Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

Statistical Analysis of Unemployment in the United States of America

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BACHELOR THESIS ASSIGNMENT

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Economics Policy and Administration
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Thesis title

Statistical analysis of unemployment in the United States of America

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Objectives of thesis

The aim of this thesis is to find significant factors that most affect the unemployment rate, quantity relationship among variables, simulate different scenarios for dependent variables. Futhermore, the thesis will investigate issues related to unemployment and its consequences in the economic and social spheres.

Methodology

Theoretical part of the bachelor thesis will be worked out based on selected publications and other scientific sources. In the practical part there will be examined how average gross wage, vacancies and direct foreign investments influence the unemployment rate. As unemployment is one of the major issues in the regulation of the economic situation in any state, its analysis is essential for understanding and forecasting the future economic development of any state's national economy. To describe the development in time, methods for time series analysis will be applied to provide forecasts of the dynamics of selected indicators in the near future.

The proposed extent of the thesis

30 – 50

Keywords

Unemployment rate, frictional unemployment, cyclical unemployment, seasonal unemployment, structural unempoyment, regression model, correlation.

Recommended information sources

FIELD, A. Discovering statistics using IBM SPSS statistics. Thousand Oaks: SAGE Publications, 2013. ISBN 978-1-4462-4917-8.

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Declaration

I declare that I have worked on my bachelor thesis titled "Statistical analysis of unemployment in the United States of America" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.03.2021   _____

Azizjon Rustamov

Statistical analysis of unemployment in the United States of America

Abstract

This Bachelor Thesis studies the factors that influence the increase or decrease in the unemployment rate in the United States of America. The role of unemployment and its determinants is investigated. Moreover, the research provides the types of unemployment and the differences between them. Explained how the job search process, minimum-wage laws, labor unions and the theory efficiency wages can cause of always existence of unemployment.

The practical part of the thesis is based on regression model where dependent variable is unemployment rate and independent variables are natural average wage index, job openings, foreign direct investment, and time series. The goal of regression model is to find statistically significant variables that affect the unemployment rate. The regression model will be based on the provided annual time series data from 2000 to 2019. In addition, each determinant will be analysed individually. In the result there is found that the national average wage index and foreign direct investment are statistically not significant and excluded from model while job openings are statistically significant.

Keywords: Unemployment, Unemployment rate, Types of Unemployment, Determinants of Unemployment, Reasons of Unemployment, Unemployment in the U.S.

Statistická analýza nezaměstnanosti ve Spojených Státech Amerických

Abstrakt

Tato bakalářská práce zkoumá faktory, které ovlivňují zvýšení nebo snížení míry nezaměstnanosti ve Spojených státech amerických. Je zkoumána role nezaměstnanosti a její determinanty. Výzkum navíc poskytuje typy nezaměstnanosti a rozdíly mezi nimi. Vysvětlil, jak může proces hledání zaměstnání, zákony o minimální mzdě, odbory a teorie efektivity mezd způsobit vždy existenci nezaměstnanosti.

Praktická část práce je založena na regresním modelu, kde závislou proměnnou je míra nezaměstnanosti a nezávislými proměnnými jsou index přirozené průměrné mzdy, volná pracovní místa, přímé zahraniční investice a časové řady. Cílem regresního modelu je najít statisticky významné proměnné, které ovlivňují míru nezaměstnanosti. Regresní model bude založen na poskytnutých ročních datech časových řad od roku 2000 do roku 2019. Kromě toho bude každý determinant analyzován jednotlivě. Ve výsledku je zjištěno, že národní průměrný mzdový index a přímé zahraniční investice nejsou statisticky významné a jsou z modelu vyloučeny, zatímco pracovní příležitosti jsou statisticky významné..

Klíčová slova: Nezaměstnanost, Míra nezaměstnanosti, Druhy nezaměstnanosti, Determinanty nezaměstnanosti, Důvody nezaměstnanosti, Nezaměstnanost v USA.

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1 Introduction

Every country's economic indicator is unemployment. If the economy is struggling it indicates high unemployment rate, and consequently meaning that the resources of a certain country's economy are not being allocated fully.

While the core economic long-term aim is to increase living standards, as the economy goes through a crisis, unemployment becomes a source of immediate concern. Unemployment brings economic hardship to the unemployed individuals and their families. People who have been unemployed for a long time will not be able to afford existing costs, such as electricity, tax, etc., and will have to switch to less costly accommodation and otherwise reduce their living conditions.

On the other hand, consequences of the highly influencing globalization on unemployment are enormous. Globalization effect on unemployment is going by moving the job patterns, each state has different variation of wages by rising and declining, it became more easier for labors to immigrate from developing countries to developed countries and finally import and exports have grown up significantly. As an example, nowadays more developing countries can afford to produce what was the U.S. dominance some 30 years ago, that is why more U.S. many jobs have shifted overseas. The structural development of the global economy, and its impact on the U.S. economy today means that for the first-time growth and employment in the United States are starting to slow.

At the same time, many jobs in the United States are moving from the sectors experiencing the most growth to those experiencing less growth. Large emerging economies are becoming more aggressive where the U.S. economy has historically dominated, such as the development and manufacture of semiconductors, pharmaceuticals, and information technology services. Employment barely rose in the U.S. economy, mostly in sectors that produces goods and services which will be consumed anywhere. There are manufactured goods, medicine, engineering, and consulting services.

Thus, measuring and forecasting the rate of unemployment and its dynamics in the future is one of the most important jobs in building strategy for the effective development of the country's economy.

2 Objectives and Methodology

2.1 Objectives

The main objective of this thesis is to find factors affecting the unemployment rate, quantify correlations between variables and model various dependent variable scenarios. The specific objectives are:

- Find main causes of unemployment rate in the U.S.
- Analyze the unemployment rate, national average wage index, job openings, and foreign direct investment.
- Find statistically significant or statistically insignificant variables based on the regression model, and then show the relationship between them.

2.2 Methodology

The analysis is conducted through an extensive review of the relevant literature. Scientific sources and online libraries of top universities are used as additional information. The Census Bureau and Bureau of labor statistics are used as a source to collect data for time series analysis 2000-2019 years.

In this research three variables are used for finding the determinants of unemployment. Unemployment rate variable is used as dependent variable when independent variables are national average wage index, job openings, and foreign direct investment.

Fulfill the goal of the thesis Microsoft Excel 2016 and SAS studio are used for calculation and analysis of given data.

Multiple Regression model is build based on the equation that describes how the dependent variable Y is related to the independent variables X_1, X_2, ..., X_p.
Multiple regression model:

Equation 1 Multiple regression model

$$Y = \alpha + \beta_1 * x_1 + \beta_2 * x_2 + ... + \beta_p * x_p + \varepsilon \qquad (1)$$

In this model α, β_1, β_2, ..., β_p are referred to as parameters of the model, and ε is a random variable referred to as the error term. If the values of α, β_1, β_2, ..., β_p were known, equation (1) could be used to calculate the mean value of Y at given values of x_1, x_2, ..., x_p. Sample data will be used to estimate these parameters. Estimated multiple regression

equation:

Equation 2 Estimated multiple regression

$$y_i' = a + b_1 * x_1 + b_2 * x_2 + ... b_p * x_p \qquad (2)$$

where: y_i' = estimated value of the dependent variable; $a, b_1, b_2, ..., b_p$ = estimated parameters.

OLS method is used to develop the estimated multiple regression equation, following is formula:

Formula 1 OLS

$$\sum_{i=1}^{n} \left(y_i - a - b_1 x_{1i} - b_2 x_{2i} \right)^2 ... \min \qquad (3)$$

For determining statistical significance of estimated parameters used the t-test. There are several ways to compute statistical significance:

Making null and alternative hypothesis → Selecting a level of significance: 1%, 5% or 10% → Calculating t-value → Finding t-critical value → Comparing critical and calculated t-value → Making decision reject or do not reject hypothesis

Multiple coefficient of determination is used to measure the goodness of fit for the estimated multiple regression equation:

Formula 2 Multiple coefficient of determination

$$R^2 = \frac{SSR}{SST} \qquad (4)$$

Where: SST = total sum of squares, SSR = sum of squares due to regression

Hypothesis of t-test are: $H_0: \beta_i = 0$, $H_1: \beta_i \neq 0$

In last step of computing statistical significance:

- If P-value is greater than alfa 0.05, then a certain variable is statistically no significant

If P-value is less than alfa 0.05, then a certain variable is statistically significant

3 Literature Review

3.1 Introduction to Unemployment

3.1.1 Definition of unemployment

In developed and developing countries there are several definitions of unemployment. A 6-year-old without a job is not counted as unemployed. A person in jail is not also counted as unemployed. A retired 60-year-old grandmother and grandfather are not also unemployed. In three cases they are not considered as an unemployed. The proper definition is "*someone is counted as an unemployed only if he or she is willing and able to work but cannot find a job. In real life that means to be considered as an unemployed, a person must be an adult 16 years or older, not placed on specialized institutions (an example, not in jail), a civilian, and most importantly, this person must look for work*". *(Cowen, 2015)*

3.1.2 How is unemployment measured?

In the USA unemployment is measured by the Bureau of Labor Statistics (BLS), which is part of the Department of Labor. The BLS produces statistics on unemployment and on different aspects of the labor market every month. There are types of unemployment, the average workweek length, and unemployment period. The data that we use comes from a monthly survey, called the Current Population Survey, of around 60,000 households (Mankiw, 2016).

In the USA, the BLS puts each adult (aged 16 and older) in each household surveyed into one of three group depending on the answers to survey questions:

- This first is employed group. It consists of those who have worked as paid employees, worked in their own business, or worked as unpaid workers in a family member's business. Both full-time and part-time workers are counted. There are also those who were not working but who had work from which they were temporarily away because of sickness, vacations, or bad weather.
- The second is unemployed. This group includes those who were not employed, were available for work, and had tried to find a job during the last four weeks.
- The third is not in the labor force. This group includes those who fit neither of the first two categories, such as full-time students, homemakers, and retirees.

When all the individuals have been grouped by covered the survey in a category, the BLS computes various statistics to summarize the state of the labor market. The BLS describes the labor force as the sum of employed and the unemployed (Mankiw, 2016). Then the unemployment rate is defined as follows:

Formula 3 Unemployment rate

$$Unemployment\ rate = \frac{Number\ of\ unemployed}{Labor\ force} * 100 \qquad (5)$$

Modern economists identify three types of unemployment: frictional, structural, and cyclical. But before to go to the types of unemployment, it is important to mention the chosen determinants of unemployment.

3.2 Discussion of determinants

Due to the acceleration of globalization trends, capital movements and their consequences have attracted increased attention in recent years. Many developing countries to maintain economic development are considering foreign direct investments as a good source to cover the deficit. Especially the national income, inflation, productivity of a certain country is positively affected by foreign direct investment. Another interesting result is that the foreign direct investment also effects to the unemployment rate by decreasing it. Economic and social costs are high enough affected by the people who are participated in production. Usually in the countries where the unemployment rate is high all available resources is not used effectively as a result actual level of national output stays lower potential output (Mehmet, 2013).

In countries with open economies, the problem of high unemployment can be solved with the help of foreign direct investment. As foreign direct investment creates environment for new work opportunities it will be the cause of the development and those improved fields opens additional workplaces by direct and indirect links (Mehmet, 2013). By contrast, these new openings and other obtaining can bring to job losses as a direct negative effect or dependence on imports and extrusion local businesses can also cause to job losses as negative indirect effect. In case of U.S economy the effect of foreign direct foreign investment is significant or not needs to be estimated for a given period.

Usually, it is considered that one of the most effective indicator of labor market is the relationship between unemployment and job openings. Typically, when job openings increase the unemployment rate decreases which stays stable for a long time. When job openings grow and unemployment rate does not go down or goes slowly, then that means there is structural mismatch in the workforce, bringing to the growth of lowest unemployment rate. This and other problems will be discussed in types of unemployment and causes of always existence of the unemployed chapters.

3.3   Types of unemployment

3.3.1   Frictional Unemployment

Each economist interprets the definition of his findings in his own way. But most closest and well-known explanation is "*Frictional unemployment is a short-term unemployment caused by the standard difficulties of matching employee to employer*" (Cowen, 2015).

As an example, what would be the fastest and effective way if someone would like to sell his house? He would lower the price! Any house will sell quickly if the seller keeps a price low enough. For anyone selling houses would be easy. The difficult thing is finding a right price that the seller is willing to accept, and the buyer is willing to pay. The same goes to the job if you are willing to work for peanuts, getting a job is always easy. It takes time and commitment to find a job that you like and the salary you will accept, and the employer who will pay. The challenge that arises between matching employees to employers creates friction in the labor market, and that temporary unemployment is called frictional unemployment.

One of the main reasons of frictional unemployment is scarcity of proper information. When people who want to work cannot find all the work opportunities available to them and employers cannot find all the available candidates and their respective qualifications. The modern technology and internet made it easier for workers to find jobs that best suit for them and for firms to find workers. Perhaps that cause to the decrease of frictional unemployment rate.

Frictional unemployment is not long-term unemployment type. When the economy is not in a recession, for workers finding a job can take a couple of weeks or even a several months but not longer, for skilled workers. In figure 1 you can see two periods. The first

non-recession year in 2005 which is the typical duration of unemployment. The second recession year in 2007-2009 is when the economy slowly exited. Many of unemployment was short duration in 2005. Based the data of BLS 35.1% of the unemployed were jobless for less than five weeks and 30.4% were jobless for only 5 to 14 weeks based the data of BLS. The rest one-third were jobless for more than 14 weeks, with 19.6% jobless for more than half a year (Cowen, 2015).

When most of the unemployed had been unemployed for more than 14 weeks the situation was totally different in 2010. In mid-2010 46.1 percent of the unemployed were unemployed for more than 6 months. For such an extended period so many unemployed workers had been unemployed since the Great Depression (Cowen, 2015).

Figure 1 Unemployment duration in 2005 and 2010 in the US
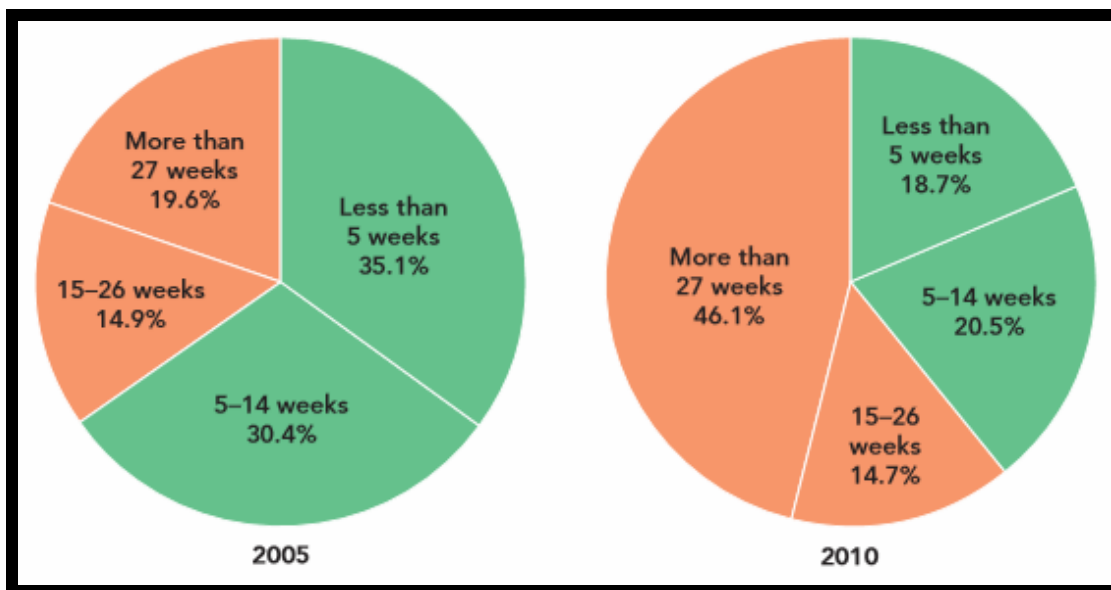
Source: Cowen, 2015

As the U.S. economy is dynamic frictional unemployment plays major role in total unemployment. Progress is powered by creativity and constant pressure of competition. Economic growth and change do not simply build new jobs and connect them to the existing ones. It is just about creating new jobs and the destruction of old jobs. By analyzing data on job creation and destruction, you can see this phenomenon in more detail.

3.3.2 Structural Unemployment

Structural unemployment regards to the type of unemployment which is persistent and long-term. It may be confusing how unemployment can be persistent and long-term. For example, around 40% to 50% of the unemployed in France, Spain, Italy, and Germany had been unemployed for more than one year and this has been for around 20 years. But 46% of the unemployed in 2010 in the USA had been unemployed for more than 6-7 months and it has been only around one year (Cowen, 2015). In this stage it is becoming clear that by persistent and long-term means that the unemployed person had been unemployed for more than one year and that this problem has continued for a long time. It is not yet known whether long-term unemployment in the USA will stay in the same level or that rate will decrease to more classical levels.

One of main causes of structural unemployment is economic-wide and big shocks that occur relatively quickly at one specific time. It takes time for the economy to recover as adapting to these shocks can generate long-term unemployment. Example of such in the US economy was the oil shock, globalization, and new information technologies such as the computer and the Internet pushed the economy to restructure from a manufacturing to a service economy.

Lack of jobs does not mean structural unemployment. Structurally unemployed workers usually take for short periods, before finding desirable vacancies, works such as in fast-food industry, coffee shops, breakfast and dinner services in hotels, cleaning services. As they are the first places where required few skills and knowledge and they are always available on the labor market. Working in such works make workers less attractive and their work habits tend to be poor (Cowen, 2015).

Another situation when occurs structural unemployment is when the number of people who are looking for a job is greater than the jobs at the certain level of salaries. Following is explanation of structural unemployment in a few sentences: "*The term structural unemployment refers to a situation in which people spend long periods out of work, often with little prospect of finding adequate jobs. This prolonged joblessness occurs partly because the shifting structure of the economy has made their skills obsolete. This category of workers also includes people with few skills and little work experience. Teenagers and some minority groups are particularly affected by this type of unemployment*" (Maitah, 2017).

Let us sum up the key factors of structural unemployment. There are oil shocks,

globalization, and global competition, shift from manufacturing to services and fundamental technology shocks (the Internet, computer, and artificial intelligence).

3.3.3 Cyclical Unemployment

Cyclical unemployment is stands with the correlation of the ups and downs of the market state. Figure 2 shows the U.S. unemployment rate since 1948 where focus on the recessions which are shaded (Cowen, 2015). Pay attention that every recession leads to dramatic increase of unemployment.

There are two reasons why higher unemployment is caused by low growth. Very clearly when GDP is falling, firms cut out workers, which raise unemployment. Another reason is more obvious. If less workers are producing goods and services, it means unemployment is high. When workers are sitting unoccupied, it is likely that related capital is also sitting idle. Growth cannot be maximizing with unoccupied labor and idle capital. The ability of an economy to create more jobs will be distracted (Cowen, 2015).

Figure 2 The Unemployment Rate Increases during a Recession, period 1948–2013
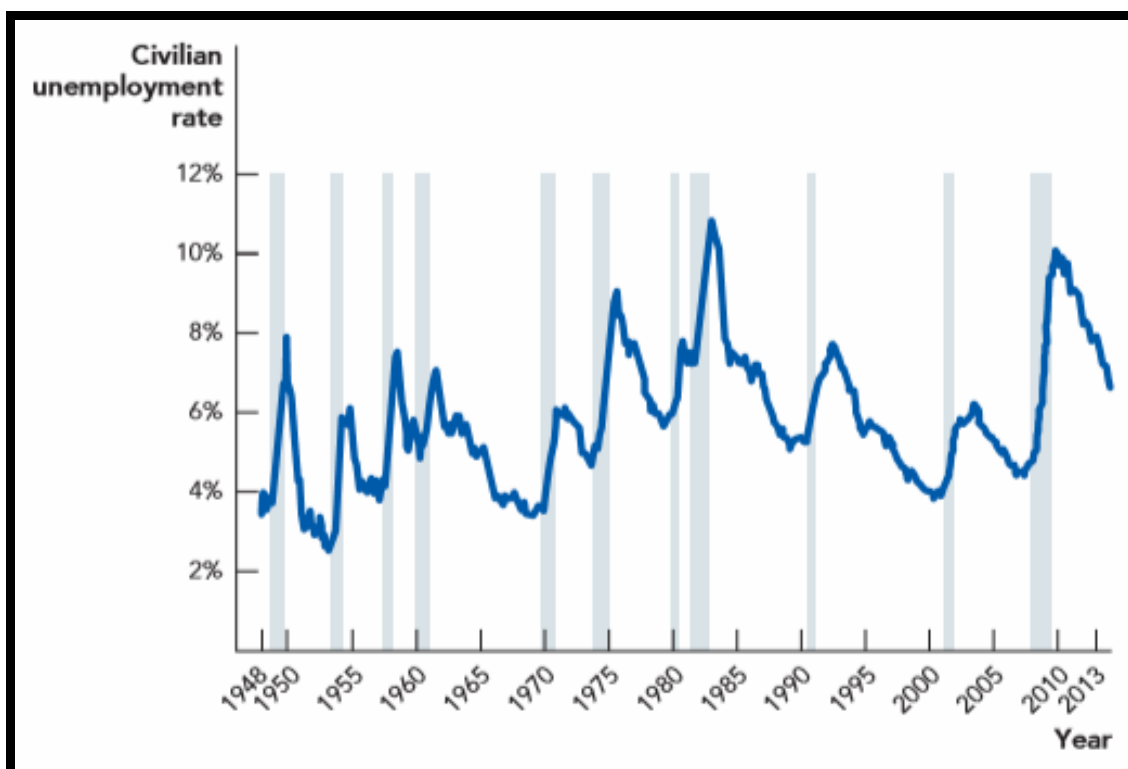
Source: Cowen, 2015

Figure 3 highlight the other side of idea that increase in unemployment is correlated by lower growth and vice versa decrease in unemployment is correlated by faster growth. Figure 3 marks shifts of unemployment rate in the U.S on the vertical axis against growth on the horizontal axis. As it shown decrease of unemployment is caused by faster growth of real GDP. Indeed, unemployment tends to increase when growth is below average, and it tends to decrease when growth is above average. As an example, the unemployment rate increased by 2.2% in 1982 when the economy of USA was in a deep recession. Contrarily, unemployment decreased when real GDP was raising quickly at 7% a year just after two years in 1984. As a result, former Hollowood actor Ronald Reagan was reelected with great success (Cowen, 2015).

Figure 3 Faster Growth in Real GDP Decreases Unemployment.
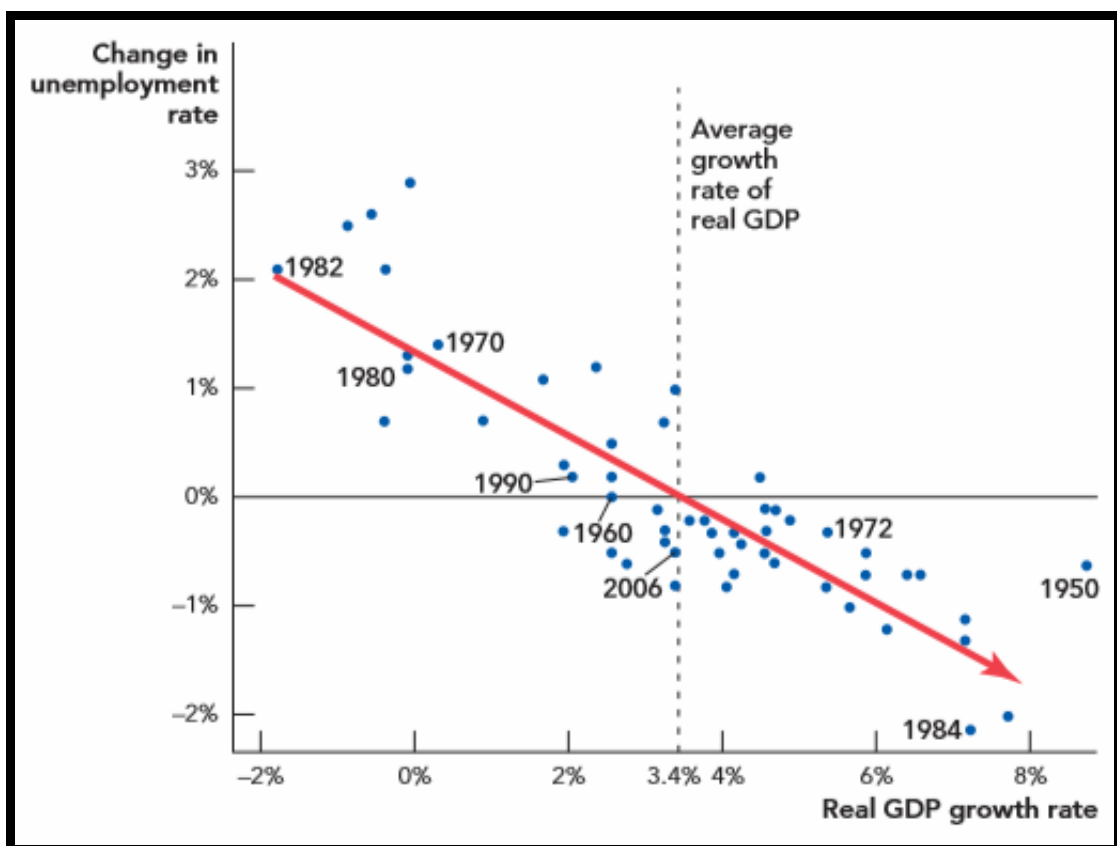
Source: Cowen, 2015

Cyclical unemployment as caused by a mismatch between the aggregate level of wages in an economy and the level of prices. The wages demanded by workers are out of synch with the level of prices, so workers are too expensive to hire from the point of view

of firms.

There is a common example to complement the theory above. Beside the wage of an employee, the price of a certain firm's product also effects whether a certain business needs to hire new employee or not. If Microsoft can sell its laptop for $1000, it has a better chance of ramping up production and hiring more employees than if Microsoft could sell a laptop for $500. However, workers are not always informed of the prices and therefore the profits available to their employers when they are demanding wages. Compared what the business considers profitable the wage demands may be too high, and this contradiction creates increase of cyclical unemployment. Nevertheless, if the aggregate demand for goods and services were somehow higher, the higher wage requirements could possibly be asserted, and the workers could be hired. In any case, it is obvious to all that the cyclical unemployment after the recent recession remained high in 2010, even when compared to previous recessions. These processes usually known as "jobless recovery" (Cowen, 2015).

3.4 Reasons for the always existence of the unemployed

3.4.1 Why are there always some people unemployed?

In theories above there has not been explained why economies experience unemployment. In many markets of a certain country's economy, quantity supplied, and quantity demanded come to balance by adjustment of prices. The quantity of labor supplied, and the quantity of labor demanded would be balanced because of adjustment by wages. As a result, the adjustment of wages will guarantee fully employment of all workers (Mankiw, 2016).

Important point is that real life not always match the theory. Even if a country's economy in boom period there would be always some workers without jobs. If to go more detailed that means the unemployment rate would never fall to zero. Rather the unemployment rate oscillates around the natural rate of unemployment. To clarify the natural rate next chapters will investigate the reasons absolute of full employment and the real situation of labor market (Mankiw, 2016).

Preliminary showing the conclusion in the end, there will be four ways of explanation of unemployment in the long run. Searching for the jobs that the best suit the worker which obviously takes time would be first explanation. As in theories above were already mentioned that the unemployment resulting from the process of suiting workers

and jobs is called frictional unemployment.

The remaining three explanations for unemployment tell us that the quantity of available jobs in labor markets are not able to provide sufficiently a job to everyone who desires. These situations happen when the quantity of labor supplied is greater than the quantity demanded. When wages are placed above the point that brings supply and demand into equilibrium. There will be discussed minimum-wage laws, efficiency wages and unions as three reasons for an above-equilibrium wage (Mankiw, 2016).

3.4.2   Job Search - Unemployment Insurance

Unemployment insurance is a government program that, without intend increases the amount of frictional unemployment. The program stands for incomplete protection against losing jobs by employees. Two types of unemployed are not eligible for an insurance. There are employees quitted their jobs, who were fired for a reason, and employees who just joined the labor force. Only unemployed who were fired because of no longer need of their skills would get paid benefits. In the USA, each state has its terms and conditions which differs from each other, but a normal worker covered by unemployment insurance obtains fifty percent of his previous wages for 26 weeks (Mankiw, 2016).

The point is to explain how while unemployment insurance decreases the difficulty of unemployment, it also effects to increase in the amount of unemployment. On one of the Ten Principles of Economics (Mankiw, 2016) will be based the explanation. That well known principle is how people respond to incentives. When an employee gets a new job unemployment benefit also stops, that is why the unemployed person dedicates less effort to finding a job and the possibility to reject unattractive job offers are high. Furthermore, because unemployment insurance makes unemployment process less painful, when unemployed arrange with employers about the terms of work they are less likely to aspire job security guarantees.

The incentive effects of unemployment insurance were analyzed on labor economists' studies. State of Illinois's study examined an experiment in 1985. The state when unemployed workers applied to receive unemployment insurance benefits randomly chose several of them and offered each a $500 bonus if they found new jobs within 11 weeks. The group was then compared to a control group that was not offered stimulus.

The average period of unemployment for the group offered the bonus was 7 percent less than the average period for the control group. The experiment exactly shows how the structure of the unemployment insurance system influences the effort that the unemployed invest in finding work (Mankiw, 2016).

Several other studies have examined finding effort by tracking a group of workers over period. After 6 months or 1 year unemployment insurance benefits ordinarily end instead of lasting forever (Mankiw, 2016). These studies concluded that the probability of their finding a new job increases apparently when the unemployed are no longer eligible for. Thereby, getting unemployment insurance benefits significantly decrease the finding effort of the unemployed.

While unemployment insurance decreases search effort and increases unemployment, it is not necessary to conclude that these policies are bad. The primary goal of the program was indeed reducing the income uncertainty faced by workers and it is achieved. Moreover, workers have the chance to find jobs that better match their abilities and tastes when they dismiss unattractive job offers. Increasing the potential of the economy to match each employee with the most appropriate employer by unemployment insurance are argued by some economists.

From another point the examination of unemployment insurance proves that the unemployment rate is an imperfect indicator of the general level of economic well-being. Most economists agree that excluding unemployment insurance will decrease unemployed people in a certain economy. Nevertheless, economists disagree about whether economic welfare will increase or decrease as a result this policy change. (Mankiw, 2016)

3.4.3 Minimum-Wage Laws

Let us review how unemployment can be caused by minimum-wage laws. The minimum wage has a significant outcome for certain groups with particularly high unemployment rates, but they are not the main cause of unemployment in a particular economy (Mankiw, 2016). Furthermore, to understand some of the other causes of structural unemployment, a natural place to start is an analysis of the minimum wages.

Figure 4 presents the main economic aspects of the minimum wage. Increasing the supply of labor and reducing the amount of labor required from the equilibrium level is caused when the minimum-wage law forces wages to stay above the level that balances

supply and demand. Since there are more people are desiring to work than jobs, some workers are unemployed. That is why there is a surplus of labor.

As reviewing more causes of unemployment, minimum-wage laws are one of the reasons. In general, these causes do not have an impact on everyone in a certain country's economy. The law does not preclude the adjustment of most wages to balance supply and demand as the vast majority of workers have salaries well above the statutory minimum. Least skilled and least experienced members of the workforce such as adolescents are the main individuals whom the minimum-wage law effects most of all. Chances of wages of adolescents to fall below the legal minimum are high because their equilibrium wages tend to be low. The existence of unemployment explained by minimum-wage laws is to be only among these representatives of labor force (Mankiw, 2016).

Figure 4 Unemployment from a Wage above the Equilibrium Level
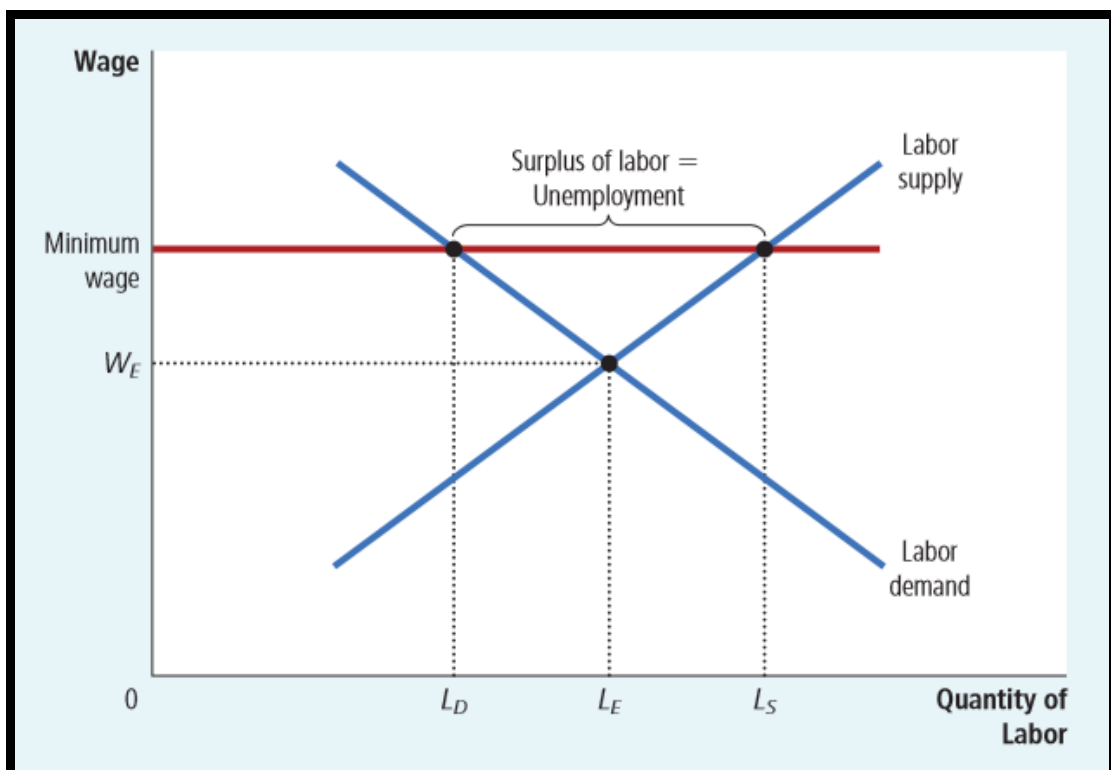
Source: Gregory, 2017

The effects of the minimum-wage law are illustrated on Figure 4, but moreover it shows a more common lesson: If for any reason wages is held above the equilibrium level, unemployment is the result. Just one of the reasons why wages may be "too high" is

minimum-wage laws.

Though at this stage it is important to stop and note that dissimilar from the frictional unemployment which occurring in the process of job search, the structural unemployment arises from wages above equilibrium. The need to find a job is not related to the inability of wages to balance supply and demand for labor. People are looking for the jobs that best match their abilities and taste when job search is the excuse of unemployment. In contrast, when wages are above the equilibrium level, the amount of labor provided exceeds the amount of labor required, and workers are unemployed because they wait for jobs to open (Mankiw, 2016).

3.4.4 The Economics of Unions

A union is an association of workers that negotiates with an employer about wages, benefits, and working conditions. Currently, only 11 percent of the USA workers are union members, but in the past unions played a much larger role in the U.S. labor market. Around 35 percent labor force of the USA became unionized when union membership was at its maximum in the 1940s and 1950s (Mankiw, 2016).

In addition, unions keep playing a big role in most European countries for various historical reasons. For instance, in Belgium, Norway, and Sweden more than half of the workers belong are members of unions. Oppositely in France and Germany collective bargaining regulates the wages of most employees, although only a few of these employees are themselves union members. In this kind of situations, there is no equal determination of wages which theoretically should be set by competitive labor market between supply and demand of equilibrium.

Example of the purpose of a union is like sellers group acting together with the expectation of influencing their mutual market power. The working conditions, benefits, and most important salaries of most employees are discussed with their employers as an individual basis. That is how it works in US economy. On the contrary, workers in a union do so as a group. Collective bargaining is defined as the process by which unions and firms agree on the terms of employment (Mankiw, 2016)

When a union makes a deal with a firm, it demands higher wages, better benefits, and better working conditions than the firm could offer in the absence of the union. The union can arrange a recalling of employees from the firm in case if the union and the

business do not reach agreement between themselves, which is known as a strike. Because of mass meetings businesses cut production, sales, and profit and there is high probability that the business in trouble will agree to provide higher wages than otherwise. The influence of unions was experienced by economists and they found out that union employees get paid around 15 to 25 percent more than their counterparts who are not unionized.

If there is increase in the amount of labor supplied and decrease in the amount of labor demanded that means a union enhances the wage above the equilibrium level, the outcome is unemployment. Workers who stay in jobs with the higher wages live better, but those who were preliminarily worked and are now unemployed live worse. In fact, disputes between various class of employees usually perceived to create by unions—between members who profit from high union wages and the non-member who do not receive union jobs.

There are two ways how non-member may reply to their position. Some of them prefer to stay without job and expect for the opportunity to become member and gain high union salaries. For the rest non-members there is only one way to accept jobs in not unionized firms. Consequently, when unions increase salaries in one part of the economy, labor supply raises in other parts of the economy. This increase in labor supply, in turn, lower wages in non-union sectors. In different explanation, unionized workers benefit from collective bargaining, while workers not-union workers carry some of the costs.

The importance of unions in the economy is based on laws that regulate collective bargaining and union organizations. The politicians who wrote antitrust laws put forward the idea that workers needed more market power when negotiating with employers. In fact, many laws are developed to stimulate the organization of unions. In particular, the prohibition of employers from interfering when workers attempt to organize unions and demand employers to negotiate in good faith with unions was in the Wagner Act of 1935. In the US, the right of workers to organize unions is ensured by the government agency named "The National Labor Relations Board" (NLRB) (Mankiw, 2016).

3.4.5 Efficiency Wages Theory

In addition to job search, minimum-wage laws, and unions – another reason why economies experience some unemployment is about the theory of efficiency wages. Based

to this theory if wages are above the equilibrium level, firms operate more efficiently. Consequently, keeping wages high even in the presence of a surplus of labor will be profitable for business (Mankiw, 2016).

Appearance of the unemployment from efficiency wages is the same way as the arising of unemployment from unions and minimum-wage laws. Wages above the level that balances the quantity of labor supplied and the quantity of labor demanded becomes the reason of unemployment inn all three cases. Another important difference is when minimum-wage laws and unions put a stop to firms from decreasing wages in the existence of a surplus of workers. The theory of Efficiency-wage says that by keeping wages above the equilibrium level firms may be well off as those constraint on firms is worthless in many examples.

What is the reason of keeping the wages high? At first the decision may seem weird, after all, wages constitute a significant part of the costs of firms. Profit-maximizing businesses usually expect to keep costs and accordingly wages, as low as possible. Paying high wages would be profitable as they can increase the efficiency of a firm's workers and it is the modern comprehension of efficiency-wage theory.

Efficiency-wage theory has several types. Each type proposes an individual interpretation for why firms should pay high wages. Let us now consider four of these types (Mankiw, 2016):

1- **Worker Health**. Better-paid workers tend consume a more nutritious diet, and workers who consume better diet are healthier and more productive. Instead of paying low wages and have less healthy and less productive workers business will find it profitable to pay high wages and have healthy and productive workers.

2- **Worker Turnover.** There are a lot of reasons why workers may quit jobs: to get jobs at other companies, to move to different regions of the country, to quit the labor force. The reason with which workers quit their jobs mostly depends on the series of incentives they encounter, including the benefits of staying and the benefits of leaving. the less often its workers will choose to leave if more companies pay its workers.

3- **Worker Quality.** This type of theory's link in between worker quality and wages. Who does not want talented worker? All companies try to pick the best one to fill job position. When a company provide a high wage, it attracts better workers to apply for its jobs and in that way increases the quality of its labor

force.

4- **Worker Effort.** There is one possible way to make workers work hard it is to pay them more than others. How to motivate workers to put forward their best effort is just by making wages high again. Thus, make workers more eager to keep their jobs. Employees would have less reason to work hard if the wage were at the level that balanced supply and demand. Imagine if employees were fired by employers, employees could quickly find another job at the same wage.

3.5   The Natural rate of unemployment

3.5.1   Definition of natural unemployment rate

The structural and frictional unemployment is defined as the natural rate of unemployment. Most economists consider that major and long-lasting features of the economy change are the underlying rates of frictional and structural unemployment as changing only slowly through time. Over a several of months cyclical employment could dramatically increase or decrease. The actual rate of unemployment varies around the natural rate when through time the natural rate changes slowly (Cowen, 2015).

The ideas of frictional, structural, and cyclical unemployment are not usually distinct and clear. If an employer put more advertisements and look for workers harder, it means that times are good. We can say that the cyclical rate of unemployment has fallen, but we also can say that the frictional rate of unemployment has fallen. Both meaning of the advance are true. Likewise, on the strength of economic conditions will depend how effectively an economy swallows replaced auto workers (structural unemployment). An unemployment type can easily turn into another type. As an example, if workers remain unemployed for long, cyclical unemployment can change into structural unemployment, in results it will bring to employment opportunities and degradation of skills. In the recession of 2007-2009 it took a very long time to the increased unemployment rate to fall. (Cowen, 2015). Many economists were worried that started cyclical unemployment may become structural.

Characteristics of structural, frictional, and cyclical in combination are viewed as observed unemployment by many economists. All three types though give us some valuable ideas for organizing the sources of unemployment.

3.5.2 Output gaps and the Natural Rate of Unemployment – Okun's Law

The percentage gap between GDP and potential GDP is known as the output gap. Real GDP would be equal to potential GDP and the labor market of certain country would be at full employment when the output gap is equal to zero. In full employment there would still be structural, frictional, and seasonal unemployment (Stiglitz, 2006). Correct definition of full employment does not indicate that the total unemployment rate would be equal to zero. But in total unemployment rate there will not be cyclical unemployment. In theories above were mentioned that the natural rate of unemployment is the unemployment rate that happens when the output gap is equal to zero. The actual unemployment rate equals the natural rate of unemployment when the output gap is equal to zero. The actual unemployment rate would be lower than the natural rate of unemployment when the output gap is affirmative. Vice versa, it surpasses the natural rate of unemployment when the output gap is privative (Stiglitz, 2006).

Elements such as shifts in the age compound of the labor force can cause the natural rate of unemployment to change over period. As an example, older workers typically tend to have less unemployment rates than do young workers.

Graph 1 Okun's Law, 1959-2002 in the USA
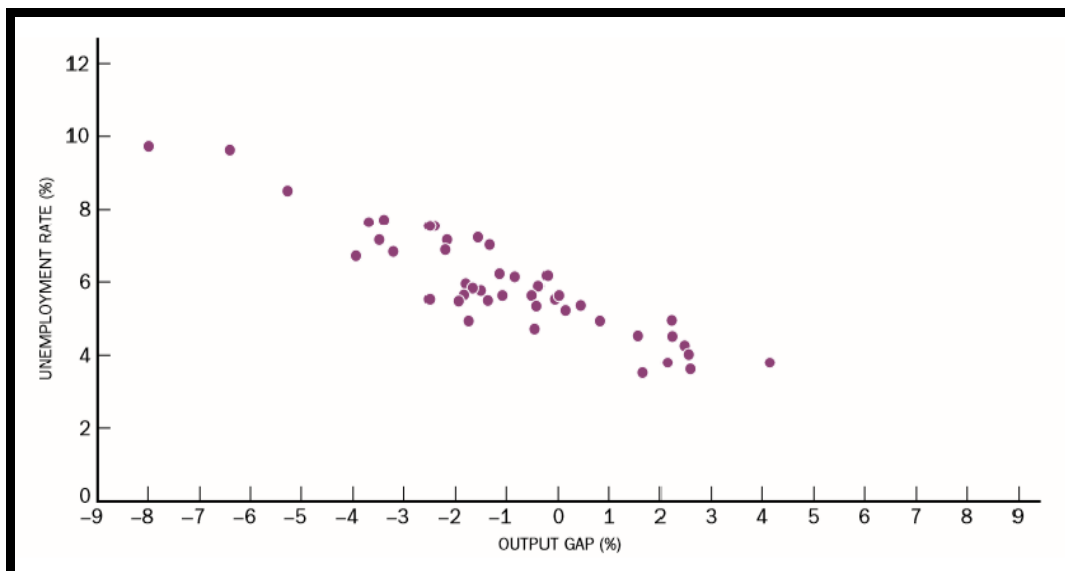
Source: Stiglitz, 2006

So, the unemployment rate bound with a zero-output gap grew when the baby boom generation first started to enter to the labor force in the 1960s. Many economists

believed that the natural rate of unemployment was about 6% in the 70s and 80s of the 20 centuries (Stiglitz, 2006). The natural rate of unemployment went down as the baby boomers get older because employees in age forty and fifty tend to have lower unemployment rates. Nowadays' the natural rate of unemployment is set at about 5 to 5.5 percent by most economists (Stiglitz, 2006).

Interpretation of Figure 5 is about the link between fluctuations in the unemployment rate and fluctuations in the economy's production. The output gap is on the horizontal axis. On the vertical axis is the unemployment rate. The downward connection between the output gap and the unemployment rate appears clearly. Arthur Okun is a man who demonstrated that as the economy emerges from recession, output increases more than employment growth. Under President Lyndon Johnson he performed duties as a chairman of the Council of Economic Advisors. Moreover, the output shrinks by a larger percentage as the economy goes into recession than employment shrinks. This outcome is then named as Okun's Law. Actual estimates of the relation between the output gap and employment forecast that a 1 percent increase in the unemployment rate will match to reduction in the output gap of about a 2 percentage points (Stiglitz, 2006).

Moreover, Figure 5 tells that real GDP equals potential GDP when the output gap is equals to zero. Typically, in the US the unemployment rate is about 5.5 percent. If real GDP falls below potential GDP and the output gap becomes negative, then unemployment rises above 5.5 percent (Stiglitz, 2006). It makes sense, the unemployment rate should be equal to the natural rate of unemployment when the output gap is zero, which, as it has already been noticed, is usually estimated to be about 5.5 percent.

Okun's Law makes it easy to relate fluctuations in unemployment to fluctuations in the output gap. It can also help estimate the cost of the recession. In 1999, with the boom, the number of unemployed Americans dropped below 6 million. By 2002, just over 8 million American workers were looking for work but could not find one (Stiglitz, 2006). Economically speaking, the loss from rising unemployment during a recession is the amount of output that could have been produced if those workers remained employed. This lost output represents the opportunity cost of the higher unemployment, and the Okun's Law can be used to approximate it. In 2002 the unemployment rate hit 5.8 percent. Using a natural rate estimate of 5.5 percent, it has been found that cyclical unemployment was 5.8 minus 5.5 percent, or 0.3 percent (Stiglitz, 2006). According to Okun's Law, this would be associated with a negative output gap of $2 \times 0.3 = 0.6$ percent. With real GDP in

2002 of about $10 trillion, a 0.6 percent output gap means the economy was producing 0.6 percent of $10 trillion, or $60 billion ($60,000,000,000), which is less than its potential. This is the opportunity cost of rising unemployment during the recession, which in the US amounts to just under $200 per person.

3.6   Comparisons of international unemployment rates

From an international point of view, the United States unemployment rate fared slightly better than classical unemployment rate in different countries. In the Table there is a possibility to compare for varies years before and after recession period from other developed countries.

Table 1 International Comparisons of Unemployment Rates

Country	1991	1996	2001	2006	2012
United States	6.8%	5.4%	4.8%	4.4%	8.1%
Canada	9.8%	8.8%	6.4%	6.2%	6.3%
Japan	2.1%	3.4%	5.1%	4.5%	3.9%
France	9.5%	12.5%	8.7%	10.1%	10.0%
Germany	5.6%	9.0%	8.9%	9.8%	5.5%
Italy	6.9%	11.7%	9.6%	7.8%	10.8%
Sweden	3.1%	9.9%	5.0%	5.2%	7.9%
United Kingdom	8.8	8.1%	5.1%	5.5%	8.0%

Source: Opentextbc.ca

Different labor market and different survey instruments of each country makes the comparison of unemployment rates to be approached with caution. As an example, unemployment rate of Japan seems low, but the economy of Japan is growing very slowly since 1985. Employees who fired from their works are usually leave the labor market quickly and do not try to find a new work, in which not to be counted as an unemployed. As well as companies in Japan tend to not to lay off workers as a result the company has significant number of workers who work on shorter hours or are legally hired but perform tiny amount. This type of model is obviously seen as a socially uncommon method of supporting the unemployed and rather than a sign of thriving economy ("Patterns of

Unemployment", n.d.).

It is also very difficult to compare unemployment rates of the U.S and developed countries with the unemployment rates of other unproductive economies such as Eastern Europe, Africa, Latin America, Asia. In most low-income countries majority of people are not included in the labor market though employers provide their salaries regularly ("Patterns of Unemployment", n.d.).

4 Practical Part

4.1 Descriptive analysis of variables

4.1.1 Unemployment rate

In the USA the unemployment rate had an increase from 2000 till 2003, starting with 3.97% and hit a high of 5.99%. Then there was a gradual decline and stabilised till 2007 with 4.62%. In contrast, when the Great Recession began in 2008, there was a sharp rise that significantly affected the unemployment rate. It reached its highest level at 9.61% in the second half of 2010. Finally, the next eight years show that the unemployment rate has declined steadily since 2011 and reached its lowest level of 3.67% in 2019.

Summarizing all the information, there can be concluded that the maximum unemployment rate was 9.61% in 2010, and the minimum was 3.67% in 2019. During 2000-2019, the average rate (mean) was 5.88%.

Graph 2 Unemployment rate during 2000-2019
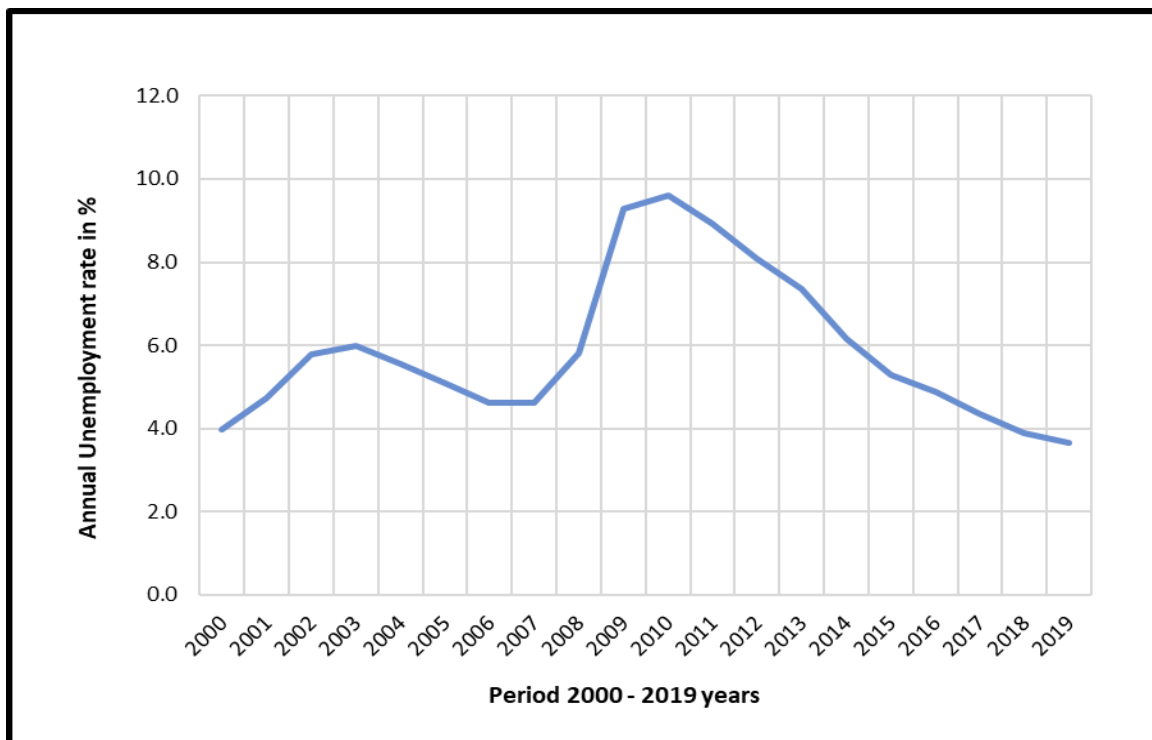
Source: U.S. Bureau of Economic Analysis, own work

4.1.2 National average wage index

Graph 3 National average wage index in the US
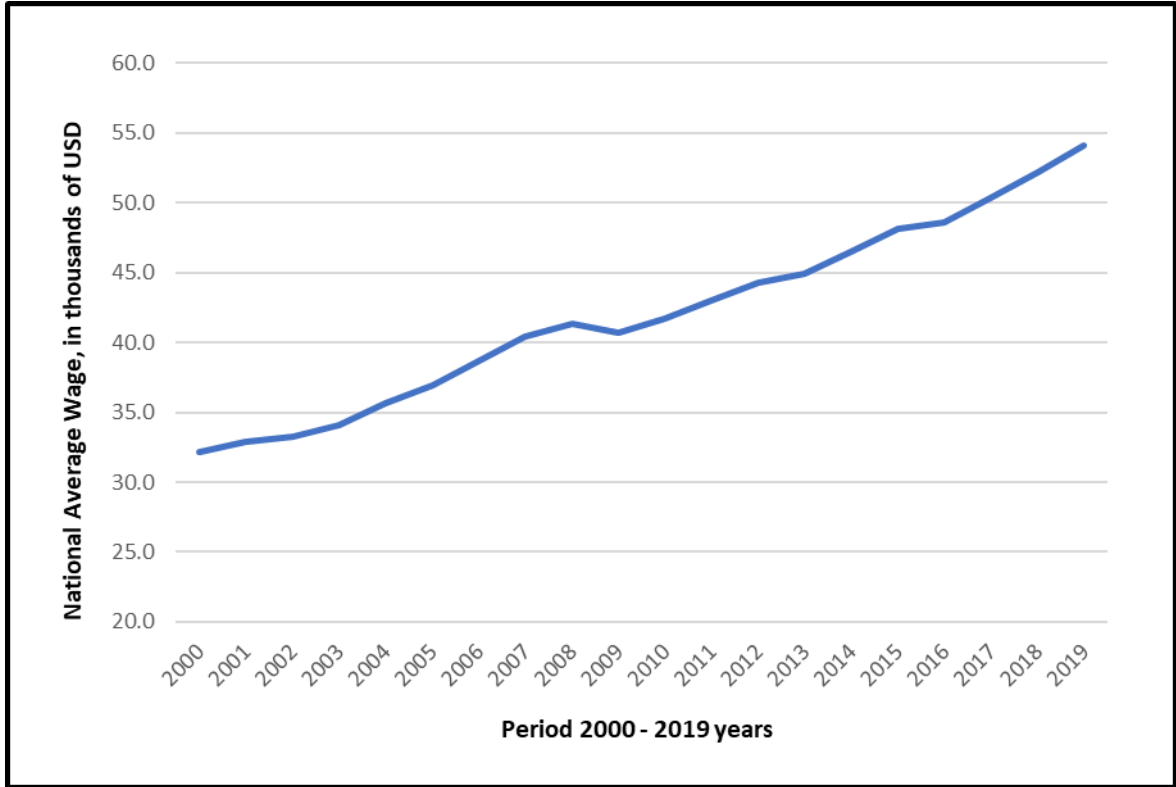
National average wage index in graph 3 are a prime example of the dramatical growth over the past 20 years in the US history. However, during the Great Recession in 2008 and 2009, there was a slight decline - around 2%. Thit decline led to fluctuations in wages. The average wages fell from $ 41,330 to $ 40,710. Another important point: after twenty years of growth, only in 2012/ 2013 and 2015/2016 the wage remained practically stable.

Overall, the maximum level of the average wage reached $ 54,100 at the end of 2019, and the minimum level was $ 32,150 at the beginning of 2000. The average wage over twenty years was $ 41,990.

4.1.3 Job openings

Job openings graph 4 shows remarkable relationship with unemployment rate. Since no data was available for 2000, the graph shows that there has been a decline from

2001 until 2003. The number of job openings in 2003 was 3,887,000 which is 19% less than in 2001. Then there was fluctuation, which first increased job openings to 5,624,000 and then dropped sharply to 2,998,000 in 2009. The impact of this fall was also during the Great Recession. The recovery period will come after 2000. In 2019, it reached its highest level of 8,580,000 job openings.

In total, over twenty years, the maximum number of job openings at the end of 2019 was 8,580,000, and the minimum was 2,998,000 in 2009. The average job openings per year is 5,383,000

Graph 4 Job openings in the US
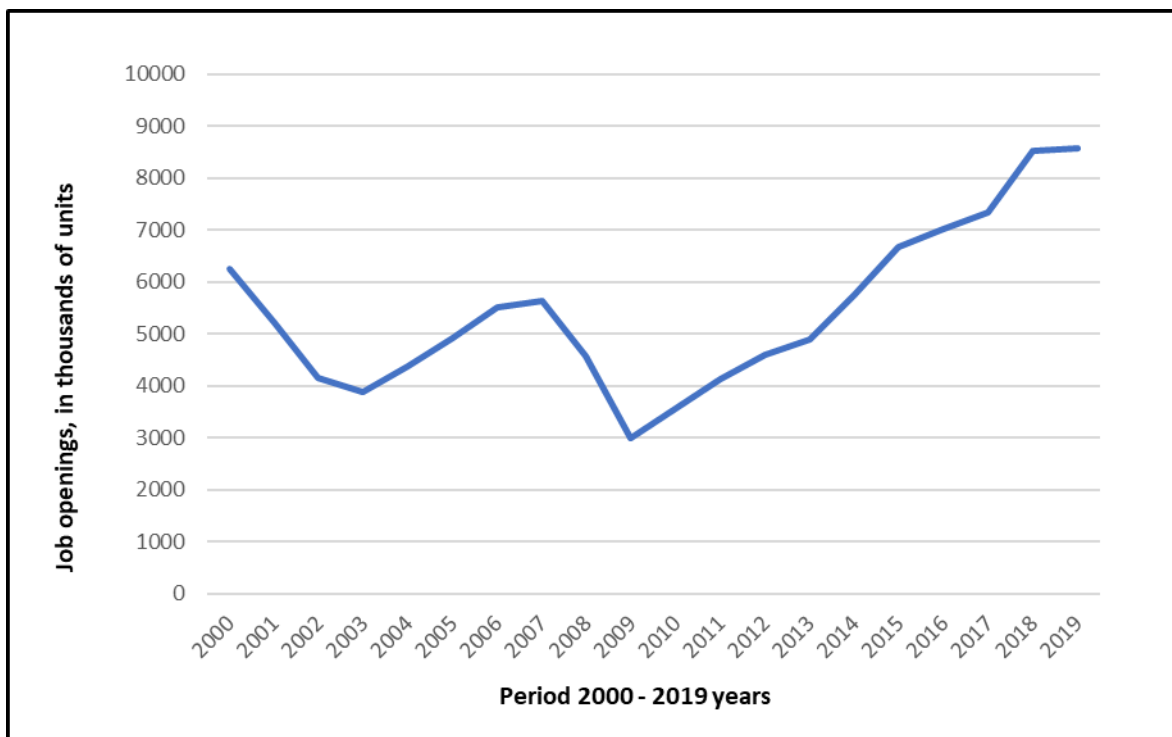
Source: U.S. Bureau of Economic Analysis, own work

4.1.4 Foreign Direct Investment

The United States is the world largest foreign direct investment (FDI) recipient. As the economy of this country is the world largest and by many companies the country itself is considered as an innovative and stable market. Graph 5 shows that the US economy's foreign direct investment from 2000 dramatically went down by reaching lowest point at $ 53 billion in 2003. Then with double fluctuations in 2004/2005 and 2006/2007 it increased until $ 306 billion.

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Graph 5 Foreign Direct Investment in the US
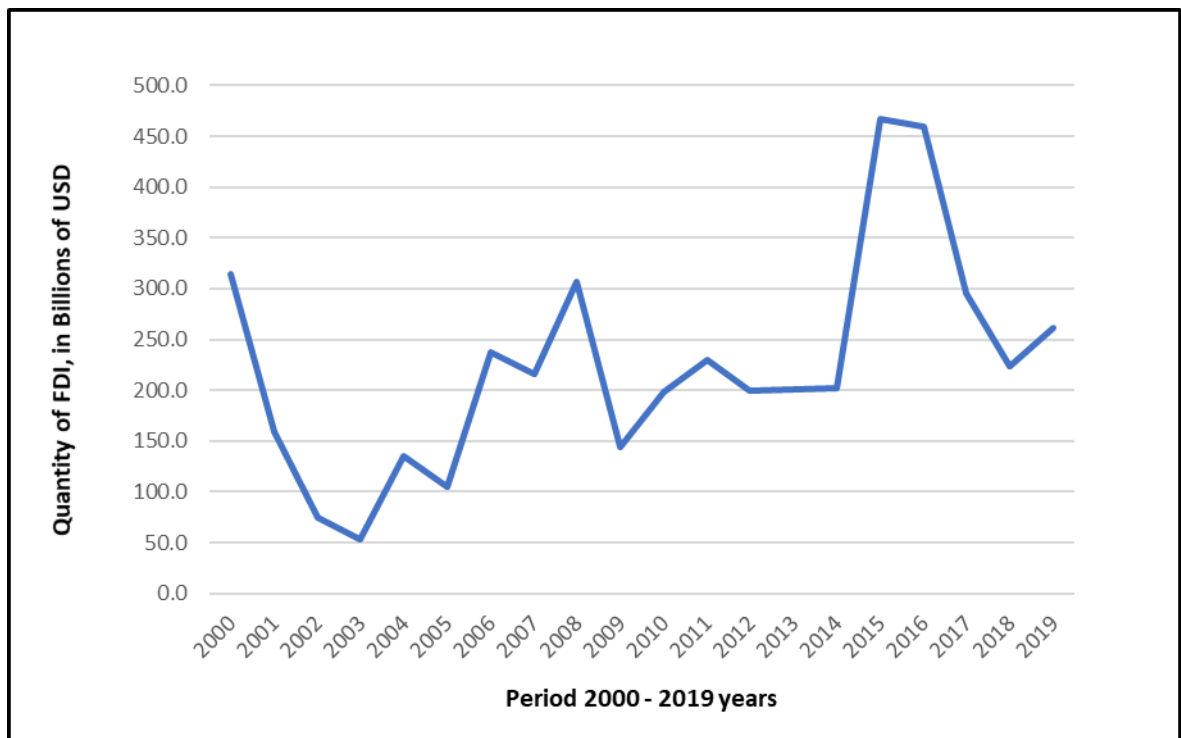
Source: U.S. Bureau of Economic Analysis, own work

What you can see now in graph 5 is the consequence of the Great Recession from 2008 until 2009 that lowered the amount of foreign direct investment. With fluctuation it came to stable period which is from 2012 to 2014 at around $ 201 billion. But the most important thing is that it doubled to $ 468 billion in 2015. In 2016 and 2017 there was a sudden decline by reaching $ 223 billion. At the end foreign direct investment again experience a slight increase in 2018 and 2019.

Concluding all given information, over the twenty years the maximum foreign direct investment approximated $ 468 billion in 2015, the minimum approached $ 53

billion. The average FDI was $ 224 billion per year. The US annual average foreign direct investment is greater than GDP of Greece in 2019.

4.2 Economic model and Time series data

The table 1 annual time series data is built based on annual unemployment rate, national average wage index, annual job openings, and foreign direct investment data during 2000 and 2019.

Table 2 Annual Time Series, period 2000-2019

Years	Unemployment Rate, %	National average wage, thousand dollars	Job Openings, thousand units	FDI, Billion dollars
2000	3.97	32.15	6250	314.0
2001	4.74	32.92	5227	159.5
2002	5.78	33.25	4146	74.5
2003	5.99	34.06	3887	53.1
2004	5.54	35.65	4370	135.8
2005	5.08	36.95	4929	104.8
2006	4.61	38.65	5504	237.1
2007	4.62	40.41	5624	216.0
2008	5.8	41.33	4562	306.4
2009	9.28	40.71	2998	143.6
2010	9.61	41.67	3564	198.0
2011	8.93	42.98	4117	229.9
2012	8.08	44.32	4607	199.0
2013	7.36	44.89	4882	201.4
2014	6.16	46.48	5725	201.7
2015	5.28	48.1	6677	467.6
2016	4.88	48.64	7029	459.4
2017	4.34	50.32	7339	295.3
2018	3.89	52.15	8528	223.4
2019	3.67	54.1	8580	261.4

Source: U.S. Bureau of Economic Analysis

With the goal to find statistically significant or statistically not significant variable following economic model is build:

"*The unemployment rate of the U.S. is affected by national average wage, job openings, and foreign direct investments to the USA*"

The first view of model in the mathematical notation is expressed as:

$$UNEMPLOYMENT = f\ (WAGE,\ JOB\ OPENINGS,\ FDI)$$

In Linear regression models will be estimated and analysed each variable to find the statistically significant variable until the final model.

4.3   Regression model and its estimation

4.3.1   Regression model

Economic model from previous chapter is used in regression model. The final estimation of regression model gives clear understanding about relationships between dependent variable (unemployment rate) and independent variable (National average wage index, job openings, foreign direct investment, and time series). Regression model is down below:

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \varepsilon_t$$

Where:

y_t – unemployment rate in percentages per year

x_{1t} – national average wage index in thousands of dollars

x_{2t} – job openings in thousands of units per year.

x_{3t} – foreign direct investments in millions U.S. dollars per year

ε_t – timer series

The goal is to see which variable is statistically significant, according to the result, statistically not significant variables will be excluded. In SAS studio in liners regression task, based on annual time series data from the Table 2 the unemployment rate is chosen

as dependent variable and national average wage index, job openings, foreign direct investment, time series are chosen as independent variables.

The Table 3 shows the result from first estimation and can be said that P-value of foreign direct investment 0.6267 is greater than alfa 0.05, accordingly the variable is not statistically significant. By excluding foreign direct investment variable, one more regression model will be built and estimated.

Table 3 Estimation of determinants

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	56.72605	14.18151	31.91	<.0001
Error	15	6.66625	0.44442		
Corrected Total	19	63.39230			

Root MSE	0.66665	R-Square	0.8948
Dependent Mean	5.88050	Adj R-Sq	0.8668
Coeff Var	11.33655		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	17.23892	8.50158	2.03	0.0607
National Average Wage	National Average Wage	1	-0.21496	0.29588	-0.73	0.4787
Job Openings	Job Openings	1	-0.00131	0.00018319	-7.17	<.0001
Foreign Direct Investment	Foreign Direct Investment	1	0.00088422	0.00178	0.50	0.6267
Time	Time	1	0.43739	0.31106	1.41	0.1801

Source: Own calculation, SAS Studio

4.3.2 Regression model without FDI

The table 4 shows new regression model estimation where dependent variable is unemployment rate and independent variables are national average wage, job openings and time series.

Based on estimation without foreign direct investment can be said that the P-value of national average wage 0.4696 is greater than alfa 0.05 which means that national average wage is also statistically not significant. By excluding national average wage variable, one more final regression model will be built and estimated.

Table 4 Estimation of determinants without FDI

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	56.61648	18.87216	44.56	<.0001
Error	16	6.77582	0.42349		
Corrected Total	19	63.39230			

Root MSE	0.65076	R-Square	0.8931
Dependent Mean	5.88050	Adj R-Sq	0.8731
Coeff Var	11.06640		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	17.22811	8.29896	2.08	0.0544
National Average Wage	National Average Wage	1	-0.21394	0.28882	-0.74	0.4696
Job Openings	Job Openings	1	-0.00129	0.00017261	-7.47	<.0001
Time	Time	1	0.44091	0.30357	1.45	0.1657

Source: Own calculation, SAS Studio

4.3.3 Final regression model

The Table 5 shows final regression model estimation where dependent variable is unemployment rate and continuis variables are job openings and time series. As mentioned before foreign direct investment and annual gross wage were exluded because of their insignificance.

In Table 5 there can be seen that P-value of job openings is less than alfa 0.05 and there can be confirmed that job openings is statistically significant variable. Also, t-value of job openings is equal to -11.69. One more key factor is that P-value of time series is also less than alfa 0.05, confirming its statistical significance. The R-square of estimated regression model is equal to 88.94% and adjusted R-square is 87.64%.

Table 5 Final Estimation

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	56.38412	28.19206	68.39	<.0001
Error	17	7.00818	0.41225		
Corrected Total	19	63.39230			

Root MSE	0.64206	R-Square	0.8894
Dependent Mean	5.88050	Adj R-Sq	0.8764
Coeff Var	10.91852		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	11.09391	0.53466	20.75	<.0001
Job Openings	Job Openings	1	-0.00138	0.00011808	-11.69	<.0001
Time	Time	1	0.21727	0.03118	6.97	<.0001

Source: Own calculation, SAS Studio

Following is the interpretion of final estimated regression model :

$$\hat{y}_t = 11.09391 - 0.00138x_{1t} + 0.21727t$$

- Equation shows that job openings have negative relationship with the unemployment rate, meaning the increase of job openings have positive afftect on the unemployment rate.

- Example: If job openings increases by 1 mln units per year, then the unemplyment rate decreases by *0.00138 %* approximately in average per year. Oppositely, if job openings is equal to zero, then the unemployment rate would be equal to *11.09391* % appoximately in average per year.

- As foreign direct investment and national average wage were found statistically not significant.

5 Discussion and result

The first regression model was built based on annual time series data where the dependent variable is unemployment rate and independent variables are national average wage index, job openings, foreign direct investment, and time series. After estimation there were found that P-value of foreign direct investment is higher than alfa, meaning that the variable is statistically not significant.

The second regression model was built by excluding foreign direct investment and keeping the rest variable the same where the dependent variable is unemployment rate and independent variables are national average wage index, job openings, and time series. There were found that P-value of national average wage index is higher than alfa, meaning that the variable is statistically not significant.

The final regression model was built by excluding the national average wage index variable. The dependent variable is unemployment rate and independent variables are job openings and time series. There were found that P-value of both job openings and time series is less than alfa. As a result, job openings and time series found as statistically significant variables. Moreover, the negative relationship between job openings and unemployment rate were confirmed.

The interpretation of the economic model from chapter 4.2 will be changed to:

"The unemployment rate in the U.S. is affected by job openings and time series"

In the Table 6 there is also possibility to compare Adjusted R-squares of regression model with all variables, the second regression model estimation without foreign direct investment, and in final regression model estimation without national average wage index. It is visible that adjusted R-square is increasing from 86.68% to 87.64 %.

Table 6 Comparison of Adjusted R-square

	1 model	2 model (no FDI)	3 final model
Adjust R-Square	86.68 %	87.31 %	87.64 %

In the Table 7 there is a comparison of t-value from each regression model estimations and can be seen that adjusted R-square is increasing as model excludes not significant variables. Final estimated regression model verified that Job openings is statistically significant variable.

Table 7 Comparison of t-values and P-values

	t-value	P-value	Significance
Foreign Direct Investment	0.50	0.6267	not significant
Average Wage Index	-0.74	0.4696	not significant
Job Openings	-11.69	< 0.0001	significant
Time series	6.97	< 0.0001	significant

By keeping in mind that our model explains in average and approximately 87.64% of variation only one scenario is predicted as an example to see the change of unemployment rate:

$$\hat{y}_t = 11.09391 - 0.00138x_{1t} + 0.21727t$$

What happens with the unemployment rate if job openings increase from 8580 to 9000 units, when the time series stays the same in 2019?

- If job openings increase from 8580 to 9000 units, then the unemployment rate decreases from 3.67% to 3.02%.

What happens with the unemploymet rate if job openings rate decreases from 8580 to 8000 units, when time series remain the same in 2019?

- If job openings decrease from 8580 to 8000, then the unemployment rate increases from 3.67% to 4.40%.

6 Conclusion

Concluding all there can be said that unemployment will exist and fluctuate even in good times. The one thing is clear for each of us that the economy of a certain country is changing all the time. The growth is only possible through changes. Theories above gave a clear picture of definitions unemployment and its estimation. There were explained with examples the main causes of frictional, structural, and cyclical unemployment. Can be concluded that the modern technology and internet made it easier for workers to find jobs perhaps causing to the decrease of frictional unemployment rate. Such factors like oil shocks, globalization, and global competition, shift from manufacturing to services and fundamental technology shocks (the Internet, computer, and artificial intelligence) causing to the increase of the structural unemployment. Finally, cyclical unemployment is caused by a mismatch between the aggregate level of wages in an economy and the level of prices.

Moreover, it is important to mention baby boomer, technology change, cultural approaches to women and work, government restrictions can all be a reason to the increase and decrease of the labor force participation rate. It was also discussed how job search, minimum wage laws, labor unions and the theory of efficiency wages can be the cause of always unemployment.

From practical part, the analysis of unemployment rate from 2000 to 2019 can be concluded that the highest unemployment rate was 9.61% in 2010 because of the Great Recession, and the lowest unemployment rate was in 3.67% in 2019 during the presidency of Donald Trump. While from the analysis of job openings during 2000-2019 can be concluded that the maximum number of job openings were 8,580,000 units, and the minimum was 2,998,000 units also because of the Great Recession in 2009.

Statistical analysis of unemployment in the United States of America can not be compared with analysis of unemployment in different countries. Totally different economy

and labor marker require individual approach always. But despite of all factors, the main goal is achieved. The regression model was built where the unemployment rate is dependent variable and job openings, time series are independent variables. Based on the estimated regression model the national average wage index and foreign direct investment were found statistically not significant as P-values of both variables were higher than alfa, while job openings and time series were found statistically significant as P-value of variables were less than alfa. The estimated coefficient of determination is equal to 88.94%. Another important point to mention is that annual job openings have negative relation with the unemployment rate, meaning the increase of job openings has a positive affect on the unemployment rate.

Moreover, from the analysis of foreign direct investment and national average wage index can be concluded that their number increased for 20 years. Interesting fact is that even though there was not found the significance of Foreign direct investment, the U.S. is the most environmental and top receiver country of foreign direct investment in the world. Besides foreign direct investment, it should not be forgotten that the U.S. has the highest national average wage indexes among with the UK, Germany, France, and Japan. Finally, as mentioned in "discussion of determinants" chapter foreign direct can have direct positive or indirect negative effects to the labor market and if minimum wage is above equilibrium level can cause structural unemployment concludes that the economy and labor market of U.S. require more advanced methods to analyze impact selected variables on the unemployment rate.

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