

**Czech University of Life Sciences Prague**  
**Faculty of Economics and Management**  
**Department of Statistics**



**Bachelor Thesis**

**Labour market analysis of the Czech Republic and  
chosen European countries**

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# **BACHELOR THESIS ASSIGNMENT**

Tomáš Pírko

Economics and Management  
Economics and Management

Thesis title

**Labour market analysis of the Czech Republic and chosen European countries**

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## **Objectives of thesis**

The main goal of this thesis is to analyze the development tendencies of the labour market of chosen European countries using various statistical methods and to compare it with the situation in the labour market of the Czech Republic.

## **Methodology**

The methodology will be based on data acquisition, study and examination of the obtained data. The data will be obtained from websites such as Czech Statistical Office, Ministry of Labour and Social Affairs and Eurostat. It will be also based on a statistical analysis of obtained data and testing of hypotheses that emerge from the data set.

## The proposed extent of the thesis

30 – 40 pages

## Keywords

Labour market, Unemployment, Gender, Workforce, Job, Statistical analysis

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## Recommended information sources

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## Declaration

I declare that I have worked on my bachelor thesis titled "Labour market analysis of the Czech Republic and chosen European countries" 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 copyrights of any third person.

In Prague on 14. 03. 2021 \_\_\_\_\_

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# Labour market analysis of the Czech Republic and chosen European countries

## Abstract

This bachelor's thesis deals with the unemployment rate and the rate of long-term unemployment in the labour market in selected European countries. Specifically, these are the Czech Republic, Slovakia, Germany and also the United Kingdom. There are relatively large differences in the values of labour market indicators between individual European countries. The main goal of this bachelor thesis is to analyze individual indicators and determine the development trends of these indicators in individual countries in the years 2008-2019 using the  $\beta$ -convergence method, which is applied to data collected from statistical offices such as Eurostat. A secondary goal is a closer look at 2020. The result of the analysis varied from one European country to another during the period under review. Convergence using the  $\beta$ -convergence method was confirmed only in the case of the economic indicator GDP per capita. For the rest of the analyzed indicators, due to insufficient conclusive value, the correlation diagrams were analyzed, which determined how the indicators behave in individual countries compared to other countries. The same results were obtained for both indicators based on the analysis of correlation diagrams. The Czech Republic tended to distance itself from other countries in its values. In both cases, Slovakia is lagging behind other countries. In the case of Germany, a high initial value of the indicators was determined together with a high decrease. In the case of the United Kingdom, a below-average initial value and a below-average rate of decline of individual indicators compared to other countries were determined. A closer look at 2020 identified the reason for the rapid rise in unemployment, which is the COVID-19 pandemic.

**Keywords:** Labour market, Unemployment, Gender, Workforce, Job, Comparison

# Analýza trhu práce České republiky a vybraných zemí Evropy

## Abstrakt

Tato bakalářská teze pojednává o míře nezaměstnanosti a míře dlouhodobé nezaměstnanosti na trhu práce v rámci vybraných evropských zemí. Konkrétně se jedná o Českou republiku, Slovensko, Německo a také Spojené království. Mezi jednotlivými evropskými zeměmi jsou poměrně velké rozdíly v hodnotách indikátorů trhu práce. Hlavním cílem této bakalářské teze je analyzování jednotlivých indikátorů a určení vývojových tendencí těchto indikátorů u jednotlivých zemí v letech 2008-2019 pomocí metody  $\beta$ -konvergence, která je aplikována na data sbíraná ze statistických úřadů jako je Eurostat. Vedlejším cílem je pak bližší pohled na rok 2020. Výsledek analýzy byl rozdílný v jednotlivých evropských zemích během sledovaného období. Konvergence metodou  $\beta$ -konvergence byla potvrzena pouze v případě ekonomického indikátoru HDP na obyvatele. U zbytku analyzovaných indikátorů došlo kvůli nedostatečné vypovídající hodnotě k analýze korelačních diagramů, která určila, jak se chovají indikátory v jednotlivých zemích oproti zemím ostatním. U obou indikátorů byly získány na základě analýzy korelačních diagramů stejné výsledky. Česká republika měla tendenci se ostatním zemím svými hodnotami vzdalovat. Slovensko se v obou případech za ostatními zeměmi opožďovalo. V případě Německa byla určena vysoká počáteční hodnota společně s vysokým poklesem. V případě Spojeného království byla určena podprůměrná počáteční hodnota a podprůměrná rychlost poklesu jednotlivých indikátorů oproti ostatním zemím. Bližší pohled na rok 2020 určil důvod rapidního růstu nezaměstnanosti, jímž je pandemie nemoci COVID-19.

**Klíčová slova:** trh práce, nezaměstnanost, pohlaví, pracovní síla, práce, porovnání



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# 1 Introduction

The unemployment rate, together with the long-term unemployment rate is one of the most important indicators of the labour market. In the labour market, there is always at least some unemployment rate needed, but if such a rate is too high, it is a negative indicator of the labour market. This could be seen, for example, in the European Union between 2012 and 2014, when the unemployment rate exceeded 10%. However, it should be noted that the unemployment rate varies greatly in different countries, for example, the Czech Republic has one of the lower unemployment rates, but Slovakia has one of the highest values. At the same time, the unemployment rate is affected by a large number of different factors, such as the ability to work from home, especially during the COVID-19 pandemic, or the Europe 2020 strategy, which aimed to gradually reduce unemployment. From a practical point of view, it is almost impossible to reach equilibrium in the labour market. Thus, unemployment is a phenomenon dealt with by a relatively large part of Europe. A large part of people in the labour market have encountered the phenomenon of unemployment and this phenomenon affects everyone differently, it brings a feeling of insecurity to someone and it can even bring existential problems to someone.

The aim of this bachelor thesis is to analyze selected labour market indicators in selected European countries and determine whether levels in individual countries tend to cope with others or, conversely, to move away from them, which should help determine whether differences between countries in the labour market are decreasing or increasing.

The structure of this bachelor thesis is as follows - introduction, objectives and methodology, literature review, practical part, results and discussion, conclusion. The objectives and methodology part is focused on the description of the objectives of the work and the procedure of using statistical methods that were used in the practical part of this thesis. In the part literature review, the thesis focuses on the description of the theoretical basis of the labour market, describes the various factors operating in the labour market and discusses the balance in the labour market. It also deals with unemployment, its division and the factors that affect it. The practical part is focused on the analysis of selected labour market indicators of selected countries. In the results and discussion section, the results from the practical part are discussed and the shortcomings of the work are identified in it. At the end of the work is then briefly summarized the result of the whole work.

## **2 Objectives and Methodology**

### **2.1 Objectives**

The main objective of this thesis is to compare the development trends in the labour market of selected European countries, including the Czech Republic, Slovakia, Germany and the United Kingdom. The comparison of development trends is based on the use of statistical methods such as measuring  $\beta$ -convergence. The measured factors include the unemployment rate and the long-term unemployment rate. Statistical methods are applied to data collected from statistical offices, mainly from the European Statistical Office called Eurostat.

### **2.2 Methodology**

The practical part of this thesis will be created through the analysis of accumulated data. The analysis will be performed by the  $\beta$ -convergence or correlation diagram analysis method. First, the collected data will be presented and then their subsequent analysis will be performed using the above-mentioned methods.

#### **2.2.1 Convergence measurement**

According to Minařík, et al. (2013) If the development of a certain variable in time on a set of units is observed, there may be a gradual approach of units (convergence) or their distancing (divergence). There are two basic concepts focused on measuring convergence, they are called  $\beta$ -convergence and  $\sigma$ -convergence. If more units are analyzed by this method, these methods show us rather their predominant tendencies, the case of “net convergence“ can only be discussed in the case of a pair of units. If there are such units among the units that stand outside the prevailing tendencies, we speak of so-called disparities.

#### **2.2.2 $\beta$ -convergence**

$\beta$ -convergence is based on the assumption that units either approach (converge) or zoom out (diverge) over time. This means that if units that initially showed lower values over time show higher growth, it is convergence. If units that initially showed low values

and at the same time show lower growth over time than units that initially showed higher values, this is a divergence. (Minařík, et al., 2013)

### 2.2.3 Procedure for measuring $\beta$ -convergence:

1. collection of data on variables at the beginning and end of the observed period and subsequent logarithmization of the given values, which eliminates their positive asymmetry,
2. calculation of the average growth coefficient per unit of the time according to the formula:

$$\bar{k} = \sqrt[n]{\frac{y_n}{y_0}} \quad (1)$$

where  $\bar{k}$  stands for the average growth coefficient,

$y_n$  stands for the value of the last year of observed period,

$y_0$  stands for the value of the first year of observed period,

and  $n$  stands for the number of periods,

3. construction of a planar graph, where the logarithms of the initial values are plotted on the horizontal axis and the logarithms of the average growth coefficients on the vertical axis,
4. using the least-squares method, determine the equation of the regression line, in the form:

$$\log \bar{k}' = \alpha + \beta \log y_0 \quad (2)$$

where  $\log \bar{k}'$  is the calculated value of the logarithm of the average growth coefficient,

$\log y_0$  is the logarithm of the initial value of the variable,

and  $\alpha, \beta$  are the parameters of the regression line,

5. according to the value of the guideline  $\beta$  we decide:
  - if  $\beta < 0$  there is a predominant tendency of convergence,
  - if  $\beta > 0$  there is a predominant tendency to divergence,
  - if  $\beta$  is approximately equal to 0, this is not a tendency,
6. then it is necessary to calculate the value of the coefficient of determination in per cent. (Minařík, et al., 2013)

$$100r^2 = 100 \frac{VAR \log \bar{k}'}{VAR \log \bar{k}} \quad (3)$$

#### 2.2.4 Case of unproven convergence/divergence

Minařík, et al. (2013) says that if the results of the convergence analysis are not conclusive, the correlation diagram analysis shall be used. First, the area of the diagram is divided according to the averages of the values into quadrants, and then the interpretation is performed as follows:

- if the monitored units are predominantly located in the second and fourth quadrants, this is highly conclusive convergence,
- if the monitored units are predominantly located in the first and third quadrants, this is a highly conclusive divergence,
- the more units are scattered in all quadrants, the more the evidence decreases,
- in the first quadrant, some units tend to move away from other units because they have an above-average initial value and an above-average growth rate,
- in the second quadrant, some units show a tendency to get into the first quadrant because they have below-average initial value and above-average growth rate,
- in the third quadrant, some units tend to lag behind other units because they have a below-average initial value and at the same time a below-average growth rate,
- in the fourth quadrant, some units tend to move to the area of the third quadrant because they have an above-average initial value and a below-average growth rate.



## **3 Literature Review**

### **3.1 Labour market**

Jírová (1999) defines the labour market as a place where the labour supply meets (i.e. where the people offer their job, apply for a job) and labour demand (i.e. where companies, government and households offer jobs). The tool for balancing labour supply and demand for labour is the price of labour – wages. One of the specific forms of the labour market is labour offices, in another form all forms of job demand advertising, i.e. job offers, and job offers from those who are looking for work.

Krebs, et al. (2002) follows and claims that the labour market is, therefore, a very specific type of market. Its specifics are based on the fact that work is a function of labour, and is therefore closely connected with the personality of man. It has a very important role in a market economy in the sense that it is expected to provide the economy with the necessary manpower in the required structure. (professional, age, educational, etc.), that means it will enable the production of goods and services. It is also expected to provide adequate manpower, mainly due to earnings (but it is also important, for example, to secure a certain social position, prestige, self-realization, etc.), to the extent that corresponds to their share of production.

Sojka, et al. (2006) then adds that work does not have the nature of other goods, mainly because it is performed by people with whom it is inseparably linked. The difference between people and other factors of production lies in the fact that they are endowed with thought and they have their will and have their rights. Due to its peculiarities, the labour market is a frequent subject of state intervention and a field for conflicts between employers and trade unions or a starting point for political conflicts. Despite the differences from other markets, well-known tools of microeconomic analysis can be used, such as - demand and supply curves - to analyze it.

The labour market is made up of three basic factors: labour supply, labour demand and the price of labour - wages.

#### **3.1.1 Labour**

There are several ways to define work from the physical definition of work to economic definition. The most appropriately used definition of work here will be the

economic definition. According to Šimek (2004), work is defined as any type of manual or intellectual activity that is necessary for a market economy to produce products and services and is focused on obtaining a pension. The work agreement then takes place on the labour market, which defines it as the place where the employer and the employee find each other and agree on a contract on wages, working hours, etc. Šimek (2004) further defines the workforce that performs work as an economically active population as people who either work or want to work. The labour force does not usually include non-working students, non-working pensioners, housewives and some other groups of people who are not counted as unemployed because they are not actively looking for work (for example, the homeless).

Labour is one of the four factors of production, these four are:

1. land (source of natural resources),
2. labour,
3. capital (e.g. machinery, equipment),
4. entrepreneurship.

Thus, work is a type of intentional or planned human activity, in which raw materials are transformed through human beings through given production processes into various goods and services. These goods and services have the primary task of satisfying needs. Thus, one gets to meet the needs of the individual through work. (Amadeo, 2020)

There is motivation associated with the work performed and with it the fair remuneration for the work. There can be many such kinds of motivation for a person to do work. Probably the most important of the motivating aspects of doing the job is the monetary reward. Thanks to the monetary reward, the individual gains purchasing power and can thus acquire funds to satisfy their not only basic living needs and security. But there are also jobs for which no one pays, such as housekeeping or caring for their loved ones, such jobs bring rather internal psychological satisfaction. The amount of remuneration depends on several factors such as the quality of the work performed, the amount of work performed and the complexity of the work. Remuneration should thus positively motivate workers to perform their work and it should also be fair, where equal remuneration should be paid to workers for the same work performed.

### **3.1.2 Division of labour**

Division of labour is a way of cooperation where individuals participate in divided activities. The division of labour has its origins in prehistoric times when from the beginning it was a division of labour according to difficulty. It was primarily a division into male and female work, where male work such as hunting was performed only by men and less demanding work such as food collection was performed only by women.

Today, work is considered "male" or "female" based on the proportion of each gender. If more than 60% of people of the same sex are involved, they are considered to be either "male" or "female". At present, more than 90% of activities meet this condition. There are reasons why employers prefer a particular gender based on characteristics that they believe are typical for a given gender. Sometimes there is gender discrimination in the labour market, where, for example, women can receive less pay for the same work that men do.

Brožová (2006) claims that if we discriminate against a person, we violate his dignity, make differences between people, or deny him certain rights and opportunities. It is important to address such situations and protect people from discrimination. The issue of discrimination is still insufficiently mapped and systematically organized.

Based on the division of labour, a specialization arose. Specialization means that certain people will focus on a given job. When different people specialize in the production of different goods and thus guarantees an increase in the productivity of a given economic good. Based on specialization, cooperation was established between individual manufacturers, in which there is a mutual exchange and thus the creation of a market. (Billing, et al., 1994; Renzeti, et al., 2003)

### **3.1.3 Labour market supply**

The basic unit of work is people who belong to the household. There is a decision here on whether to enter the labour market and under what conditions. It is therefore primarily a question of whether the consumption of money income will be given priority and thus more work will be offered, or whether leisure time will be given priority. The Labour Force by definition includes all people of working age who actively seeks work. (Ehrenberg, et al., 2012; Kuchař, 2007)

*“Labour services are supplied by individual workers. Classical economists assumed that the individual attempts to maximize utility (or satisfaction). The level of utility depends positively on both real incomes, which gives the individual command over goods, services and leisure. There is, however, a trade-off between the two goals because income is increased by work, which reduces available leisure time.”* (Froyen, 2013)

Macáková (2007) then develops that the work supply consists of an economically active population who can and wants to work. Human work can take the form of work in a company, for example, hire a job to make money or it can take the form of work at home. Work at home means the creation of services and products intended for direct consumption or self-development. The time spent working in the company and the time spent working at home is one part of the day, the rest of the day is made up of free time.

Labour market supply is usually divided into individual labour supply, market labour supply and aggregate labour supply.

#### 3.1.3.1 Individual supply for labour

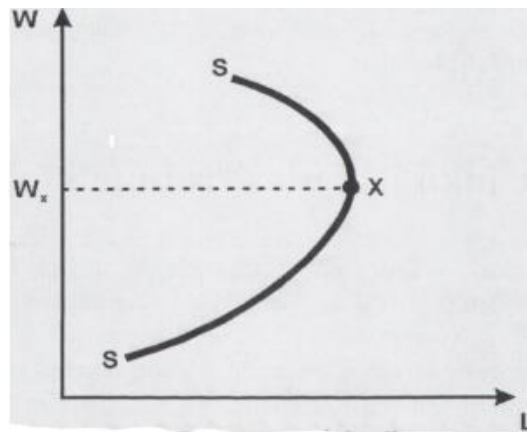
The change in the wage rate has a double effect on the choice between work and leisure, the so-called substitution and pension effect. At a time when wage growth is rising, leading to an increase in the amount of work offered at the expense of leisure time, in this case, it is talked about the substitution effect. However, if a higher wage appreciation increasing real income (assuming unchanged prices of products and services) leads to the replacement of work by free time. At that moment, it is talked about the pension effect. (Pierre, et al., 2014; Macáková, 2007)

According to Macáková (2007) these two effects (substitution effect and pension effect) have the opposite effect, this is a reason why the labour supply curve is backwards curved.

Because:

- if the substitution effect prevails, the amount of work offered increases with the growth of the offered wage evaluation,
- if the pension effect prevails, the amount of work offered decreases with the growth of the offered wage evaluation.

**Figure 1: Individual labour supply curve.**



Source: Jírová (1999)

As can be seen from Figure 1, with increasing wage evaluation, a person doing work offers more hours of work, up to point “X“, because every other hour brings him more utility. If the wage is lower and the curve is therefore positively sloping, then the substitution effect prevails, thanks to which the increase in the wage increases the interest in doing work and thus increases the labour supply. If the wage is higher and the curve in the graph is therefore negatively sloping, the effect that will result is that with higher wages, workers can afford more free time to satisfy their demands will prevail here. This is the reason why the labour supply decreases when the wage value get above the value of “X“ in Figure 1. (Jírová, 1999)

### 3.1.3.2 Market supply for labour

The labour supply on the market of a certain profession respects that the curves of individual labour offers represent the preferences of each person, as well as the fact that the wage rate in one professional market attracts labour offers from other markets. This effect of shifting labour from other markets to higher wage markets, assuming that important information is provided and that there is a possibility to overcome professional barriers, explains the positively tilted and growing labour market curve. (Holman, 2011; Brožová, 2006)

The labour supply market curve shows how many hours of work all workers in this market will offer at each wage rate. Assuming that more work is offered in the sector with rising wages the labour supply market curve is growing. The labour supply market curve is the horizontal sum of the individual labour supply curves. (Macáková, 2007)

According to Macáková (2007), there are two main reasons why the labour supply market curve is not backward sloping as an individual labour supply curve is.

Those reasons are:

- different people have different alternative costs and different relationships to work, which leads to a curvature of their supply curves at different points,
- the rising wage rate is attracting new workers to the market with higher transfer earnings.

### 3.1.3.3 Aggregate supply for labour

As aggregate in economics means total, aggregate labour supply means the total labour supply in a given economy in a given time interval, normally within a year.

According to Jírová (1999), labour supply is determined by these factors:

- real wages (their current and expected value),
- assets (property),
- non – working income (including government transfers),
- demographic development (especially number and age structure of the population),
- rate of economic activity of the population (i.e. ratio between the working population and total population or the ratio between the working population in working age and working-age population, expressed as a percentage),
- interest rate,
- social traditions.

### 3.1.4 Labour Market demand

Macáková (2007) claims that the demand for work is determined by the amount of work that the company hires at different levels of labour costs, respectively. at different wage rates. Brožová (2006) adds that demand for labour is derived demand. It depends on the demand for the product that the work produces. The company demands work to produce goods or services that the consumer desires because the consumer benefits from their consumption. Increasing consumer demand in the goods market also increases the company's demand for work that wants to produce more.

According to Kuchař (2007) demand is represented by the companies (employers) whose main effort is to maximize profit. And according to him, the extent of the demand for work is mainly influenced by two factors.

Those factors are:

- recruitment of new workforce,
- labour costs.

Demand can be divided the same way as the supply does, i.e. individual labour demand, market labour demand and aggregate labour demand.

#### 3.1.4.1 Individual demand for labour

Froyen (2013) claims *“In the classical model, firms are perfect competitors that choose their output to maximize profits. In the short run, the output is varied solely by changing the labour input so that choice of the level of output and quantity of the labour input is one decision. The perfectly competitive firm will increase output until the marginal cost of producing a unit of output is equal to the marginal revenue received from its sale.”*

Expressed by the formula:

$$MRP_L = MFC_L = w \quad (4)$$

Where:

$MRP_L$  = marginal revenue from the product

$MFC_L$  = marginal labour costs

$w$  = wage rate (Macáková, 2007)

The company is also interested in the monetary value of the marginal product.

Expressed by the formula:

$$MRP_L = MPP_L * P \quad (5)$$

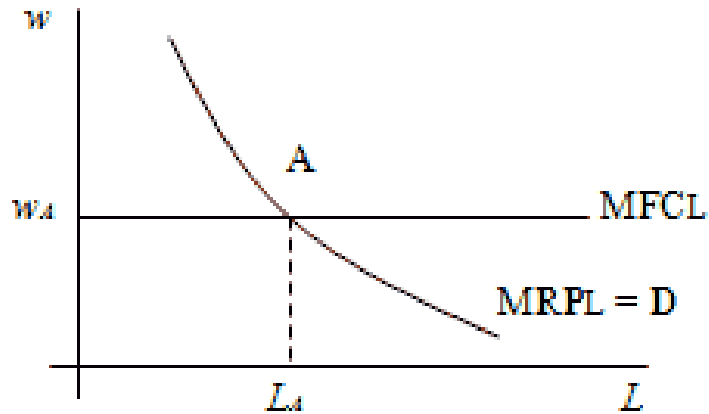
Where:

$MRP_L$  = marginal revenue from the product

$MPP_L$  = marginal physical product of labour

$P$  = product price on the perfect market (Brožová, 2006)

Figure 2: Individual labour demand curve.



Source: Macáková (2007)

As already determined and as can be seen from Figure 2, the labour demand curve (D) is a derived curve from the income curve from the marginal product (MRPL). The demand for labour is derived from the demand for final goods. In perfect competition, the firm is maximizing profit when marginal revenue from the product  $MRP_L$  is equal to marginal labour costs  $MFC_L$  (wage rate (w)). (Froyen, 2013)

#### 3.1.4.2 Market demand for labour

Market demand is the sum of the demand of individual consumers. The labour demand market curve is the horizontal sum of the individual demand curves of all companies in the labour market. (Macáková, 2007)

Demand for work of individual companies in a certain sector indicates the dependence between the amount of work demanded on the market by all companies and their price.

#### 3.1.4.3 Aggregate demand for labour

Macáková (2007) describes aggregate labour demand as the total labour demand in a given economy during a given time interval, normally within a year.

According to Jírová (1999) labour demand is determined by these factors:

- the price of labour characterized by the wage rate,
- demand for production produced by labour and the price of this production,
- work productivity (i.e. total output divided by work inputs) which depends on



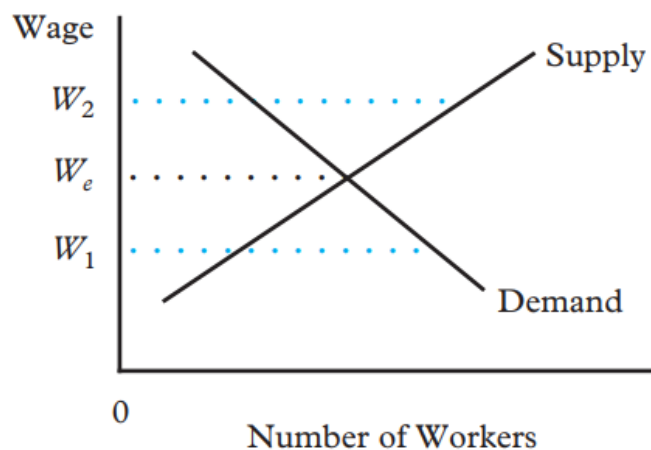
- a) quality of work inputs (given by literacy, education, training and skills of the economically active population),
- b) quantity and quality of cooperating production factors,
- c) levels and the usage of technical and technological knowledge,
- cost of other inputs (capital, land),
- awaited future sales,
- available surplus labour.

### 3.1.5 Equilibrium in the labour market

Equilibrium is reached in the labour market under the same conditions as in the ordinary market for goods. Equilibrium is reached when the intersection of the demand curve and the supply curve, i.e. the point, is found and with the point is also found equilibrium wage. The supply of labour and the demand for labour is therefore in competition with each other, as is the case under normal market conditions for goods. (Krebs, et al., 2002; Macáková, 2007)

As stated above labour supply market curve is the horizontal sum of the individual labour supply curves and the labour demand market curve is the horizontal sum of the individual demand curves of all firms in the labour market (similar to the market curve of product demand). (Macáková, 2007)

**Figure 3: Labour market equilibrium.**



Source: Ehrenberg, et al. (2012)

Achieving equilibrium in the labour market is the main target in the relationship between labour demand and labour supply and this state occurs when these two quantities are equal which means in the case when equilibrium wage is reached ( $W_e$ ). This wage is

also called a market-clearing wage. “..., *employers can fill the number of openings they have, and all employees who want jobs in this market can find them. There is no surplus and no shortage. All parties are satisfied, and no forces exist that would alter the wage.*” (Ehrenberg, et al., 2012)

The disbalance in the labour market can be eliminated by the movement of the wage. If the wage value deviates from the equilibrium level, arises either shortage or surplus of work in the labour market. If the market wage rate is lower than the equilibrium rate and reaches the level of W1 in Figure 3, then the amount of work supplied is lower than the amount demanded and thus there is a lack of labour on the market. At that moment, the wage rate must be raised, or supply or demand would have to change for demand and supply to reconcile at an equilibrium level. Companies that demand work will increase wages to increase the labour supply and the demand for labour will go down. This increase in the wage will end at the moment when the equilibrium point is reached again. If a situation where the wage rate is higher than the equilibrium rate (W2) arises and the amount of labour offered is thus higher than the demand, such a situation is called a surplus. The wage rate is then pushed back to the equilibrium level. In other words, the wage rate is therefore determined by the labour market and market members have to adapt to it. (Ehrenberg, et al., 2012; Macáková, 2007)

In the equilibrium state, the natural unemployment rate is still present, which is characterized by a longer-term absence of involuntary unemployment. It exists even with a longer-term equilibrium of the economy and it is a temporary vacancy, which arises due to the dynamics of the labour market because filling positions take some time. From an economic point of view, absolute equilibrium is a mere abstraction in the labour market. In a perfectly competitive market, many of these assumptions do not occur in real life, such as inhomogeneity of work or barriers to entry into employment. In the labour market, entities can increase the price of labour and thus there is a surplus of labour supply, which means the emergence of various types of unemployment. (Kuchař, 2007)

Standard market mechanisms that balance supply and demand due to the price of labour, or wages, do not work completely on the labour market. The market mechanism is thus relatively weakened in the case of the labour market. (Krebs, et al., 2002)

According to Krebs (2002), there are several reasons why standard market mechanisms are weakened in the labour market.

- Decision-making not only according to the amount of the salary but also according to many other preferences (both employees and employers apply different preferences and do not make decisions based only on wages. Some factors are, for example, the risk of work, the prestige of the profession, different work dispositions, etc.).
- The effort of companies to retain quality or regular employees also has its effect on adjusting supply and demand according to the price of labour. Companies often invest in workers and therefore try to keep them, just as workers do not want to be unemployed due to the attractiveness of the profession or the general fear of the problem of unemployment. This makes the sensitivity of wages to changes in supply and demand lower.
- Labour market segmentation also has a certain effect. Segmentation results from both the enormous differences between people (dispositions and assumptions), thus from the territorial allocation of labour markets. This has the effect of reducing the impact of competition on the labour market and causes wage disparities between different professions and in different territories.
- Collective bargaining (unions) that seeks higher wages. It can be with or without state participation. By administrative intervention, the wage is then moved to a higher level and then causes a decrease in efficiency. It can cause inflation to rise.
- Influence by the state (labour legislation). It causes adjustments to work hours, setting the minimum wage, length of schooling, etc.

All this makes wages inelastic and thus there is an increase in unemployment. The labour market is not an ordinary competitive market, but an administratively highly regulated market. Governments seek to reduce labour market imbalances and focus on macroeconomic regulation by regulating aggregate supply and demand for labour. (Krebs, et al., 2002)

### **3.1.6 Labour market segmentation**

The labour market is divided into many sub-labour markets, as there are many different types of labour supply and demand. This is one of the reasons why the labour market is heterogeneous. This is evidence of the existence of a phenomenon called labour market segmentation. There are several theories about labour market segmentation, the best known

of which is the theory of the dual labour market, which divides the labour market into two parts, primary and secondary. One of the other forms of labour market segmentation is segmentation into internal and external labour markets. It is further divided into formal and informal markets according to institutional regulation, control and legality.

#### 3.1.6.1 Primary and secondary labour market

Mareš (1998) claims that the primary labour market is the market where better job opportunities are concentrated, which at the same time have greater prestige. The advantages of these markets include, for example, good career opportunities and better working conditions associated with this market. Jobs are considered safer jobs here (much lower risk of job loss). Work here is usually better paid and there is relatively low fluctuation.

Mezihorák (2006) describes the secondary market as a market where, on the other hand, jobs are specific for low prestige and overall lower pay. There is almost no opportunity for career growth and it is a market where there are very few stable job positions and people working in such a market are then often exposed to alternating periods of unemployment. On the other hand, it is easier to find a job in such a market than in the primary market. There is also a barrier between these markets, such as the qualification requirements of both markets, which make it almost impossible for a person working in the secondary market to enter the primary market.

#### 3.1.6.2 Internal and external labour market

Mezihorák (2006) the internal labour market is a market within individual companies and therefore is not considered directly as a market in the true sense of the word. This is a market where workers are transferred within one company to jobs where workers will be needed at a given time. It is, therefore, a transfer of employees already employed in the company.

The advantages of a company focused on the internal labour market are as follows:

- increased job security,
- increasing the qualifications of employees,
- it is often a move to a higher position, so employees have a certain motivation for better and more effective work results.

In the external market, individual companies compete. The external market thus supports the greater mobility of employees between individual companies. (Mezihorák, 2006)

### 3.1.6.3 Formal and informal labour market

In the case of the formal market, it is a job market that is official. Also, what is happening in this market is controlled by various social institutions created for this purpose. In the informal market, on the other hand, it is a question of job opportunities that are not controlled by social institutions, and activities in this market then tend to belong to the grey and black economy. The informal labour market includes, for example, neighbourhood bailouts, but also illegal activities that circumvent the law. It is, therefore, for example, the employment of workers without a work permit. (Mareš, 1998)

Dualization of the labour market thus leads to the division of the labour force into protected "insiders" and marginalized groups of "outsiders" with less stability on the labour market in terms of their integration. The differentiation of the two groups, and thus the disadvantage of the second group, is reflected in several areas, such as a higher risk of unemployment, a lower probability of obtaining a permanent job or lower availability of social rights. Outsiders can then typically be defined as persons with a non-standard form of employment, i.e. temporary workers, part-time employees, or "false" self-employed persons. (Fervers, et al., 2015)

## 3.2 Unemployment

According to Jírová (1999), unemployment can be defined as a state of the economy in which people of working age with the ability to work and who are willing to work are not able to find a job. Ehrenberg, et al. (2012) complements “*The concept of unemployment is somewhat ambiguous, since, in theory, virtually anyone would be willing to be employed in return for a generous enough compensation package. Economists tend to resolve this dilemma by defining unemployment in terms of an individual’s willingness to be employed at some prevailing market wage.*”

The population division is therefore as follows:

Economically active population:

- 1) Employed - people who perform any paid work and at the same time those who have a job but are not currently working due to illness, strikes or holidays.
- 2) Unemployed - this includes people who are not employed, but:
  - a) are actively looking for a suitable job,
  - b) are waiting for a call to return to work if they have been fired, or
  - c) they expect to apply for work next month and are also registered with employment agencies.

Economically inactive population:

- 3) Other citizens, who make up about 36% of the adult population. These include retired people, women on maternity leave and women caring for children in households, students, people who are long-term or permanently incapable of work and people who are not looking for work.

As mentioned earlier, the absolute balance in the labour market is a mere abstraction due to many factors, such as barriers to entry, job heterogeneity, or the immobility of workers. In the labour market, the supply of labour exceeds the demand for labour, due to the persistence of a wage that is higher than the equilibrium wage. And this creates different types of unemployment.

Brožová (2006) adds that unemployment is a very complex societal problem with multidimensional consequences. Losing a job is an unpleasant event for almost all people who encounter this problem. In most cases, it means a decline in living standards and economic uncertainty for the future, a loss of relationships and contacts. For many people, work is a source of personal income, but also a meaningful activity that fulfils part of their lifetime. Exclusion from the work process is then perceived by some as a questioning of their own ability to apply themselves in complex social relationships, and thus to be a full member of society. Jírová (1999) further claims that high unemployment is a manifestation of a waste of resources because, during depressions, when unemployment is high, the economy does not produce as much as it is able to. Losses that occur during periods of high unemployment are the greatest documented waste of resources in today's economy.

Therefore, it can be said that a healthy economy means visible economic growth and, with it, should mean an acceptable level of unemployment. Unemployment, then, represents the loss of goods and services that may have been produced by the unemployed. This loss is relatively easy to quantify in the economy if we average the size of production. However, this loss also includes benefits which, on the one hand, make unemployment

more acceptable, but which, on the other hand, burden the state budget. The longer the unemployment, the more severe its consequences gradually become.

### 3.2.1 Unemployment rate

The unemployment rate is used to measure unemployment and is the most widely used indicator showing the development of the labour market. It shows the ratio of the unemployed to the total labour force (when the total labour force is the number of the economically active population, i.e. the sum of employed and unemployed persons of a given territory).

$$u = \frac{U}{L} \cdot 100(\%) \quad (6)$$

Where  $u$  stands for the unemployment rate

$U$  stands for the number of unemployed workers

$L$  stands for the labour force (Jírová, 1999)

It should be noted that there is also a certain level of unemployment that is part of every market. We call it the natural rate of unemployment. *“Employment rates are sensitive to the economic cycle, but in the longer term, they are significantly affected by governments' higher education and income support policies and by policies that facilitate the employment of women and disadvantaged groups.”* (OECD)

According to Ehrenberg, et al. (2012), The natural unemployment rate is the level of unemployment where the individual segments of the labour market are in balance. In some markets, the supply of labour exceeds and there are enough jobs associated with it. In other markets, on the other hand, the demand for labour, which is associated with subsequent unemployment, predominates. Jírová (1999) adds that with the natural rate of unemployment, inflation is stable and does not show an increase or decrease. Today, the natural unemployment rate is the lowest sustainable unemployment rate. At the same time, it expresses the highest sustainable employment rate and corresponds to the potential product of the country. Jírová (1999) further claims that unemployment at the level of this natural rate of unemployment can be described as voluntary unemployment, because the unemployed are not interested in job vacancies for certain reasons, as they do not meet their entitlements.

## **3.2.2 Types of unemployment**

### 3.2.2.1 Types of unemployment by cause

#### 3.2.2.1.1 Frictional unemployment

Ehrenberg, et al. (2012) describes frictional unemployment as a type of unemployment that will always exist, even if we have a labour market that is in equilibrium, where the demand for labour would exactly cover the supply of labour, there would be frictional unemployment. Even in such a situation, there are always people who will be between jobs. Even if the size of the workforce is constant, there will be new people who want to enter the labour market or people who want to leave the labour market. There are also people who want to change their job. Jírová (1999) adds that frictional unemployment is also referred to as completely natural.

#### 3.2.2.1.2 Structural unemployment

Ehrenberg, et al. (2012) says that structural unemployment appears in the labour market at a time when there is a mismatch between supply and demand. Structural unemployment can then arise when the demand for one type of work decreases and for another type of work increases. Holman (2011) describes an example where workers made redundant as a result of a fall in demand fail to qualify for another job quickly enough. Supply of work is then not able to adapt quickly enough, because it is quite difficult for a person to go through requalification and also get used to new work. Structural unemployment is also a natural part of every economy and cannot be prevented, as it could slow down the economy.

#### 3.2.2.1.3 Cyclical unemployment

Cyclical unemployment occurs when total labour demand is low in the business cycle downturns. People then cannot find work in other industries either. It thus belongs to involuntary unemployment and its length depends primarily on what part of the economic cycle the given economy is currently in. (Samuelson, et al., 2010)

#### 3.2.2.1.4 Seasonal unemployment



Ehrenberg, et al. (2012) claims that seasonal unemployment is the result of fluctuations in labour demand. Its feature is that it can be repeated at a given time of year and most often affects sectors such as agriculture or forestry.

### 3.2.2.2 Types of unemployment according to voluntariness

#### 3.2.2.2.1 Voluntary unemployment

Voluntary unemployment is a situation that occurs when the labour market is in equilibrium or when there are fewer unemployed people than job opportunities. The market works in such a way that everyone who tries to find a job at the going wages and working conditions can find it and companies can find a workforce under the given conditions. “*Some economists label this voluntary unemployment to denote that people are unemployed because they prefer that state over other labour market states.*” (Samuelson, et al., 2010)

#### 3.2.2.2.2 Involuntary unemployment

It is then the opposite phenomenon when the supply of labour prevails over the demand for labour. Under the given conditions, there are more workers on the market who want to work than job positions. At that moment, part of the worker cannot find a job under normal wage conditions and is therefore involuntarily unemployed.

### 3.2.2.3 Types of unemployment according to duration:

#### 3.2.2.3.1 Short-term unemployment

Holman (2011) claims that the duration of short-term unemployment is usually within a few weeks to months. Short-term unemployment usually does not cause any problems for people and is often associated with frictional unemployment.

#### 3.2.2.3.2 Long-term unemployment

According to the International Labor Organization (ILO), a long-term unemployed person has been looking for work for at least one year. Long-term unemployment can be a big problem for a person. It can cause loss of qualifications or existential problems. If the economy suffers from a higher rate of long-term unemployment, this rate functions as an indicator of the shortcomings of the economy. (Holman, 2011)

### **3.3 Factors affecting unemployment**

As mentioned above, there are several types of unemployment and their associated causes, such as the lack of qualifications of potential employees and the associated structural unemployment. However, several other factors affect the unemployment rate, such as the problem of high financial unemployment support from the state. This unemployment support then extends the duration of unemployment of individual citizens. It can also reach a level where it is no longer advantageous for employees to work and they prefer to enjoy their free time and receive this financial support. The other most important factors are:

#### **3.3.1 The age structure of the population**

The age structure of the population determines the potential workforce that can be used in the economic sphere. (Dvořáček, et al., 2012) The change in this age structure of the population can be monitored depending on the number of immigrants, emigrants, deaths and births in the given territory within the observed period. Changes in the number of live births have a very significant impact on the age structure of the population. Depending on how many children are born, it can be roughly estimated what the potential workforce might look like in the future. Many factors affect the number of live births. From the past, events such as world wars, their end, economic crises, or the legalization of abortion are visible in the graphs.

#### **3.3.2 Education**

Another very important factor that affects unemployment is the structure of education. As described above, there is so-called structural unemployment. This unemployment has a declining trend if the structure of education meets the requirements of the labour market. In most cases, this is not the case and this structure of education does not meet the requirements of the labour market. This is one of the factors that cause an increase in structural unemployment.

### **3.3.3 The influence of foreigners on the market**

The labour market is undoubtedly also affected by international migration, ie the number of immigrants and emigrants. The more foreigners come to a given labour market to look for work, the fewer jobs will be available to citizens of the given market. Foreigners are willing to perform work that is not very interested in the market. Foreigners are willing to accept lower wage conditions and thus fill vacancies in the labour market. In the Czech Republic, foreigners have a relatively large influence only in certain jobs, such as construction or agriculture. (Cieslar, 2021)

### **3.3.4 Technological progress**

Other factors influencing unemployment include changes in technology, which may cause further unemployment. Thanks to better technologies, it is possible to produce more goods with less effort, which is associated with a reduction in costs and thus can justify the subsequent lower need for employees and the associated reduction in staff.

## **3.4 Employment Policy**

Employment policy is one of the most important factors in the ability to influence unemployment. According to Krebs, et al. (2002) employment policy can be defined as a set of measures that help create the conditions for a dynamic balance in the labour market and the efficient use of labour. The primary effort is therefore to match labour supply with demand for labour, which supports and adjusts in terms of balance without fundamentally modifying the labour market. Employment policy is divided into two basic sectors. It is divided into active and passive employment policy.

### **3.4.1 Active employment policy**

The main goal of active employment policy is the suppression of unemployment and the associated balancing of supply and demand for labour. According to Jírová (1999), active employment policy includes:

- expenditure on employment policy administration and employment-related services,
- retraining,

- support for small businesses and support of employment in the private sector,
- job creation by the state,
- support of job creation for citizens who have altered working ability,
- introduction of shorter working hours in companies with temporary sales difficulties,
- development of labour market infrastructure,
- removal of existing barriers for certain risk groups when entering the labour market,
- enabling labour mobility.

### **3.4.2 Passive employment policy**

Krebs, et al. (2002) says Passive employment policy mainly includes securing living conditions for those who have somehow become temporarily unemployed. It is therefore the material security of the unemployed, which takes the form of various benefits and financial supports. Its purpose is to compensate for the loss of earnings. Jírová (1999) adds that passive employment policy also includes stimulating early retirement.

## **4 Practical Part**

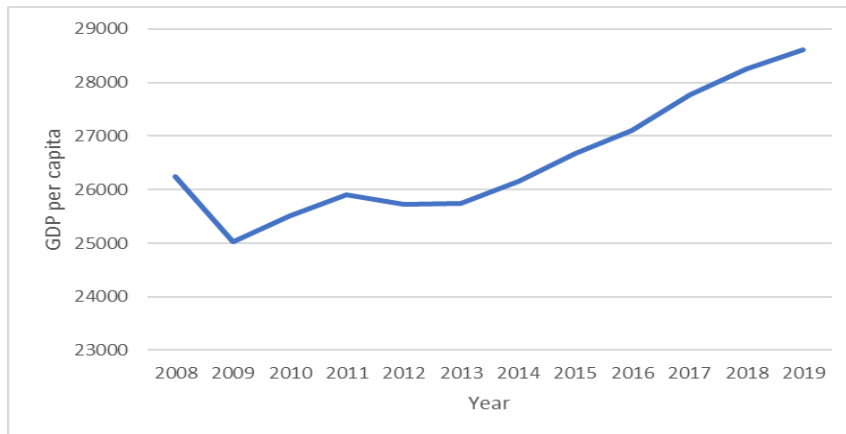
The practical part of this bachelor thesis is focused primarily on the analysis of labour markets of four selected countries. For the analysis to take place, data on individual labour market indicators must be collected. The data will be collected primarily from Eurostat, as it is an institution that collects statistical data from individual countries. Usually, each country has its own statistical office, but for example, the calculation of the unemployment rate can vary considerably from country to country, which is why data from Eurostat will be used, because these data are unified there. If there is a problem retrieving data from Eurostat, then other statistical offices will be used, such as national statistical offices.

For the analysis of the labour market, 4 countries located in Europe were selected. These are the Czech Republic, Slovakia, then Germany and the United Kingdom. The Czech Republic was chosen because of the origin of the bachelor's thesis, as its origin is the Czech Republic. Slovakia was chosen based on the similarity of the size of the economy with the Czech Republic, another reason is the fact that until recently the Czech Republic and Slovakia were the same countries. At the turn of 1992 and 1993, Czechoslovakia was divided into two independent states, namely the Czech Republic and the Slovak Republic. Another selected country is Germany and was chosen because it has one of the strongest economies in Europe and is also a neighbouring country of the Czech Republic. The fourth and last country is the United Kingdom, which was chosen for the same reason as Germany because it has a very strong economy, but also because of Brexit, which caused a relatively large crackdown. This is the withdrawal of the United Kingdom from the European Union, this decision was made based on a referendum in mid-2016.

### **4.1 Overview of the European labour market**

In the European labour market, the European Union occupies a relatively large part of the overall development; it is the union of most European countries that cooperate. In a way, the European Union can significantly influence the situation in the European labour market. One piece of evidence was, for example, the Europe 2020 Strategy, which aimed primarily at achieving a 75% employment rate for women and men aged 20-64.

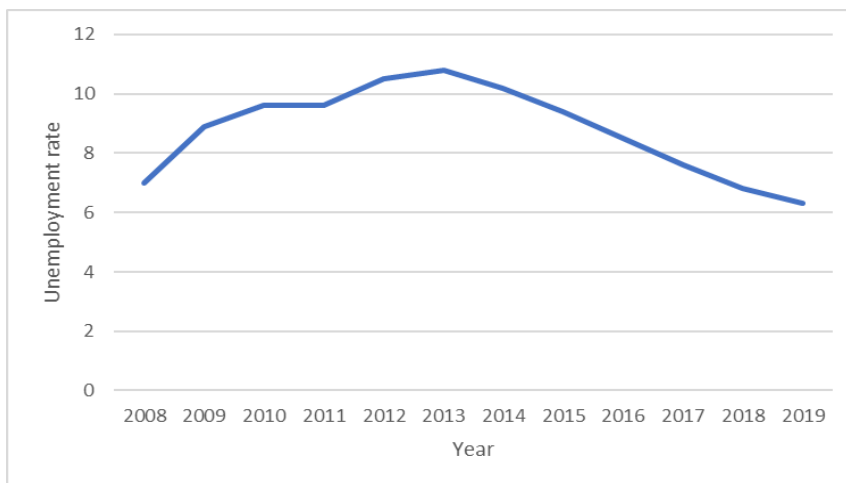
**Figure 4: GDP per capita in the European Union (EUR)**



Source: Eurostat

If the economic side of the European Union is taken into account, as can be seen from Figure 4 GDP per capita in the European Union has fallen after 2008, as the world has been hit by a major financial crisis. After 2009, GDP per capita began to grow again and with a growing trend, it remained until 2019, when GDP per capita reached 28610 euros.

**Figure 5: The unemployment rate in the European Union (%)**



Source: Eurostat

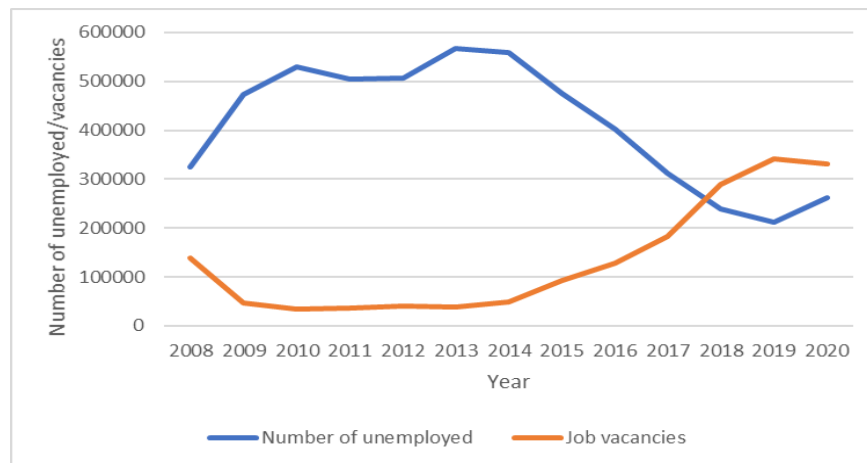
As for one of the most important indicators of the labour market, the unemployment rate, as can be seen from Figure 5, the unemployment rate in 2008 began to rise quite markedly. The reason for such a decline was again the financial crisis, which affected the whole world. The growing trend lasted for the unemployment rate until 2013 when the unemployment rate in the European Union reached a level of 10.8%. Subsequently, a turning point came and the unemployment rate began to fall again and approached the level of 6% in 2019, the average unemployment rate for the European Union in 2019 was measured at 6.3%.

### 4.1.1 Czech Republic

The situation in the labour market in the Czech Republic is relatively significantly influenced by regional differences. These regional differences are visible, especially when comparing Central Bohemia, including the capital city of Prague, with the area of Eastern and Northern Bohemia. In the middle of 2020, the lowest recorded unemployment rate in the whole of the Czech Republic was found in Prague, 2.4%. Prague is mainly very strong in terms of services and investors, primarily in the field of real estate and tourism. The Pardubice region was second in order with 2.53% and the Hradec Králové region with an unemployment rate of 2.82%. According to the values taken from the Czech Statistical Office, the total unemployment rate in the Czech Republic in 2020 is then averaged 3.6%. This means an increase compared to last year.

As for statistics on foreigners in the Czech Republic, a large proportion of foreigners in the Czech Republic come from neighbouring countries such as Slovakia, Germany, or Poland (CZSO). However, a large part of foreigners also come from territories outside the European Union, primarily from Ukraine, where the largest percentage of foreigners in the Czech Republic has long been the largest, followed by Vietnam, Belarus, Russia and India, for example.

**Figure 6: Number of vacancies vs unemployed in the Czech Republic**



Source: Eurostat, own processing

Figure 6 shows the development of the number of job vacancies and the development of the number of people looking for a job. As can be seen from Figure 6, the number of vacancies since 2008 has not exceeded the labour supply, ie the number of unemployed until 2018, when this happened for the first time. From 2006, the trend of both curves seemed to be comparable until 2008, when the world was hit by the financial crisis, and

therefore the number of job opportunities decreased again and the number of job seekers increased again. Everything was equalized up to the year 2018 when the number of job opportunities exceeded the number of people looking for work. In 2020, a coronavirus pandemic hit the world and the two curves began to converge again.

As for average wages, they have been rising in recent years. The average wage in the Czech Republic was set at \$ 29,281 per year in 2019 (OECD), which is below average across Europe. However, average wages in the Czech Republic still have a growing long-term trend.

#### **4.1.2 Slovakia**

With a population of 5,457,873, Slovakia has about half the population of the Czech Republic. From an economic point of view, Slovakia is very similar to the Czech Republic. It is not so long ago they still functioned as one state. According to GDP per capita, Slovakia's economy is one of the slightly weaker and below-average European economies.

The unemployment rate has been declining in recent years, reaching 5.19% at the end of March 2020 when the largest part of the unemployed was determined in the age group between 55-59 years. The lowest number of unemployed was measured in the Bratislava area and, conversely, the most unemployed appeared in the Prešov part.

The statistics related to Slovakia and foreigners are then as follows. By far the largest share of foreigners to Slovakia comes from Ukraine, a total of 44.85% of foreigners in June 2020 were foreigners from Ukraine. The second-largest percentage of foreigners is occupied by foreigners from Serbia, who make up 18.88 per cent of foreigners in Slovakia. Then there are people from Vietnam with 7.3 per cent, from Russia with 6 per cent and from China with 3.1 per cent (Spectator). There are also foreigners in Slovakia, for example from northern Macedonia, the Republic of Korea, Iran, the USA, or even India. However, there is also a declining short-term migration for work abroad by Slovaks. These workers focused primarily on the healthcare and construction industries. A large part of Slovaks worked, for example, in Austria, the Czech Republic or in Germany. In Slovakia, the number of vacancies continued to fall, for example in the trade or industrial production, but new jobs appeared in health care.



**Figure 7: Number of vacancies vs unemployed in Slovakia**



Source: Eurostat, own processing

As Figure 7 suggests, the number of vacancies remains relatively constant over time. On the contrary, the number of unemployed individuals showed growth after 2008, caused by the financial crisis. The growing tendency of the number of unemployed persons was maintained until 2013 when the turning point came and the numbers of unemployed persons began to decline until 2019. Despite the constant number of vacancies in Slovakia, it can be seen that the curves tend to converge.

With the growing number of employees in various sectors, the development of employment was also relatively fundamentally affected. Employment grew mainly in the IT sector, in professional scientific and technical activities, but also in agriculture and industrial production. The decline in employment was reflected in construction, where employment fell. In recent years, Slovakia has had the highest long-term unemployment rate among selected countries. Long-term unemployment in Slovakia is also above average compared to European averages. As for GDP per capita, it is below average in Slovakia compared to the European average. Slovakia, with an average annual salary of \$ 25,452, (OECD) ranks below average in Europe. But in recent years, their wages have risen sharply.

### 4.1.3 Germany

Germany is one of the economically largest countries in the world. It has over 81 million inhabitants and 61% of the German workforce is employed in small and medium-sized enterprises, which thus form a large part of German companies. Germany is also on the list of countries with the largest exports, namely Germany is in third place behind

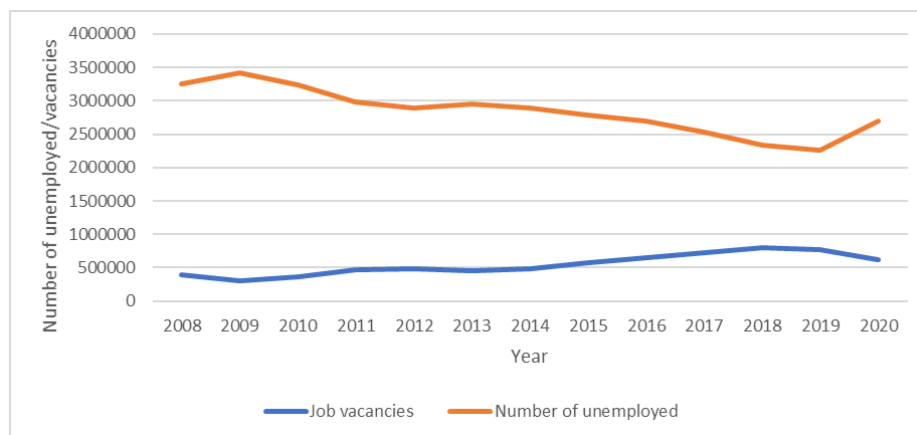
China and the USA. Germany has a much higher GDP per capita than the other countries selected in this thesis. It is above average compared to the European Union average.

Unemployment in Germany has been on a declining trend since 2009, when it reached 7.8%, gradually falling to 3.1% in 2019 when the turning point came and in 2020 the number of unemployed people began to rise again. The lowest unemployment was then measured in Bavaria.

Germany is one of the strongest countries in terms of average wages, with an average value of \$ 53,638 in 2019 (OECD), it is one of the countries with above-average salaries within the entire European Union.

As for the statistics on foreigners in Germany, they are as follows. Most of the foreigners in Germany are people from Turkey. In 2019, their number was 1,472,390, making them the number one foreigner living in Germany. Another is Poland with 862,535 living individuals in Germany. This is followed by foreigners from Syria, Romania, Italy and others (Statista).

**Figure 8: Number of vacancies vs unemployed in Germany**



Source: Eurostat, own processing

Figure 8 then shows the difference between the number of vacancies and the number of people looking for work. There is a relatively large difference, which shows that the number of vacancies cannot cover all the people who want to be employed in a given labour market. Since 2008, a declining trend in the number of people looking for work in a given market can be seen, and conversely, a positive increasing trend can be seen in terms of job opportunities. Until 2019, when the turning point came and the curves began to recede.

In recent years, the average time taken to fill vacancies in Germany has increased to 127 days from 114 days. This long period of vacancy says that it is relatively difficult for a

large number of companies to fill some positions. It cannot be said that in this case, this is a lack of qualified staff. But there are some bottlenecks in the professions relating to health care and nursing, or in construction.

#### **4.1.4 United Kingdom**

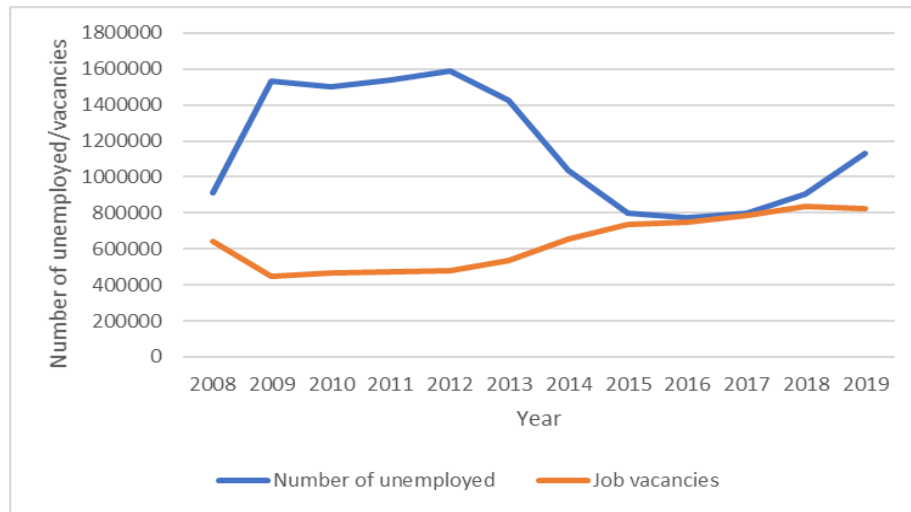
The unemployment rate in the United Kingdom labour market had a declining trend from 2011 to 2019. However, the situation in the United Kingdom labour market has not been the best lately, with the employment rate starting to show a declining trend in 2020 and a rising unemployment rate. The United Kingdom left the European Union on 31 January 2020, so it may be interesting to follow labour market developments.

In terms of gross domestic product per capita, the United Kingdom is doing very well, with only a slightly lower GDP per capita than Germany, making it one of the stronger European countries. As for the average wages in the United Kingdom, they reached \$ 47,226 in 2019 (OECD). It is thus slightly below Germany with average wages, but it is still one of the stronger countries in Europe and thus one of the European countries with a high average wage.

Unfortunately, not enough data was available to compare the number of vacancies and job seekers. Data on the number of job vacancies in the United Kingdom were found only until 2011, where it was clear that there were several times fewer jobs than people seeking work. In the following years, the numbers of people looking for work fell, but in 2018 they began to rise sharply again.

There are also many foreigners from different countries in the United Kingdom. The largest share of foreigners in the United Kingdom is foreigners from Poland of which in 2019 there were over 900 thousand in this area. Furthermore, there is a relatively large number of foreigners from Romania, of which there are about 450 thousand. Others include primarily foreigners from India, the Republic of Ireland, Italy, Portugal, Pakistan, or France and other countries (Statista).

**Figure 9: Number of vacancies vs unemployed in the United Kingdom**



Source: Eurostat, own processing

Figure 9 shows the development of the number of unemployed and job opportunities, so it can be seen from Figure 9 that since 2008, when the financial crisis took place, the number of unemployed has been growing at a very high rate and later, by 2012 at a slower pace. The turning point came in 2012 and the number of unemployed began to decline, the decline continued until 2016, when the number of unemployed began to rise slowly again. As regards the number of job vacancies, this number has decreased in 2008 and an upward trend can be observed since 2009. Between 2016 and 2018, the curves came very close, but it never happened that the number of job vacancies exceeded the number of unemployed. In 2017, the number of unemployed persons received a rising trend again and the curves began to recede again.

## 4.2 Evaluation of selected indicators in the time series 2008 to 2019

The method of  $\beta$ -convergence is chosen for the evaluation of selected indicators, which shows whether the values of the given indicators for individual countries tend to approach each other (there is a convergence between them) or moving away from each other (in this case there is a divergence). Selected indicators are GDP per capita, as it is the main indicator of the strength of the economy, which is also related to the labour market and also it is an indicator for which the concept of convergence was originally derived. The next one is the unemployment rate, which is one of the main indicators of the labour market and finally the long-term unemployment rate, which is a negative indicator of the labour market.

#### 4.2.1 GDP per capita

**Table 1: GDP per capita in observed areas (EUR)**

Year	Czech Republic	Slovakia	Germany	United Kingdom
2008	15500	12600	32320	30940
2009	14690	11890	30580	29460
2010	15020	12560	31940	29830
2011	15310	12990	33200	29960
2012	15170	13220	33280	30190
2013	15160	13290	33330	30660
2014	15480	13630	33920	31290
2015	16290	14270	34130	31780
2016	16670	14550	34610	32060
2017	17490	14980	35380	32430
2018	17990	15520	35720	32640
2019	18330	15860	35840	32910

Source: Eurostat

In Table 1 there can be seen data taken from the European statistical office called Eurostat. These are annual data from 2008 to 2019, which serve as preparation for the analysis through convergence. As can be seen from Table 1, Slovakia has the smallest GDP per capita. The Czech Republic shows only slightly higher values, while the United Kingdom shows above-average values, together with Germany, whose values are the highest among the selected countries.

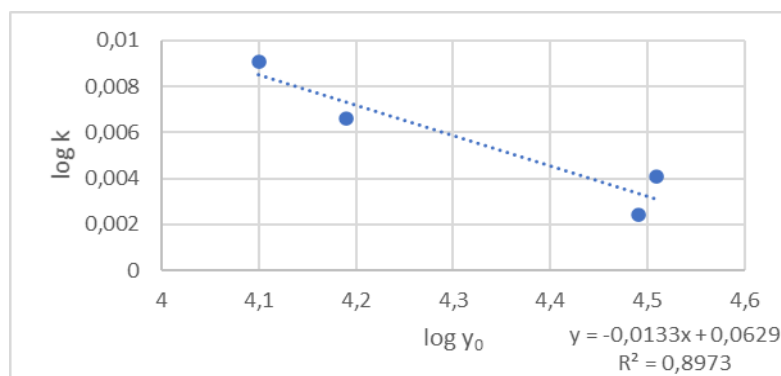
**Table 2: Data for measuring the convergence of regions (GDP per capita)**

Country	Indicator		Logarithm of the indicator	
	Unemployment rate	Average growth rate	log $y_0$	log $\bar{k}$
	$y_0$ (EUR)	$\bar{k}$		
Czech Republic	15500	1,015362171	4,190331698	0,006620979
Slovakia	12600	1,021138816	4,100370545	0,009084785
Germany	32320	1,009442332	4,509471352	0,004081514
United Kingdom	30940	1,005627294	4,490520309	0,002437052

Source: Own calculations

In Table 2, the indicators needed for analysis through  $\beta$ -convergence are listed in the first two columns, these indicators are the first years of the observed period of individual countries shown in the first numerical column and the average growth coefficients shown in the second numerical column. Subsequently, they were logarithmized in order to possibly remove the positive asymmetry. The logarithmic values are then located in the third and fourth numeric columns.

**Figure 10: Graphical representation of the convergence of regions (GDP per capita)**



Source: Own processing

Figure 10 shows points representing the logarithmic calculated values of individual countries. The points are located in the second and fourth quadrants, meaning that this is a highly conclusive convergence. A regression line with a regression equation is attached to Figure 10, which can also be seen in Figure 10. The straight-line guideline has a negative value, so it is clear that there is a convergence. In Figure 10 there is a calculated coefficient of determination value that shows a value of 0.8973. When converted to a percentage, it is 89.7%, and that is a value that has a significant tendency to convergence.

#### 4.2.2 Unemployment rate

**Table 3: Unemployment rate in observed areas (%)**

Year	Czech Republic	Slovakia	Germany	United Kingdom
2008	4,4	9,5	7,5	5,6
2009	6,7	12	7,8	7,6
2010	7,3	14,4	7	7,8
2011	6,7	13,6	5,8	8,1
2012	7	14	5,4	7,9
2013	7	14,2	5,2	7,5
2014	6,1	13,2	5	6,1
2015	5,1	11,5	4,6	5,3
2016	4	9,7	4,1	4,8
2017	2,9	8,1	3,8	4,3
2018	2,2	6,5	3,4	4
2019	2	5,8	3,1	3,8

Source: Eurostat

One of the most important indicators for labour is undoubtedly the unemployment rate, in Table 3 there are data collected from Eurostat, which express the values of unemployment in selected countries in the years 2008 to 2019. According to the table, Slovakia has the highest unemployment rate, where until 2015 the unemployment rate

exceeded the level of 10%. On the contrary, the lowest unemployment rate is in the Czech Republic, where the unemployment rate was only 2% in 2019.

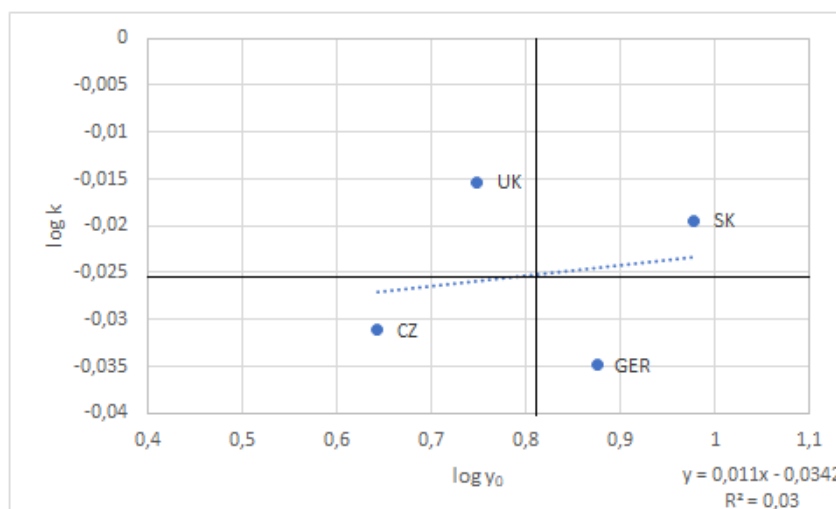
**Table 4: Data for measuring the convergence of regions (unemployment rate)**

Country	Indicator		Logarithm of the indicator	
	Unemployment rate	Average growth rate	log $y_0$	log $\bar{k}$
	$y_0$ (%)	$\bar{k}$		
Czech Republic	4,4	0,930830629	0,643452676	-0,031129335
Slovakia	9,5	0,956133601	0,977723605	-0,019481419
Germany	7,5	0,922822598	0,875061263	-0,034881779
United Kingdom	5,6	0,965362682	0,748188027	-0,015309494
Mean			0,811106393	-0,025200507

Source: Own calculations

After sorting the necessary data and their subsequent processing, Table 4 was obtained. In Table 4 the first numerical column can be used to see the first years of the observed period of individual countries and the second numerical column shows the average growth coefficients. After obtaining these data, they were logarithmized to eliminate positive asymmetry, and these logarithmic values can be seen in the third and fourth numeric columns.

**Figure 11: Graphical representation of the convergence of regions (unemployment rate)**



Source: Own processing

Figure 11 shows the points obtained by entering the logarithmic values from Table 4. The logarithms of the values of the initial years are plotted on the horizontal axis and the logarithms of the growth coefficients are plotted on the vertical axis. In Figure 11, a regression line is drawn, which has a positive directive and can therefore be said, that according to the measurement of  $\beta$ -convergence it is a divergence. However, the

coefficient of determination calculated in Figure 11 has a very low value, which, after conversion to 3%, is therefore little conclusive in the results of the convergence analysis. Therefore, there is more space for analysis of the correlation diagram. Figure 11 is divided by axes into 4 quadrants according to the averages of individual values. In the first quadrant is Slovakia, which shows a below-average decline in the unemployment rate with an above-average initial value. In the second quadrant is the United Kingdom, which has a below-average initial value and at the same time a very slow decline in the unemployment rate. In the third quadrant is the Czech Republic, which, with a below-average initial value, shows an above-average decline in the unemployment rate. In the fourth quadrant is Germany, which, with an above-average initial value, showed the fastest decline in the unemployment rate.

### 4.2.3 Long-term unemployment rate

**Table 5: Long-term unemployment rate in observed areas (%)**

Year	Czech Republic	Slovakia	Germany	United Kingdom
2008	2,2	6,6	3,9	1,4
2009	2	6,5	3,5	1,9
2010	3	9,2	3,3	2,5
2011	2,7	9,2	2,8	2,7
2012	3	9,4	2,4	2,7
2013	3	10	2,3	2,7
2014	2,7	9,3	2,2	2,2
2015	2,4	7,6	2	1,6
2016	1,7	5,8	1,7	1,3
2017	1	5,1	1,6	1,1
2018	0,7	4	1,4	1,1
2019	0,6	3,4	1,2	0,9

Source: Eurostat

Long-term unemployment is a negative indicator of the labour market. The data in Table 5 were collected from the European Statistical Office Eurostat. These data express the long-term unemployment rate in selected countries. As can be seen from Table 5, the worst situation regarding the long-term unemployment rate was in Slovakia, where this rate has long remained at around 9% and has only begun to decline in recent years. On the contrary, the best situation was measured in the Czech Republic, the long-term unemployment rate was equal to 0.6% in 2019.



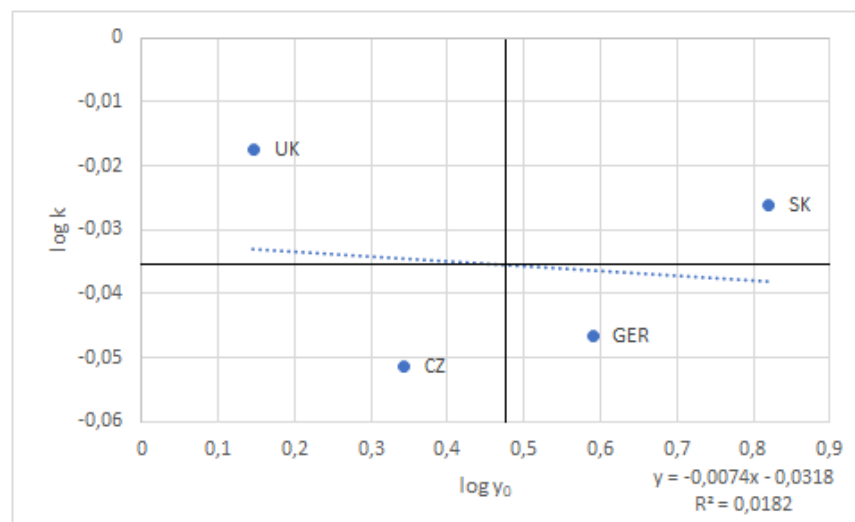
**Table 6: Data for measuring the convergence of regions (long-term unemployment rate)**

Country	Indicator		Logarithm of the indicator	
	Unemployment rate	Average growth rate	log $y_0$	log $\bar{k}$
	$y_0$ (%)	$\bar{k}$		
Czech Republic	2,2	0,888592406	0,342422681	-0,051297403
Slovakia	6,6	0,941482542	0,819543936	-0,026187729
Germany	3,9	0,898390496	0,591064607	-0,046534851
United Kingdom	1,4	0,960629372	0,146128036	-0,017444139
Mean			0,474789815	-0,03536603

Source: Own calculations

The data from Table 5 needed to determine beta-convergence were used in Table 6. These data include the first years of the reference period, which are expressed in the first column and the average growth factors are calculated in the second column. In the third and fourth columns, their values are in logarithmic form.

**Figure 12: Graphical representation of the convergence of regions (long-term unemployment rate)**



Source: Own processing

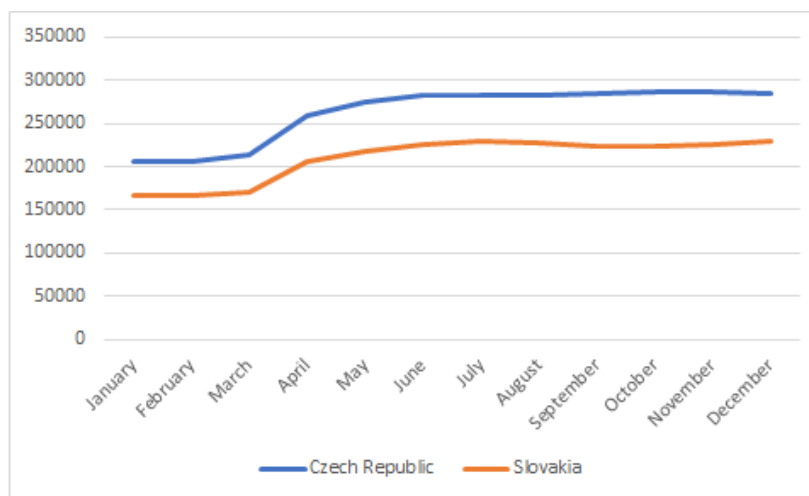
As can be seen in Figure 12, after plotting the individual points in the graph and creating their regression line with a negative direction, it can be seen that there is a convergence. However, the determination coefficient calculated in Figure 12 has a very low value of 1.8% and therefore these are little conclusive results of convergence analysis. That is why there is again space for the analysis of the correlation diagram. Figure 12 is divided by axes into 4 quadrants, divided by the averages of the values of the given points. Slovakia is in the first quadrant, which means that Slovakia initially had an above-average value of the long-term unemployment rate and shows a below-average decline. In the second quadrant is the United Kingdom, which shows below-average initial values with a below-average decline in the long-term unemployment rate. In the third quadrant is the

Czech Republic, which shows below-average initial values together with an above-average decline in the long-term unemployment rate. In the last fourth quadrant can be seen Germany, which shows above-average initial values together with the fastest decline in the long-term unemployment rate.

### 4.3 A more detailed look at 2020

There were a lot of not-so-positive things going on in 2020 in terms of the labour market, with a sharp rise in unemployment in most countries that year. The main cause was the outbreak of a global pandemic, which began to affect the whole world within a few months. A disease called COVID-19 has spread around the world, there has been a gradual reduction in mobility for social distance, which has been adopted by individual governments or by the people themselves. However, the goal of reducing the spread of the virus has also led to the closure of many sectors and the end of many activities.

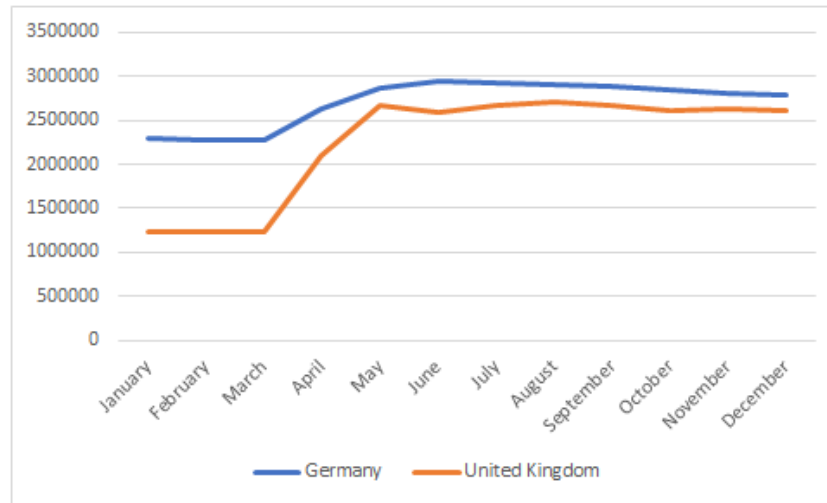
Figure 13: Number of unemployed in 2020 (CZ, SK)



Source: OECD, own processing

It is clear from Figure 13 that unemployment in 2020 began to rise mainly in March, as March 2020 is the first month when COVID-19 appeared in the Czech Republic. The same can be seen when looking at Slovakia when the increase in the number of unemployed also came in March and remained relatively constant until the end of the year.

**Figure 14: Number of unemployed in 2020 (UK, GER)**



Source: OECD, own processing

Figure 14 then shows the development of the number of unemployed in Germany and the United Kingdom. As can be seen, the key month is also March 2020, when in the case of the United Kingdom there was a sharp increase in the number of unemployed persons. In the case of Germany, the increase was not so huge, and in both countries, the number of unemployed persons developed relatively constantly until the end of the year.

Many people today still work in jobs where they do not have the opportunity to work remotely, they need to be in personal contact with people, or they do work that cannot be completed from home. People with lower education and lower wages are particularly at risk, as only a few of them have the opportunity to work at a distance. On the other hand, there could be a lot of new opportunities to work in a digital environment.

## **5 Results and Discussion**

### **5.1 Vacancies vs unemployed**

When measuring the number of vacancies and unemployed individuals in the monitored labour markets a situation when the number of unemployed was exceeded by the number of vacancies was observed only in the Czech Republic. The United Kingdom was also very close to this in the past, but the number of unemployed did not exceed the number of unemployed here during the observed period. The rest of the monitored countries, namely Germany and Slovakia, had a much smaller number of vacancies than unemployed individuals during the observed period.

### **5.2 Convergence measurement**

Thanks to the analysis of  $\beta$ -convergence, the phenomenon of GDP per capita was found to converge between the monitored countries with a very high informative value, and therefore it is clear that individual countries tend to balance their GDP per capita values over time. In the other two cases of this analysis, the telling value was very low and therefore, based on the findings described in the methodology, the correlation diagram was analyzed after dividing the plotted graph into 4 quadrants. The following description was created according to the method described in chapter 2.2 of the methodology. It was found that the Czech Republic reported a below-average initial value and above-average decline in the unemployment rate, which means that it tends to move away from other countries. On the contrary, Slovakia has shown a below-average decline and an above-average initial value, which means that it tends to lag behind. Germany then showed an above-average initial value and the fastest decline in the unemployment rate, which means that it tends to catch up with countries with lower unemployment rates. The latest is the United Kingdom, which has shown a below-average initial value and a very slow decline in the unemployment rate. Another phenomenon analyzed was the long-term unemployment rate, which when analyzed through  $\beta$ -convergence as well as the unemployment rate showed a very low conclusive value, and therefore the correlation diagram was analyzed again. In this analysis, it was found that the Czech Republic shows below-average initial values together with an above-average decline in the long-term unemployment rate, which means that it tends to distance itself from others. Slovakia then shows an above-average initial

value together with a below-average decline, so it is lagging behind the others. Germany then has the only above-average initial values together with the fastest decline in the long-term unemployment rate. Finally, the United Kingdom shows below-average initial values together with a below-average decline in the long-term unemployment rate. Chapter 4.3 A more detailed look at 2020 concluded that the rapid rise in unemployment during March 2020 was mainly due to the COVID-19 pandemic.

## 6 Conclusion

The main goal of this bachelor thesis was to analyze the development trends of labour markets in selected European countries through statistical methods and their comparison alongside the Czech Republic. The author of this thesis was concerned with finding out whether labour market indicators tend to equalize overtime or not.

One of the main indicators of the labour market is undoubtedly the unemployment rate. The Czech Republic has a very low unemployment rate for a long time. Of the monitored countries, the Czech Republic had the lowest unemployment rate in a large part of the observed time interval. Of the monitored countries, only Germany had a lower unemployment rate in 2010-2015. It should also be noted that some unemployment rate is always needed and will always exist in the labour market, for example, due to the phenomenon of structural unemployment it cannot be removed completely.

The analysis focused on the Czech Republic together with Slovakia, Germany and the United Kingdom. Data for the analysis were obtained primarily from the European Statistical Office Eurostat and from the Organization for Economic Co-operation and Development. When measuring the convergence of the long-term unemployment rate and the unemployment rate, there was a weak predictive value and therefore it was not possible to determine the convergence. Therefore, the comparison was made through a correlation diagram. As was further seen from the practical part after comparing the Czech Republic with other selected countries, it is clear that the development trends of the Czech Republic in the area of unemployment and long-term unemployment rate tend to move away from the values of other countries. However, a declining trend in the unemployment rate and the long-term unemployment rate was also demonstrated in other countries. As far as GDP per capita is concerned, this market indicator has a very strong tendency to converge, so GDP per capita values tend to equalize in individual countries.

The bachelor's thesis is a kind of a shorter thesis and that is why it is relatively brief research. Therefore, in order to obtain better and more accurate results, it would be great to extend this work to a diploma thesis. For example, a more detailed view of the individual years of the examined indicators through the method of  $\sigma$ -convergence is offered.

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