e-16 ***
lag_UG       0.3357854  0.1857801   1.807  0.07555 .
OG           0.0002731  0.0001073   2.546  0.01340 *
dif_LPI     -0.0637324  0.1366909  -0.466  0.64267
adj_CPI     -0.0274230  0.0083272  -3.293  0.00164 **
PG          -0.3189028  1.2432001  -0.257  0.79840
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8579 on 62 degrees of freedom
  (4 observations deleted due to missingness)
Multiple R-squared:  0.691,     Adjusted R-squared:  0.6661
F-statistic: 27.73 on 5 and 62 DF,  p-value: 1.243e-14
```

Source: Rosstat 2016, Customized by author.

Figure 13: White Test

```
> summary(white)

Call:
lm(formula = residua_sqr ~ y_hat + y_hat2)

Residuals:
    Min      1Q  Median      3Q     Max
-1.0188 -0.1437 -0.0595  0.1143  3.4204

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  5.37317    2.35406   2.283  0.02574 *
y_hat       -1.69908    0.68285  -2.488  0.01541 *
y_hat2       0.13586    0.04811   2.824  0.00629 **
---
Signif. codes:
0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.5948 on 65 degrees of freedom
Multiple R-squared:  0.2783,    Adjusted R-squared:  0.2561
F-statistic: 12.53 on 2 and 65 DF,  p-value: 2.492e-05
```

Source: R studio output

Figure 14: Heteroskedasticity adjustment.

```
t test of coefficients:

             Estimate  Std. Error t value  Pr(>|t|)
(Intercept)  9.41087049  1.12028131  8.4005 8.012e-12 ***
lag_UG       0.33578542  0.20168886  1.6649   0.10099
OG           0.00027308  0.00012396  2.2031   0.03131 *
dif_LPI     -0.06373235  0.19428608 -0.3280   0.74399
adj_CPI     -0.02742302  0.01055158 -2.5989   0.01167 *
PG          -0.31890281  1.42771105 -0.2234   0.82398
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Source: R studio calculations,

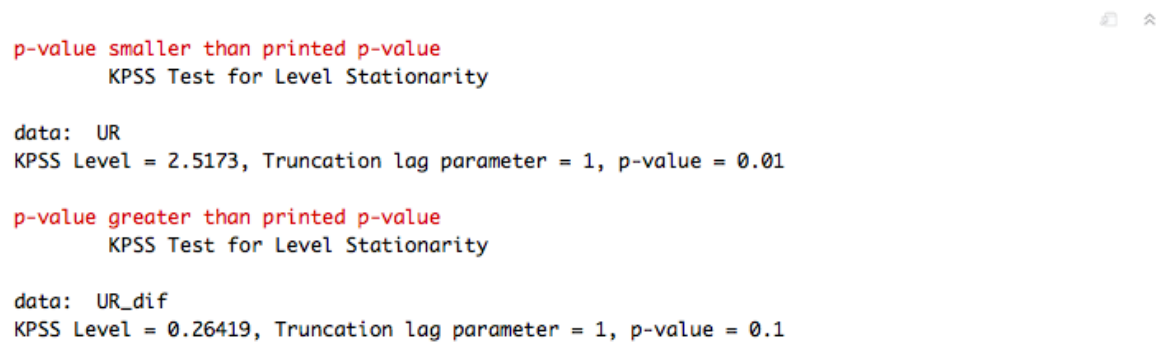*Figure 15: ADF Test*

```
        Augmented Dickey-Fuller Test

data:  UR
Dickey-Fuller = -3.4653, Lag order = 4, p-value = 0.05219
alternative hypothesis: stationary


        Augmented Dickey-Fuller Test

data:  UR_dif
Dickey-Fuller = -3.4198, Lag order = 4, p-value = 0.0595
alternative hypothesis: stationary
```

Source: R studio calculations

Figure 16: KPSS Test

```
p-value smaller than printed p-value
        KPSS Test for Level Stationarity

data:  UR
KPSS Level = 2.5173, Truncation lag parameter = 1, p-value = 0.01

p-value greater than printed p-value
        KPSS Test for Level Stationarity

data:  UR_dif
KPSS Level = 0.26419, Truncation lag parameter = 1, p-value = 0.1
```

Source: R studio calculations,

Figure 17: Durbin-Watson Test

```
> dwtest(regression)

        Durbin-Watson test

data:  regression
DW = 2.3377, p-value = 0.8136
alternative hypothesis: true autocorrelation is greater than 0
```

Source: R studio calculations,