Regional Unemployment Patterns in Visegrád Countries

Michal Tvrdon

Department of Economics
Silesian University, School of Business Administration
Karvina, Czech Republic
tvrdon@opf.slu.cz

Abstract—**Regional disparities have become a debated topic in the last two decades. Aim of this paper is to estimate trends in regional disparities at the level NUTS 2 during the period 2000-2009. This paper looks at unemployment in four Visegrád group countries and its persistence over time. It also attempts to identify the factors responsible for this persistence. The first part of the paper offers a review of different approaches to regional disparities´ measurement. Regional trends are measured mainly using a variety of approaches – the coefficient of variation, the Herfindahl index or the Geographic concentration index. The second part of the paper is based on empirical data and calculations of the indexes or the coefficients. Unemployment rates and number of unemployed paper are used for calculations. From the analysis we can see remarkable differences between regions. Moreover, regional unemployment disparities across Visegrad group countries appear to be characterized by a high degree of persistence. Calculations also confirmed a link between the economic crisis and decreasing regional disparities.**

Keywords- Regional disparities, Visegrad countries, Unemployment rate

I. INTRODUCTION

The analysis of regional disparities in the European Union has become a popular theme in the last years. The EU enlargement is an attempt of promoting growth and convergence through positive factors of integration. The New Member States were converging significantly during the years 2004-2008. But the question is if they reached same convergence at a regional level. In this paper we try to elucidate the extent to which existing regional income disparities in the European Union can be attributed do differences in level of GDP and GDP per capita respectively.

The aim of this paper is to estimate various alternative measures of regional disparities in New Member States, especially in the context of labor market development. Based on the results obtained, we assessed and compared the level of achieved regional imbalances. We used Eurostat Regional Database, which is a comprehensive and consistent macroeconomic database of EU countries at the sub-national territorial level, covering demography, economic accounts, labor market, social and innovation indicators.

The paper is structured as follows. First, we discuss theoretical concept of the measurement of regional disparities. Next, we provide the estimation results. Finally, the main findings of the analysis are summarized.

II. THEORETICAL CONCEPT AND LITERATURE REVIEW

The unemployment rate is the most widely used indicator for the expression of imbalances between regions. The unemployment rate represents the number unemployed as a percent of the labor force.

According to [12] a region´s unemployment rate is determined by the following factors:

- National factors – it will be affected by a range of national factors which are common to all regions within the same country (Changes in the aggregate demand for an economy's output due to a change in its international competitiveness, for example, are likely to affect all regions, either directly through the demand for net exports or indirectly through interregional trade).
- Fluctuation in the demand for the region´s output - the impact of cyclical fluctuations in general business activity in the demand for a region's output will be determined by the particular markets in which each region operates.
- Unit labor costs - a region's real wage will affect both the demand-side and the supply-side of the labor market and too high real wages are considered as one of the fundamental causes on unemployment persistence.
- A region´s export base - different regions specialize in the production of different commodities, the demand for which depends inter alia upon national and world income levels and upon the income elasticity of demand for these commodities.
- Other factors influencing regional unemployment rate like urban-rural mix of a region, the size of its labor market.

The first statistical method that is often used for the calculation of regional disparities is the coefficient of variation, which represents the ratio between the weighted standard deviation of the regional unemployment rate and the national unemployment rate. Since the coefficient of variation (CV) is not dependent on measured values of input parameters, it is therefore a more appropriate instrument for comparison than solely the standard deviation, with which we can meet in the studies on regional disparities [3]. The standard deviation is a measure of variability, respectively variance of random variable values around the mean. Mathematical notation of the standard deviation is as follows:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{N}(u_i - u_n)^2}{N}}$$

where u_i is the unemployment rate of i-region, u_n is national mean of the unemployment rate and N is the number of regions in the country.

The coefficient of variation (CV) is defined as the ratio of the standard deviation to the mean (the national unemployment rate):

$$CV = \frac{\sigma}{y_n}$$

If the unemployment rate is the same in all regions, the variance is zero. Large differences between regions in the country represent a fairly wide dispersion of this parameter.

Regional disparities can also be calculated using a commonly used measure of concentration - The Herfindahl index (H) which is defined as [7]:

$$H = \sum_{i=1}^{N} u_i^2$$

where u_i is the unemployed labor force share of region *i* and N stands for the number of regions. The index lies between 1/N (it means that all regions have the same unemployed labor force share, so there is no concentration) and 1, which means that all unemployed are concentrated in one region, in other words it means the maximum concentration.

There is also used the normalized Herfindahl index. Whereas the Herfindahl index ranges from 1/N to one, the normalized Herfindahl index ranges from 0 (no concentration) to 1 (maximum concentration). It is computed as [11]:

$$H^* = \frac{(H - 1/N)}{1 - 1/N}$$

where again, N is the number of regions in the country, and H is the usual the Herfindahl index, as above.

In general, however, regions have in most countries different areas so that a correct measure of geographic concentration has to compare the unemployed labor force share of each region with its share in the national territory. One suggestion, how to incorporate this idea into some formula, is to adjust the Herfindahl index by these variables. But this approach is not suitable for an international comparison because it is very sensitive to the level of aggregation of regional data. This feature is due to the fact that the differences between the unemployed labor force share and relative area of each region are squared. In this context it is appropriate to use the Geographic concentration index (GCI) which is defined in OECD [8]:

$$GCI = \sum_{i=1}^{N} \frac{|u_i - a_i|}{2}$$

where a_i is the area of region i as a share of the country area and $| u_i - a_i |$ indicates the absolute value. The index can be multiplied by 100. Then the index lies between 0 (no concentration) and 100 (maximum concentration) in all

countries and it is suitable for international comparison of geographic concentration. The GCI offers a picture of the spatial distribution of unemployment within the country or group of countries, as it compares unemployment weight and the area share over all the regions in a given country or group of countries.

III. EMPIRICAL RESULTS

In this study, we used unemployment data (the unemployment rate or number of unemployed) from the Eurostat Regional accounts database within the time period 2000 to 2009. Regions are divided, based on the Eurostat´s methodology NUTS, into three territorial levels: (i) NUTS 1 territorial unit as major regional countries; (ii) NUTS 2 which usually corresponds to the level of lower level of the administrative division and (iii) NUTS 3 which generally corresponds to the lowest administrative level. We used data at NUTS 2 level as this level is a key administrative unit for EU cohesion policy. It means that we used data of 35 NUTS 2 regions of Visegrad Group countries (Czech Republic, Hungary, Poland and Slovakia).
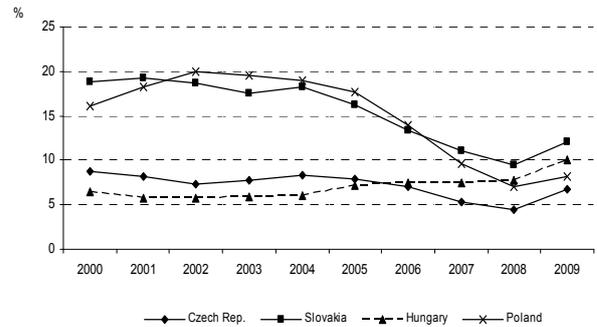

Figure 1.   Unemployment development in V-4 countries

The first figure shows year on year changes in unemployment rates between the years 2000 and 2009 (according to OECD Labor Force Statistics database). Therefore we will deal with the last years of the monitored period in more detail. All the V-4 countries, except Hungary, recorded positive development of this indicator in the last three years before the economic crisis - a decrease of the unemployment rate.

The main factor, which caused better labor market performance, was remarkable economic growth during these years. Increased pace of growth had a significant impact on the labor market. Other factors of labor market performance improvement were a massive inflow of foreign direct investment, increased household consumption as well as overall economic growth in Western Europe, especially Germany. A trend of unemployment rate decrease was significant namely in the case of countries with the high initiative unemployment rate (Poland and Slovakia), where it decreased from 19.9% or 18.7% in 2002 to 7.1% or 9.5% in 2008. In the case of Slovakia, labor market performance improvement was caused by increased cooperation jobseekers with authorities and new legislation in the field of services employment, as well as tighten up the provision of

unemployment benefits or some measures on demand side like corporate income tax cut. A decreasing trend of the unemployment rate was also recorder in the Czech Republic where the unemployment rate fell to 4.4 % and the Czech economy was among the economies with the lowest unemployment rate before the crisis. In this period, Hungary was the only economy for which an increasing trend was characteristic (the unemployment rate increased from 2004 from 6.4% to 7.4% in 2007). A previous unemployment rate decrease was partly due to modification of the unemployment benefit system, shortening of the unemployment benefit period and tightening of the eligibility criteria in Hungary [4]. Subsequent development of the Hungarian unemployment rate (since 2003) was influenced by insufficient economic situation in the country which was caused by unstable finances, large fiscal imbalances and high government debt. Given the size of fiscal imbalances, government had to raise state budget´s revenues, e.g. hikes in employee social contributions, value-added tax and business taxation. The resulting squeeze on households' disposable incomes and businesses was damping demand [6].

The deep recession in all EU Member States has led to a marked deterioration of labor market performance. Unemployment generally fluctuates depending on a phase of the economic cycle - it tends to increase during the economic crisis and tends to decline during economic growth. In the context of the global recession, thank to labor and product market reforms, in the majority of countries, the impact of the crisis on long-term and structural unemployment is likely to be more moderate than in past severe downturns.

The global recession resulted in a severe shock to the Visegrad Group countries. Moreover, both Czech and Slovakia economy got even beyond its potential in the first half of 2008, which in conjunction with a public finance reform caused inter alia by a rise of the inflation rate. The recession´s consequences are: the number of unemployed rose, employment declined and many employees are working fewer hours than before the crisis [10].

The deep recession in these countries has led to a marked deterioration of labour market performance. Unemployment generally fluctuates depending on a phase of the economic cycle - it tends to increase during the economic crisis and tends to decline during economic growth. In addition, [1] mentioned that there is a strong correlation between the unemployment rate and the average length of an unemployment spell. Moreover, there is an interesting fact that unemployment durations did not fall nearly as much as the decline in the unemployment rate might led one to expect. Moreover, long-term unemployment tends to grow for a year or two since the first decrease in the unemployment rate occurred [9]. In the context of the global recession, thank to labour and product market reforms, in the majority of countries, the impact of the crisis on long-term and structural unemployment is likely to be more moderate than in past severe downturns [2].

Unemployment in general, but especially long-term unemployment tends to significantly adverse consequences for those with relatively low levels of education, just as in the EU and in V-4 countries with increasing levels of education, both overall and long-term unemployment declining [5] or [13]. Unemployment is heavily concentrated among less educated workers in the V-4 countries. Generally, the unemployment rate is the higher the lower is the educational level (see Table 1).

TABLE I.   UNEMPLOYMENT RATES BY HIGHEST LEVEL EDUCATION ATTAINED (%)

		2000	2002	2004	2006	2008	2009
Czech Rep.	P	22.8	20.6	26.2	24.8	19.4	24.4
	S	7.9	6.4	7.5	6.4	3.7	6.2
	T	3.0	1.8	2.1	2.5	1.7	2.5
Hungary	P	11.6	11.4	12.5	16.7	18.9	23.4
	S	6.5	5.1	5.4	6.9	7.2	9.4
	T	1.4	1.8	2.2	2.8	2.8	4.0
Poland	P	23.4	28.1	30.3	23.7	12.8	15.4
	S	17.1	21.2	20.4	15.0	7.6	8.8
	T	5.4	6.6	7.3	6.0	3.8	4.4
Slovakia	P	40.5	46.1	52.1	48.6	39.6	41.7
	S	18.4	17.8	17.0	11.8	8.1	11.5
	T	5.2	3.9	5.9	3.3	3.6	4.3

Source: Eurostat

Unemployment rates among workers with primary and lower secondary education tend to be extremely high, usually well close to or even above 20 %. For example, in the case of Slovakia the unemployment rate reached its maximum (53.4 %) for a group of low educated workers (with primary education) in 2005. Such level of unemployment was more than double compared with other V-4 countries. Moreover, we have also reported large variations in the unemployment rates in this group and data confirm generally known correlation between educational attainment and a position of this group in the labor market. The rate of unemployment was much more sensitive to cyclical fluctuations in the economy than other groups in the labor market, especially when it declined. We discuss causes of these relations in individual V-4 countries later in the article.

Figure 2 shows the dispersion of the unemployment rates which is expressed by the coefficient of variation of regional unemployment rates. The coefficient of variation is the ratio between the weighted standard deviation of the regional unemployment rates (NUTS 2), compared to the national unemployment rate, and the national unemployment rate. This coefficient of variation is multiplied by 100 for expression as a percentage.

This indicator measures the spread of regional unemployment rates as regards the national unemployment rate. If all the regional unemployment rates of a country are equal, the dispersion is zero. Big differences between regional unemployment rates within a country imply a fairly wide dispersion of unemployment rates.
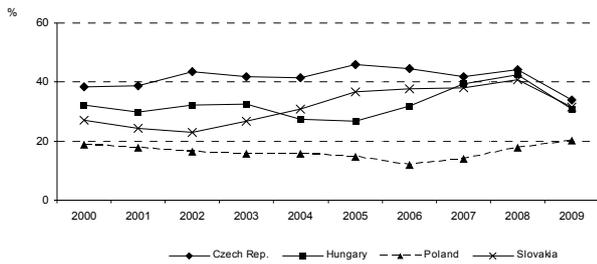
Figure 2. Cofficient of variation

The highest dispersion of unemployment rates was observed in the Czech Republic followed by Slovakia and Hungary. Value of the coefficient of variation showed that the distribution of unemployment rates is relatively wider in these three countries than in Poland. However, the coefficient decreased in all three countries in the last observed year. This trend can be explained by the increase in unemployment during the economic crisis in all regions, thus reducing the disparities between regional unemployment rates.
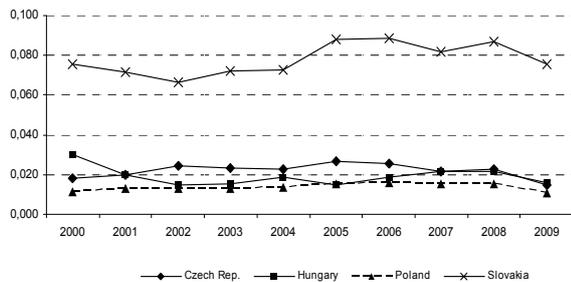

Figure 3. Normalized Herfindahl index

Another way how to measure regional inequalities is concentration indexes, especially the Normalized Herfindahl index (see Figure 3) or the Geographic concentration index (GCI) – see Figure 4. The highest values of the Normalized Herfindahl index were achieved in the case of Slovakia. Unemployment concentration seems to be low in the rest of countries if we compute the Normalized Herfindahl index. Similar to the previous coefficient of variation, the value of the Normalized Herfindal index decreased in the last observed year, and in all countries.
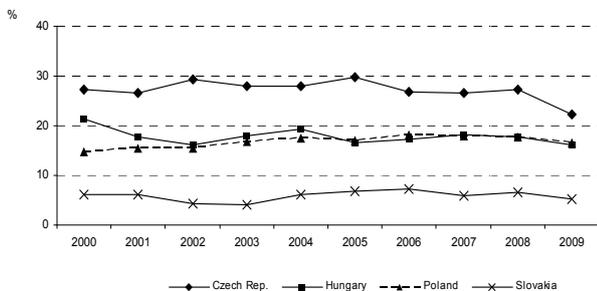

Figure 4. Geographic concentration index

Unemployment in the Czech Republic, Hungary and Poland seems not to be concentrated with the index below 30%. The Geographic concentration index is based on the difference in the share of the region in total unemployed and the share of the region of the total country area.

IV. CONCLUSION

In this article we examined the evolution of regional disparities in selected Member States of the European Union between the years 2000 and 2009. We chose traditional tools of spatial economics, which are mostly based on well-known indexes, for the measurement. We used the unemployment rate or number of unemployed respectively as the key indicators of the labor market. It seems to be obvious that growing economies of the Visegrad countries recorded the significant decrease of the unemployment rate which is a logical resulting of the growing phase of the business cycle and validation of general conclusions of the economic theory. The analysis also confirmed the link between the economic crisis and decreasing regional disparities. The results were different among used methods. Non-convergence of unemployment rates may also arise if in the presence of increasing returns from localization both expected wages and expected profits depend positively on the number of firms operating in a given area.

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