

Economic Performance and Unemployment in the Czech Republic

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Abstract

The Labor market is very important for the overall functioning of the economy. Unemployment rate belongs to the four most important characteristics of the economic efficiency along with gross domestic product, balance of payments and inflation rate. It is incorrect to think that unemployment is a problem only of the unemployed people and their family. High unemployment has many negative consequences - from economic to business, governmental and private. The economic consequences include a decline of the GDP, an increase in the relative poverty and a fall of the potential GDP. Considering businesses, there is a negative impact as well as a positive one. The negative impact is represented by a decline in demand for goods and services. On the other hand, there are a higher number of job seekers from which the firm can select the most suitable ones. Government deals mainly with a fall of revenues and a raise of expenditures. Job is deeply embedded in our culture as well as in our psyche. Through employment, we define who we are. From the individual perspective, losing job has many unpleasant effects such as a drop in living standards due to the loss of income, social exclusion, loss of a social status, deterioration of family relationships and much more.

The current economic situation in the European Union changes the type of unemployment in recent years. Text of the article addresses the recessionary economic developments in the Czech Republic and unemployment rate of the economically active population associated therewith. The objective is to chart the development of the basic indicator of the functioning of the economy, identify the different types of unemployment in the Czech Republic by the Beveridge curve and through correlation analysis statistically evaluate the relationship between the unemployment rate and the growth rate of real gross domestic product.

Keywords: Czech Republic, GDP, unemployment, Beveridge curve, correlation analysis, linear and polynomial function

1. Introduction

During the last twenty years, the Czech Republic went through various changes on the Labor market. They were marked mainly by three years: 1989, 2004 and 2008. In the first one, 1989, the problem of unemployment has appeared with the fall of Communist regime when the private sector and the Labor market emerged. Until then, having job was an obligation and unemployment did not exist officially. Major characteristic of the artificial full employment was a low productivity of Labor. The second important event in the Czech Labor market was joining of the European Union by the Czech Republic in 2004 which enlarged the Labor market for Czech citizens by the possibility of working in various member states. In that time, the unemployment rate decreased. The third significant year was 2008 when the global financial crisis started to spread from the USA. In the Czech Republic, an increase in the unemployment rate is obvious mainly in 2009 and it had continued rising even in 2010 (Ttoth, 2014).

The economic recession is affecting the aggregate demand within the economy, total output, and has a negative impact on the labor market and on the employment rate of the economically active population. When reducing employee levels, companies are focusing on maintaining key and qualified employees with experience. The current recessionary situation in the economies of the European Union is negatively affecting the labor market and employment of the economically active population in most countries. In the Czech Republic, we can identify

primarily structural unemployment and cyclical unemployment, and, at the same time, the duration of unemployment is becoming longer. A reduction in the number of jobs and increased competition on the supply side of the labor market in the form of experienced workers is bringing down the ability of young people and graduates without practical experience to apply them. Businesses are currently focusing on acquiring qualified people with experience, specialists and experts with the appropriate professional expertise and qualification structure required by the given job (Maitah, 2014).

2. Method

On the basis of theoretical data, an analysis of the elements of unemployment in the Czech Republic was conducted by way of the Beveridge curve and the correlation analysis of the effect of the GDP on unemployment in the Czech Republic. For the correlation analysis of the correlation between the analyzed variables, the correlation coefficient was used, which takes the values of $<0; 1>$, the significance of the values is as follows: 0 to 0.1 negligible correlation; 0.1 to 0.3 weak correlation; 0.3 to 0.7 medium correlation; 0.7 to 1 strong correlation.

The calculation of the correlation coefficient: $r = \frac{s_{xy}}{s_x s_y}$, determination coefficient: $R^2 = 1 - \frac{Se}{St}$ and index

correlation: $I_{yx} = \sqrt{R^2}$. The statistical data used for the correlation analysis were converted by way of chain indexes into a relative expression. Linear regression is mathematically written: $Y = a + bx$. Y is dependent variable, a is constant, b is regression coefficient, x is independent variable.

In professional literature, the comparison of values of an indicator for a certain period in view of the previous period is called the analysis of time series by way of chain indexes; such indices thus have a changing basis. In the article, the description method, mathematical modeling and the method of statistical testing of the correlation of selected variables are used. The information and statistical data have been obtained from the Ministry of Labor and Social Affairs, the Czech Statistical Office.

The most significant indicator of the performance of the economy is the gross domestic product. It is defined as the aggregate of final goods and services produced on a given territory during a certain time period. The nominal GDP is measured in current prices, i.e. prices of the given period. On the other hand, the real GDP is measured in constant prices, i.e. prices of the designated basic period, whereby it eliminates the effect of a change in the price level and monitors only the produced volume of goods and services. Mathematically, the value of the GDP can be obtained, for example, by way of the calculation of the expenditure method: $GDP = \text{expenditure of households on consumption} + \text{gross investments} + \text{government purchases of goods and services} + \text{export} - \text{import}$. Okun's law is defined as the inverse relationship between unemployment and GDP. Okun's law quantifies the relationship as follows: If the unemployment rate rises by 1% above the natural rate of unemployment then GDP will fall by 2-3% (Samuelson & Nordhaus, 2008).

In the current period of economic recession, the economic situation is negatively reflecting on the labor market and on the employment rate of the economically active population. In economic theory, such a situation is called cyclical unemployment. The cyclical element of unemployment copies the development of the economic cycle. Besides cyclical unemployment, the structural component of unemployment is known. Structural unemployment represents an incongruity on the labor market, which comes about primarily as a result of structural changes in the economy, whereby certain sectors (professions) are expanding and others are fading away or declining. For the reduction of structural unemployment, the continuous education (training, requalification) of the labor force and increasing their spatial mobility are key. The Beveridge curve can be considered to be an appropriate graphic model for the representation of unemployment according to its type. W. Beveridge was the first to describe the inverse relationship between the job change rate and the unemployment rate at a given wage (Hančlová, 2002). In a modified form of the model, variables of the number of jobs and the number of unemployed people are often applied.

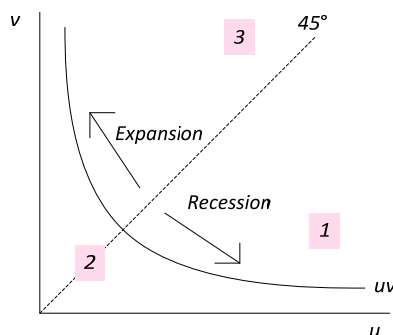


Figure 1. Beveridge curve (Hančlová, 2002)

The area marked 1 on the figure, i.e. to the right of the 45° line, shows demand-deficit unemployment. The area marked 2 on the figure, i.e. to the left of the 45° line near the origin, represents frictional unemployment. The area marked 3 on the figure, i.e. to the right of the 45° line distant from the origin, represents structural unemployment.

3. Results

The macroeconomic values for the Czech Republic are set out in Table 1. Within the European Union, the Czech Republic shows a below-average unemployment rate level. In 2011, the general unemployment rate in the Czech Republic was 6.7% (EU 9.7%), in 2012 it was 7% (EU 10.5%). As compared to the 2008 year, this was approximately a 3% increase. A significant portion of the economically active population is employed within the processing industry and another significant portion of employed people within the national economy is encompassed by the services sector. A great disparity exists between the regions in the Czech Republic. The lowest unemployment rate is seen for the capital, Prague, and, on the other hand, the highest is seen in the Moravian-Silesian Region; the difference there is approximately 10%. The gross domestic product in 2008 was affected by the recessional conditions in 2008; in 2009, there was a year-on-year slump in the economic growth of 4.5%. A slight improvement in the economy and percentage growth of the GDP in 2010 and 2011 was once again replaced by a decline of 1.3% in 2012. Prognoses for 2014 speak of further anticipated recessional conditions. The Czech economy is typified by a pro-export nature and a strong interconnection with the European Union (approximately 75% of the export of the Czech Republic goes to EU countries). Unemployment in the Czech Republic reacted with an increase in 2009, when, as a result of a decline in the aggregate demand, there was a reduction in the number of jobs, and in 2010 it reached its maximum within the analyzed period. Further, in Table 1, selected elements of GDP used in the expenditure method are shown, specifically the consumption of households, gross investments and export. The economic recession was reflected in a significant year-on-year decrease of expenditures for investments since 2008. Households reduced their expenditures primarily in 2012, when a year-on-year decline of 3.6% occurred. The gross domestic product and its components showed an improvement in their values only in the years 2010 and 2011. The year 2012 once again brought a decline in economic development. That can be attributed to the lingering uncertainty on world markets and the negative expectation for the future.

Table 1. Macroeconomic data in the Czech Republic in the period of 2007-2012 in %

Indicators	2007	2008	2009	2010	2011	2012
GDP s.c.	5.7	3.1	-4.5	2.5	1.9	-1.3
Consumption of Households	4.1	3.0	0.2	1.0	0.7	-3.6
Government purchases	1.04	1.04	1.06	0.99	0.98	1.0
Investments	15.5	1.9	-20.2	5.8	0.3	-3.2
Export	11.3	3.9	-10.9	15.5	9.5	4.4
Import	12.9	2.7	-12.0	15.5	7.0	2.2
Unemployment Rate	5.3	4.4	6.7	7.3	6.7	7.0

Source: Czech Statistical Office

The highest rate of structural unemployment (Figure 2) is measured in European Union countries, which are characterized by rather rigid labor market and lower productivity. In the Slovak Republic and Spain in the long term oscillates this unemployment rate around 15%. In the Czech Republic and German in the long term oscillates this unemployment rate around 7%, both states have a similar level of values for this indicator. It is already relatively efficient matching process in the labor market, which assigns the appropriate staff in appropriate job position. Low level of structural unemployment can be in the long term identified by the countries that have flexible labor market: Denmark (5%) and Netherlands (4%).

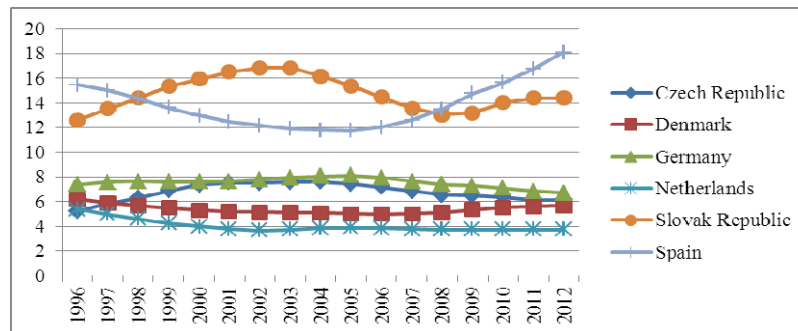


Figure 2. Structural unemployment in the countries of EU, in %

Source: OECD

By way of the Beveridge curve (Figure 3), the type of unemployment that predominated on the labor market within the studied period of 1996-2012 can be identified for the individual years. Looking at the Beveridge curve within the conditions of the Czech Republic, we can see significant structural unemployment - area 3 - in 2007 and 2008, whereby it reached a peak in 2008. As a result of a slump in the entire economy since 2008, structural unemployment has changed into cyclical unemployment - area 1 - in view of the low supply and reduction of available jobs and the parallel increase in the number of unemployed people as a result of massive firing within the economy. This situation can be explained with the fact that in view of the intensive increase in the number of unemployed people, appropriate workers from among unemployed people could be assigned to existing jobs, i.e. the structural component of unemployment decreased and the process of pairing on the labor market became relatively more effective in terms of this component of unemployment.

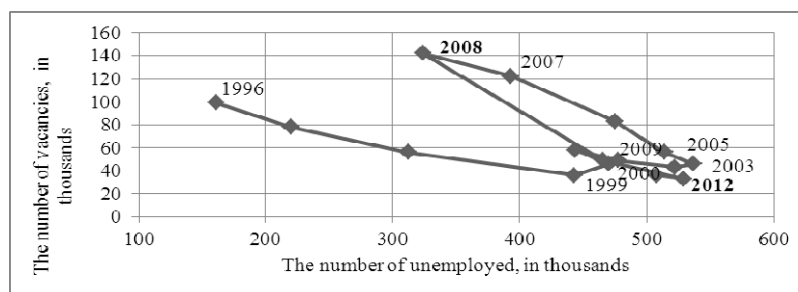


Figure 3. Beveridge curve for the Czech Republic in the period of 1996-2012

Source: Data from the Czech Statistical Office, Ministry of Labor and Social Affairs; own processing

Correlation analysis was used to evaluate the effect of the rate of growth of the GDP on the unemployment rate in the Czech Republic. Correlation coefficients were used in the Microsoft Excel 2007 program. Data relating to the GDP were converted by way of chain indexes into the required form (Table 2). The available rates of growth of the real GDP_(t), GDP_(t-1), GDP_(t-2) and GDP_(t-3) in the years 1996 - 2012 and their effect on the unemployment rate were analyzed. Such analysis also shows the delayed reaction of unemployment on the development of the economy, represented by the rate of growth of the real GDP. A medium-strength correlation was ascertained in the case of the real gross domestic product delayed by three periods, where the value of the correlation coefficient is -0.417; thus, this is an indirect correlation between the analyzed features. And, further, in the case of the real gross domestic product delayed by two periods, where the value of the correlation coefficient is -0.569; thus, this is once again an indirect medium-strength correlation between the analyzed features. In the

case of the $GDP_{(t)}$, correlation analysis ascertained a slight direct correlation. For the correlation analysis was chosen the as input the annual data, seasonally adjusted, in the period 1996-2012 (Figure 4).

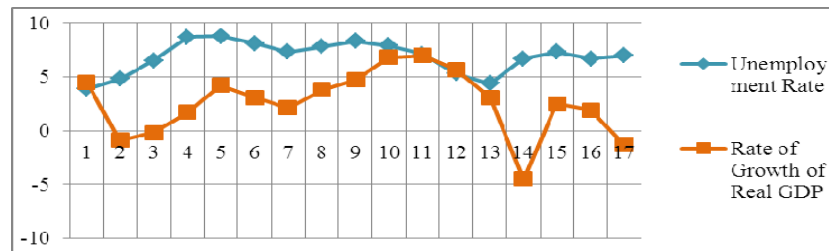


Figure 4. Unemployment rate and rate of growth of real GDP, in the period of 1996-2012 in the Czech Republic
Source: data from the Czech Statistical Office; own calculation

Table 2. Correlation coefficients

Variables:	Unemployment Rate, (1996-2012)	Rate of Growth of Real GDP _(t) , (1996-2012)	Rate of Growth of Real GDP _(t-1)	Rate of Growth of Real GDP _(t-2)	Rate of Growth of Real GDP _(t-3)
Correlation coefficient:		0,131045109	-0.363145035	-0.569373465	-0.417284348

Source: data from the Czech Statistical Office; own calculation

For the analysis and for modeling the relationship between variables have been selected as the most appropriate trend linear regression function and polynomial function. Input variables were selected according to the highest value of the measured correlation coefficient, this means that the variables the $GDP_{(t-2)}$ and the unemployment rate in the Czech Republic. For the regression analysis was used the Microsoft Excel 2007 program. Data and results of the regression analysis are shown in the Figure 4. On the horizontal axis is positioned dependent variable unemployment rate in the Period of 1996-2012; on the vertical axis is positioned independent variable rate of Growth of Real GDP_(t-2).

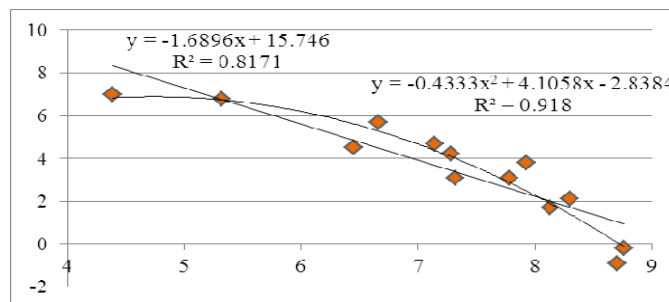


Figure 4. Unemployment rate and rate of growth of real GDP_(t-2), in the period of 1998-2012 in the Czech Republic, linear and polynomial function

Source: Data from the Czech Statistical Office, Ministry of Labor and Social Affairs; own calculation

The polynomial function has the equation: Unemployment rate = $-1.6896 GDP_{(t-2)} + 15.746$. The coefficient of determination has a value 0.82 (index correlation 90.39%). Selected trend explains the relationships between variables of the 82%. Regression coefficient b has a value -1.69 and Constant a has a value 15.75. The constant value shows how high would be the unemployment rate if rate of growth of real GDP were zero. If rate of growth of real GDP_(t-2), increasing per capita of 1%, reduced the unemployment rate_(t), in Czech republic by 1.68%.

As the most appropriate trend functions for modeling relationships between variables was chosen second-degree polynomial function. The polynomial function has the equation: Unemployment rate = $-0.4333 GDP_{(t-2)}^2 + 4.1058 GDP_{(t-2)} - 2.8384$. The coefficient of determination has a value 0.92. Selected trend explains the relationships between variables of the 92%.

4. Discussion

The current global environment is associated with frequent changes in the economy, whereby sectors decline and grow, professions cease to exist and new ones are created. The recessionary economic conditions abroad negatively affected the situation in the Czech Republic from 2008; they primarily reduced expenditures for investments, the amount of export, and, in recent years, they have also been reflecting more significantly in the reduced consumption of households. Along with the recessionary conditions, the unemployment rate is increasing, which is, however, still remaining below the average of the EU27. In the Czech Republic, structural unemployment was being identified by way of the Beveridge curve until 2008, which changed to a predominance of cyclical unemployment after 2008. According to correlation analysis, the rate of the real growth of the GDP in the Czech Republic affects the unemployment rate at a medium-strength level; the real GDP had the strongest effect, delayed by two periods in relative expression. Many countries within the EU with the lowest structural unemployment rate show an increased flexibility of the job market a trend toward the stabilization of the labor market and a decrease in unemployment is a step toward the development of flexible work loads. The Czech Republic can be considered rigid in this regard. Czech Republic is characterized by the nature of export promotion; the vast majority of goods and services directed to countries of the European Union.

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