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ECONOMIC GROWTH AND SITUATION ON THE LABOUR MARKET IN EUROPEAN UNION MEMBER COUNTRIES

Abstract

The results of empirical studies conducted in the EU member countries appear following tendencies. Firstly, exists negative and relatively low correlation between unemployment rate and actual GDP deviation from potential GDP, what indicates limited possibilities to reduction unemployment as a result of economic growth. Secondly, exists negative correlation between changes of employment and unemployment (this relationship can be unclear due to political and social factors). Thirdly, the increase of labour supply leads to growth of employment and significant fall of efficiency increase, however increase of labour supply is the result of high unemployment rate.

Moreover, the reduction of real wages leads to improve international competitiveness of the country, but this alter the labour-intensity of production in the short and long term. Additionally, the increase of part-time employment changes the correlation between growth rate of GDP and employment rate.

Key words: labour market, employment, economic growth, European Union

Introduction

The unemployment as well as employment changes has the essential influence on the labour efficiency and the growth rate of GDP. Well, the growth of employment rate can contribute to temporary decreasing of labour efficiency, due to increasing the number of workers per unit of capital. Additionally, decreasing of efficiency results from changing condition of population from the unemployment to the employment, the new workers characterize the lower level of efficiency in relation to other workers.

On the other hand, it was estimated that the negative result in the form of efficiency decreasing is comparatively small. Moreover, even, if the growth rate of productivity (measured the amount of GDP per worker) is negative, then the higher employment rate leads to increasing the GDP per capita. New workers in larger degree contribute to growth of GDP, than before employment, even then, when their efficiency is lower than average.

Additionally, both the economic theory, as well the results of empirical studies conducted among the EU member countries show that the higher employment rate has not significantly negative influence on efficiency in the long time. Therefore, it seems to be true that in reality does not exist trade off between the policy towards employment increasing and the policy towards efficiency increasing (European Economy, 2004).

Disparity in the range of economic growth and unemployment.

In A. Okun's opinion, exists constant relation between the growth rate of GDP and change of unemployment rate. Namely, with reference to "the Okun's right", the growth of GDP about 3 percentage points above "the normal growth rate", it leads to fall the unemployment rate about 1 percentage point. Therefore, the growth of real GDP accompanying reduction of unemployment about 1 p.p. is estimated on 3%. Hence, the essence of the Okun's right is correlation between the unemployment rate and the deviation of current GDP from potential GDP. The higher correlation coefficient (in general in range of 0,3 - 0,5), the higher elasticity of the unemployment rate on the change of GDP growth rate and the greater chances to reduction of unemployment thanks to economic growth.

It is also possible to calculate so-called Okun's gap, called also as a GNP Gap. The GDP gap concerns relationship between the change of GDP and the change of unemployment rate. Namely, every growth of unemployment rate over natural unemployment rate, causes fall of real GDP about $1\% \cdot \alpha$ in relation to potential GDP. The value of α parameter is different for different countries and in general amounts to 3. This relationship describes following equation [cf. equation (1)].

$$\begin{aligned} U_t - U_n &= -\alpha(\Delta Y_t - \Delta Y_n) \\ \Delta Y_t = \Delta Y_n &\Rightarrow U_t = U_n \end{aligned} \quad (1)$$

where:

- U_t – real unemployment rate;
- U_n – natural unemployment rate;
- ΔY_t – real growth rate of GDP;
- ΔY_n – potential growth rate of GDP;

Next P. Verdoorn and N. Kaldor estimated that acceleration of growth rate of national production about 1% leads to growth of the efficiency and employment about half percentage point. Therefore, the greater the growth of labour efficiency as a result of growth of national income, the greater difficulties with limitation of unemployment growth.

Obviously, the growth of employment doesn't have to mean the same reduction of unemployment. Such situation can result from the growth of labour supply in the country, as a result of appearing new working-active people on the labour market as well as a result of inflow the foreign workers to the country. The elasticity of unemployment rate on change of employment varies depending on considered country, in the range from 0,5 to 0,7. This means, that the share of additional workplaces occupied by registered unemployed amounts to from 50% to 70%. The rest part of additional workplaces (50% - 30%) are occupied by existing in the country hidden reserves of workforce as well as by foreign workers (Walterskirchen, 1999).

Economic growth, labour efficiency, employment and unemployment in the EU member countries

Following equation is the starting point to explain existing divergences between rate of economic growth and unemployment rate in EU member countries [cf. equation (2)]. In this expression the real income per capita (Y/P) is depended for two variables, namely the index of labour efficiency (Y/E) and the index of employment changes (or the unemployment) (Paci, Pigliaru, Pugno 2001).

$$\frac{Y}{P} = \frac{Y}{E} \cdot \frac{E}{P} = \frac{Y}{E} \cdot \frac{L}{P} \cdot (1-U) \quad (2)$$

where:

- Y – real economic growth;
- P – population;
- E – employment;
- L – labour force;
- U – unemployment rate.

Therefore following analysis concerns four mentioned below areas:

- the differences in the level of real GDP per capita in EU member countries;
- the differences in unemployment rates and employment rates in EU member countries;
- the differences in the technological capacity to produce new wealth (Y/E) in EU member countries;
- the correlation between the rate of unemployment and the deviation of current GDP from the potential GDP (the GDP gap), which shows on ability to limitation of unemployment as a result of economic growth.;
- the correlation between (Y/E) and the size of employment (E), which shows on ability to creation the employment in EU member countries;
- the correlation between employment and unemployment changes, which shows a percentage of additional work places occupied by the unemployed.

On basis of economic situation analysis in EU in 1996-2005 as well as forecast of economic development of EU till 2006 year, it may say, that the economy of EU (after periodical stagnation in years 2001-2003) is on the path of balanced economic growth. It is showed both the high dynamics growth of real GDP, labour efficiency, as well growing employment rate. But, the one of the highest problem of EU is still high and gradually growing unemployment, which the average level amounts to 9% [cf. Table 1]

Table 1. Selected macroeconomic indicator in EU (25) in the period 1996-2006 [in %]

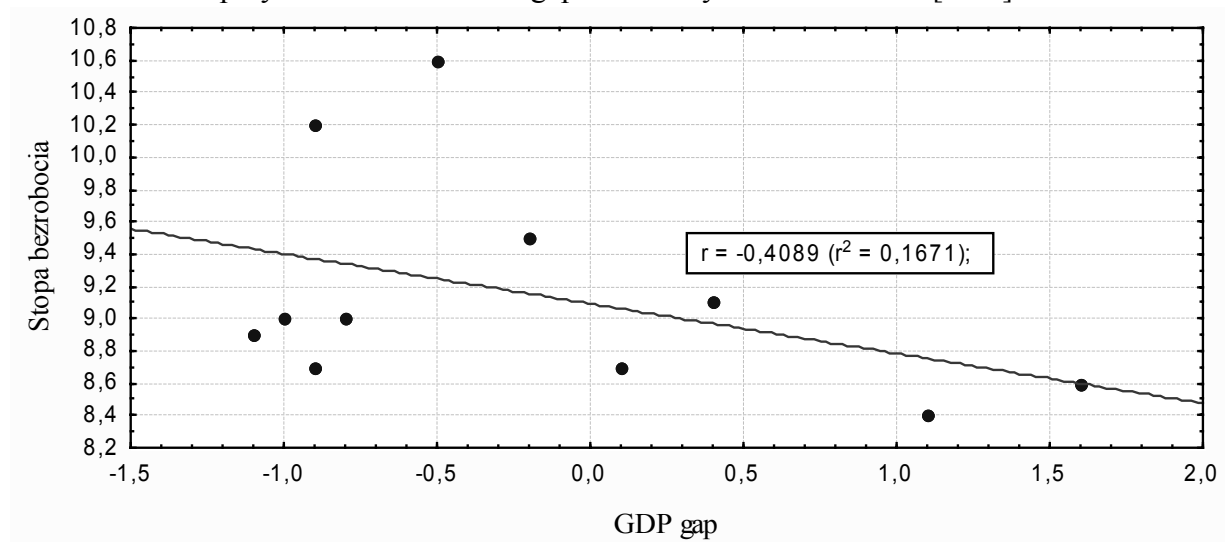
(yearly percentage changes)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
Real GDP	1,7	2,6	2,9	2,9	3,6	1,8	1,1	1,1	2,4	2,0	2,3
GDP gap	-0,5	-0,9	-0,2	0,4	1,6	1,1	0,1	-1,1	-0,8	-1,0	-0,9
Dynamics of employment changes	0,5	0,9	1,5	1,0	1,5	1,0	0,3	0,2	0,5	0,7	0,8
Employment rate	62,0	62,1	62,2	63,3	64,5	65,2	65,4	65,3	65,5	65,8	66,1
Labour efficiency	1,3	1,7	1,4	1,9	2,1	0,8	0,9	0,9	1,9	1,3	1,5
Labour efficiency per hour	1,2	1,6	1,6	2,2	2,9	1,4	1,7	1,3	2,5	1,9	2,1
Unemployment rate	10,6	10,2	9,5	9,1	8,6	8,4	8,7	8,9	9,0	9,0	8,7

* forecast

Source: Statistical Annex of European Economy, Spring 2005.

The results of conducted researches in EU in years 1996-2006 shows, that in European Union exists comparatively negative correlation between unemployment rate and deviation of current GDP from potential GDP. The correlation coefficient (r) calculated on the basis of data from years 1996-2006 amounts to $-0,4089^1$ [cf. picture 1]. The value of correlation coefficient means, that decrease of the deviation between potential and current GDP about 1 percentage point accompanies the fall of unemployment rate about 0,4 percentage point. Thereby in EU exist comparatively limited possibilities to reduction unemployment thanks to economic growth.

Picture 1. Unemployment rate and GDP gap in EU in years 1996-2006 [in %]



r – correlation coefficient; r^2 – coefficient of determination.

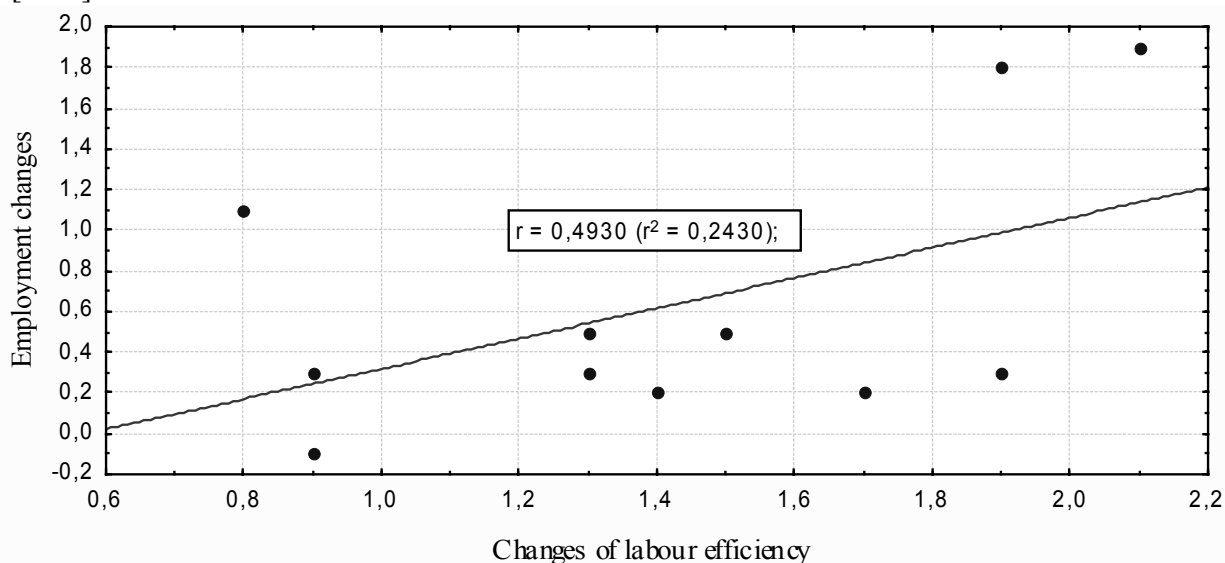
Source: Own calculations.

Therefore, sizes and changes of unemployment rates in EU have far inertial character. This situation may be consequence of the hysteresis effect existing in EU, that is lagged reaction of employment and unemployment to GDP changes (Tokarski, 2006)

On the basis of results of empirical studies it is also possible to formulate the conclusion, that exists comparatively low and positive correlation between labour efficiency and the employment, what shows on relatively limited ability to creating employment in EU countries in conditions of increasing labour efficiency. The correlation coefficient (r) calculated on the basis of data from period 1996-2006 amounts to $0,4930$ [cf. picture 2].

¹ A correlation coefficient is a number between -1 and 1, which measures the degree to which two variables are linearly related. However, coefficient of determination (or multiple correlation coefficient) represents the fraction of variability in y that can be explained by the variability in x . In other words, explains how much of the variability in the y 's can be explained by the fact that they are related to x , i.e., how close the points are to the line.

Picture 2. Correlation between labour efficiency and employment in EU in years 1996-2006 [in %]



r – correlation coefficient; r^2 – coefficient of determination.

Source: Own calculations.

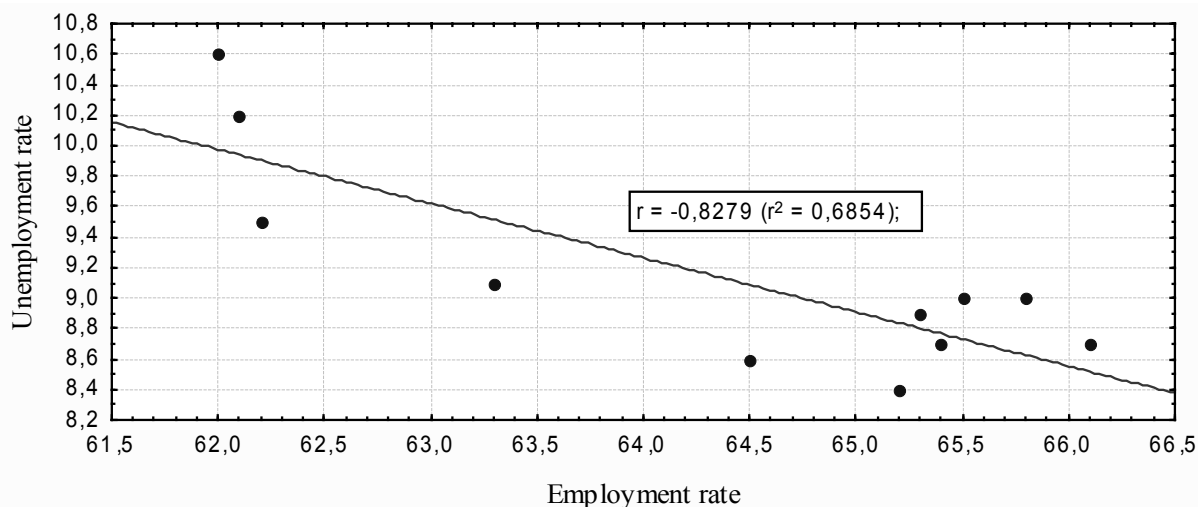
Moreover, the results of empirical studies show that in European Union exists strong and negative correlation between changes of employment rate and unemployment rate. The correlation coefficient (r) calculated on the basis of data from years 1996-2006 amounts to $-0,8279$ [cf. picture 3]. This means, that the growth (the fall) of employment rate about 1 percentage point simultaneously accompanies the fall (the growth) of unemployment rate about 0,83 percentage point.

Therefore, the elasticity of unemployment rate on change of employment rate amounted to 0,83 means, that the share of new positions occupied by registered unemployed people amounts to 83%. The rest of additional positions (17%) are occupied by hidden reserves of national workforce as well as by immigrants.

Moreover, the relation between employment rate and unemployment rate can be periodically disturbed due to political and social factors (e.g.. changes of activation policy on the labour market, lead to changes of relation between unemployment rate and employment rate).

Moreover, on the basis of analysis of selected macroeconomic indicator in 25 EU member countries, it may say, that exists comparatively low degree of nominal and real convergence of economies. That comparatively low degree of economic convergence concerns in particular differences in level of GDP per capita, unemployment rate, as well as labour efficiency in the EU member countries. Considerable disproportions in this regard exist between “old” and “new” European Union member countries. From among the EU member countries the highest level of GDP per capita exists in Luxembourg, Ireland, Dania and Holland, however the lowest level in Poland, Latvia and Lithuania [cf. Table 2].

Picture 3. Correlation between unemployment and employment in EU in years 1996-2006 [in %]



r – correlation coefficient; r^2 – coefficient of determination.

Source: Own calculations.

Table 2. GDP per capita in EU member countries in years 1996-2006 (UE 25=100) [in %]

Regions/ countries	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
UE 25	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UE 15	109.4	109.3	109.3	109.3	108.9	108.7	108.5	108.3	108.1	107.7	107.4
Austria	126.9	124.2	123.3	124.9	125.4	121.5	119.5	119.9	120.5	120.3	119.7
Belgium	118.4	117.3	116.2	115.2	116.4	116.7	117.1	117.5	118.6	118.5	118.5
Cyprus	84.3	82.8	84.1	85.1	86.1	88.9	82.3	81.4	81.7	82.9	83.8
Czech Rep.	70.4	68.3	65.9	64.7	63.6	64.6	66.2	67.5	69.5	71.9	73.5
Dania	124.2	124.7	123.5	126.0	125.9	124.3	120.1	120.6	121.2	122.7	123.1
Estonia	36.3	39.9	40.9	40.5	42.7	43.8	45.7	48.1	50.0	53.7	56.7
Finland	104.4	109.5	112.6	110.8	112.7	112.2	111.8	111.7	112.9	113.4	115.0
France	113.2	113.9	114.2	113.4	113.3	113.5	111.8	110.2	108.9	108.7	108.0
Germany	118.5	116.2	114.5	113.4	111.6	109.5	108.3	107.6	107.9	107.4	106.7
Greece	70.0	70.8	70.5	70.7	71.1	73.0	76.3	79.7	81.7	82.3	82.9
Holland	117.8	118.7	119.0	118.7	119.3	126.5	124.9	124.2	123.4	122.1	122.0
Hungary	48.4	49.6	50.7	51.7	52.5	55.1	57.9	59.5	60.4	62.0	63.3
Ireland	102.6	112.1	116.6	121.8	125.8	128.3	132.4	133.9	138.8	140.0	141.5
Italy	112.5	110.7	111.6	110.3	109.1	108.8	106.7	104.7	103.3	101.6	101.1
Latvia	30.2	32.2	33.2	33.7	34.8	36.6	38.1	40.1	42.5	45.9	48.6
Lithuania	34.6	36.5	38.4	37.1	38.1	40.0	41.8	45.3	47.6	50.6	52.8
Luxembourg	174.0	181.1	189.5	204.8	214.4	208.4	208.2	210.3	219.4	224.2	228.3
Malta	:	:	:	75.7	76.0	71.8	71.6	71.2	69.7	69.0	67.9
Poland	41.6	43.3	44.2	44.9	45.4	44.8	44.7	45.0	46.2	47.2	48.3
Portugal	75.1	76.4	78.0	80.3	80.3	79.4	79.0	76.8	75.4	74.3	73.1
Slovakia	45.4	46.3	47.0	46.4	47.0	47.8	50.2	51.3	51.4	53.3	55.2
Slovenia	69.3	70.8	71.3	73.6	72.7	73.6	74.3	76.1	77.6	79.6	81.2
Spain	87.3	87.3	88.9	92.0	92.1	92.7	94.8	97.5	96.8	97.3	97.2
Sweden	116.1	115.0	113.9	117.7	118.7	114.7	113.3	113.8	115.7	116.7	117.5
United Kingdom	109.4	111.9	111.9	111.7	112.2	112.7	115.6	117.0	116.9	116.7	116.5

* forecast

Source: Eurostat.

So essential regional differentiation of GDP per capita results from considerable disproportions among EU member countries in the range of employment rate, unemployment rate and labour efficiency [cf. Table 3]. Disclosed differences in this regard are the first of all the derivative of dynamics growth of GDP as well as economic policy led in the EU member countries.

Table 3. Employment rate in EU member countries in years 1996-2006 [in %]

Regions/ countries	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
UE 25	:	60.6	61.2	62.0	62.4	62.8	62.8	62.9	63.3	63,3	63,5
UE 15	60.3	60.7	61.4	62.6	63.4	64.0	64.2	64.3	64.7	64,8	65,0
Austria	67.8	67.8	67.9	68.6	68.5	68.5	68.7	69.0	67.8	67,9	68,4
Belgium	56.2	56.8	57.4	59.3	60.5	59.9	59.9	59.6	60.3	60,8	61,3
Cyprus	:	:	:	:	65.7	67.8	68.6	69.2	69.1	69,9	70,5
Czech Rep.	:	:	67.3	65.6	65.0	65.0	65.4	64.7	64.2	64,3	64,3
Dania	73.8	74.9	75.1	76.0	76.3	76.2	75.9	75.1	75.7	76,0	76,4
Estonia	:	:	64.6	61.5	60.4	61.0	62.0	62.9	63.0	63,4	63,9
Finland	62.4	63.3	64.6	66.4	67.2	68.1	68.1	67.7	67.6	68,0	68,5
France	59.5	59.6	60.2	60.9	62.1	62.8	63.0	63.2	63.1	63,3	63,9
Germany	64.1	63.7	63.9	65.2	65.6	65.8	65.4	65.0	65.0	65,4	65,9
Greece	55.0	55.1	56.0	55.9	56.5	56.3	57.5	58.7	59.4	59,8	60,3
Holland	66.3	68.5	70.2	71.7	72.9	74.1	74.4	73.6	73.1	73,3	74,2
Hungary	52.1	52.4	53.7	55.6	56.3	56.2	56.2	57.0	56.8	57,1	57,6
Ireland	55.4	57.6	60.6	63.3	65.2	65.8	65.5	65.5	66.3	67,5	68,5
Italy	51.2	51.3	51.9	52.7	53.7	54.8	55.5	56.1	57.6	57,8	58,1
Latvia	:	:	59.9	58.8	57.5	58.6	60.4	61.8	62.3	62,8	63,2
Lithuania	:	:	62.3	61.7	59.1	57.5	59.9	61.1	61.2	61,5	61,7
Luxembourg	59.2	59.9	60.5	61.7	62.7	63.1	63.4	62.7	61.6	63,2	65,0
Malta	:	:	:	:	54.2	54.3	54.4	54.2	54.1	54,4	54,8
Poland	:	58.9	59.0	57.6	55.0	53.4	51.5	51.2	51.7	52,2	52,8
Portugal	64.1	65.7	66.8	67.4	68.4	69.0	68.8	68.1	67.8	68,0	68,1
Slovakia	:	:	60.6	58.1	56.8	56.8	56.8	57.7	57.0	57,3	57,8
Slovenia	61.6	62.6	62.9	62.2	62.8	63.8	63.4	62.6	65.3	65,4	65,5
Spain	47.9	49.5	51.3	53.8	56.3	57.8	58.5	59.8	61.1	62,4	63,8
Sweden	70.3	69.5	70.3	71.7	73.0	74.0	73.6	72.9	72.1	72,5	73,2
United Kingdom	69.0	69.9	70.5	71.1	71.2	71.4	71.3	71.5	71.6	71,9	72,2

* forecast

Source: Eurostat.

In the case of employment rate also exist considerable disproportions between "old" and "new" the EU member countries. Among 25 the EU member countries the highest employment rates exist in Dania, Holland, Sweden, United Kingdom and Cyprus - in these countries employment rates are higher than 70%. However the lowest employment rates exist in Poland, Malta, Hungary, Slovakia and Italy - and do not exceed 60%.

Thus, employment rates in EU member countries (with the exception of Dania, Holland, Sweden, United Kingdom and Cyprus) remain below goal amounted 70%, which have set in Lisbon Strategy and should be achieved for 2010. As anticipated, it needs about 22 million additional workplaces, in order to realize this target. In "new" the EU member countries employment have to increase about a quarter in order to achieved employment rate equals 70%, what correspond to 7 million additional workplaces.

The situation looks differently with reference to unemployment rate in the EU member

countries. Namely, it does not exist so essential regional differentiation of unemployment rate in "new " and "old " the EU member countries, as in the case of GDP per capita and employment rate [cf. Table 4].

Table 4. Unemployment rate in EU member countries in years 1996-2006 [in %]

Regions/ countries	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
UE 25	:	:	9.4	9.1	8.6	8.4	8.8	9.0	9.0	8.7	8,7
UE 15	10.1	9.8	9.3	8.5	7.6	7.3	7.6	8.0	8.1	7.8	7,8
Austria	4.3	4.4	4.5	3.9	3.6	3.6	4.2	4.3	4.8	5.2	3,9
Belgium	9.5	9.2	9.3	8.6	6.9	6.7	7.3	8.0	7.9	8.4	7,5
Cyprus	:	:	:	:	5.2	4.4	3.9	4.5	5.2	6.1	4,6
Czech Rep.	:	:	6.4	8.6	8.7	8.0	7.3	7.8	8.3	7.9	8,2
Dania	6.3	5.2	4.9	4.8	4.4	4.3	4.6	5.6	5.4	4.9	4,6
Estonia	:	9.6	9.2	11.3	12.5	11.8	9.5	10.2	9.2	7.5	8,2
Finland	14.6	12.7	11.4	10.2	9.8	9.1	9.1	9.0	8.8	8.3	8,0
France	11.6	11.5	11.1	10.5	9.1	8.4	8.9	9.5	9.6	9.5	9,1
Germany	8.5	9.1	8.8	7.9	7.2	7.4	8.2	9.0	9.5	9.4	9,3
Greece	9.6	9.8	10.9	12.0	11.3	10.8	10.3	9.7	10.5	10,2:	10,3
Holland	6.0	4.9	3.8	3.2	2.8	2.2	2.8	3.7	4.6	4.7	5,0
Hungary	9.6	9.0	8.4	6.9	6.3	5.6	5.6	5.8	6.0	7.1	6,2
Ireland	11.7	9.9	7.5	5.7	4.3	3.8	4.3	4.6	4.5	4.3	4,6
Italy	11.2	11.3	11.3	10.9	10.1	9.1	8.6	8.4	8.0	7,6	7,7
Latvia	:	:	14.3	14.0	13.7	12.9	12.6	10.4	9.8	9.1	9,2
Lithuania	:	:	13.2	13.7	16.4	16.4	13.5	12.7	10.9	8.2	9,7
Luxembourg	2.9	2.7	2.7	2.4	2.3	2.1	2.8	3.7	4.8	5.3	4,3
Malta	:	:	:	:	6.7	7.6	7.7	8.0	7.6	7.9	7,0
Poland	:	10.9	10.2	13.4	16.4	18.5	19.8	19.2	18.8	17.9	17,6
Portugal	7.3	6.8	5.2	4.6	4.1	4.0	5.0	6.3	6.7	7.3	7,0
Slovakia	:	:	12.7	16.7	18.7	19.4	18.7	17.5	18.2	16.5	16,8
Slovenia	6.9	6.9	7.4	7.2	6.6	5.8	6.1	6.5	6.0	5.8	5,6
Spain	18.2	17.1	15.3	12.9	11.4	10.8	11.5	11.5	11.0	9.2	10,3
Sweden	9.6	9.9	8.2	6.7	5.6	4.9	4.9	5.6	6.3	6.3	5,3
United Kingdom	7.9	6.8	6.1	5.9	5.4	5.0	5.1	4.9	4.7	4.6	4,7

* forecast

Source: Eurostat.

Among the EU member countries the lowest unemployment rate exists in Austria, Luxembourg, Ireland, Dania, Cyprus and United Kingdom - unemployment rate in these countries does not exceed 5%. However, the highest unemployment rate exists in Poland, Slovakia, Greece and Spain. Unemployment rate in these countries is higher than 10%.

Moreover with reference to differences in labour efficiency, appear larger disproportions in this range between EU member countries. The highest coefficient of labour efficiency per worker among EU members characterize Luxembourg, Ireland and Belgium. On the other hand, the smallest labour efficiency per worker exists in Latvia, Lithuania and Estonia. In these countries the labour productivity is half lower than the average labour efficiency in EU member countries [cf. Table. 5].

Table 5. Labour efficiency per worker in EU member countries in years 1996-2006 [in %]

Regions/ countries	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006*
UE 25	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
UE 15	108.0	108.0	108.0	107.4	106.5	106.2	105.9	105.8	105.6	105.3	105.1
Austria	105.7	103.5	103.1	103.9	105.1	102.7	101.7	102.2	103.6	104.2	104.3
Belgium	127.5	127.1	126.0	124.7	125.7	126.0	127.3	128.1	129.3	129.4	129.7
Cyprus	79.7	80.3	82.9	79.5	78.0	78.6	72.3	71.9	72.9	74.1	75.2
Czech Rep.	58.0	56.5	56.6	58.4	58.5	59.5	60.0	61.8	63.8	66.1	67.9
Dania	101.3	101.7	101.1	103.5	104.8	104.2	101.3	103.0	103.9	105.3	106.0
Estonia	34.4	37.6	39.5	40.9	44.2	45.2	46.4	47.9	49.9	53.0	55.8
Finland	105.6	108.4	111.2	108.0	109.2	108.5	107.5	107.4	108.7	108.5	110.2
France	122.0	123.7	124.3	122.8	122.0	122.1	120.3	119.1	118.7	119.4	119.5
Germany	106.5	105.6	104.3	103.0	101.1	100.0	99.7	99.8	99.8	99.6	99.1
Greece	83.4	87.4	82.7	84.0	85.7	88.6	94.0	97.0	96.0	97.4	98.3
Holland	103.0	101.8	101.6	100.4	100.8	106.8	105.7	106.0	107.3	107.7	107.9
Hungary	57.1	58.6	59.7	59.3	60.1	63.5	66.6	67.2	68.6	70.3	71.8
Ireland	115.1	121.2	119.4	119.7	121.4	123.4	127.5	128.2	131.3	131.1	132.9
Italy	120.0	118.9	120.6	119.1	117.5	114.5	110.8	108.1	107.0	105.3	104.9
Latvia	32.0	32.7	34.0	35.2	37.7	38.9	39.7	40.7	42.5	45.6	48.2
Lithuania	31.0	32.4	34.6	33.7	40.9	44.7	44.8	47.2	49.5	51.8	54.0
Luxembourg	134.4	138.5	142.6	150.2	153.1	143.3	140.6	140.4	144.2	144.8	144.8
Malta	:	:	:	95.2	87.5	82.6	83.6	84.0	81.8	81.4	80.4
Poland	44.0	45.0	45.6	48.0	49.9	49.0	49.8	57.2	58.9	59.8	60.9
Portugal	68.2	69.2	70.1	71.8	71.9	71.2	71.0	69.7	68.9	68.6	68.2
Slovakia	46.6	48.6	50.3	51.6	54.0	55.2	58.2	58.2	58.7	60.1	62.1
Slovenia	63.5	66.6	68.0	69.9	69.7	71.1	70.8	72.6	73.9	76.0	77.9
Spain	102.8	100.3	99.5	100.0	97.4	97.1	98.5	100.2	98.7	96.8	94.2
Sweden	103.8	105.1	104.1	106.4	106.5	102.3	101.3	102.3	105.2	106.5	107.2
United Kingdom	100.3	101.8	102.5	102.2	103.3	104.7	107.2	107.6	107.1	107.4	108.1

* forecast

Source: Eurostat.

The results of conducted researches also show that in all the EU member countries exists essential diversity between the EU member countries in the range of correlation between unemployment rate and the deviation of the current GDP from the potential GDP (GDP gap). Namely, the correlation coefficient in this countries amounts to [-0,89; 0,43]. The highest values of correlation coefficient exist in Finland (0,43) and in Italy (0,43), and the lowest in Germany (-0,89) and in Malta (-0,84). This means that in Germany and Malta exist the higher elasticity of unemployment rate on changes of GDP growth rate and the same in these countries are greater possibilities to reduce unemployment as a result of economic growth. However in Finland and Italy exist the limited possibilities to decrease unemployment thanks to economic growth [cf. Table. 6].

Table 6. Correlation between basic economic indicators in EU member countries

Countries	Correlation coefficient (r) between unemployment and GDP gap	Correlation coefficient (r) between employment and labour efficiency	Correlation coefficient (r) between employment and unemployment
Austria	-0,79 (0,62)	-0,49 (0,24)	-0,55 (0,30)
Belgium	-0,36 (0,13)	0,01 (0,00)	-0,89 (0,79)
Cyprus	-0,08 (0,01)	-0,65 (0,42)	-0,38 (0,14)
Czech Rep.	0,29 (0,08)	-0,86 (0,74)	-0,73 (0,53)
Dania	-0,48 (0,23)	0,69 (0,48)	-0,89 (0,79)
Estonia	-0,40 (0,16)	0,71 (0,50)	-0,87 (0,76)
Finland	0,43 (0,18)	0,16 (0,02)	-0,98 (0,96)
France	-0,70 (0,49)	-0,79 (0,62)	-0,92 (0,85)
Germany	-0,91 (0,83)	-0,83 (0,69)	-0,65 (0,42)
Greece	-0,16 (0,03)	0,89 (0,79)	-0,09 (0,01)
Holland	-0,33 (0,11)	0,52 (0,27)	-0,83 (0,69)
Hungary	-0,62 (0,38)	0,78 (0,61)	-0,97 (0,94)
Ireland	-0,23 (0,05)	0,77 (0,59)	-0,99 (0,98)
Italy	0,43 (0,18)	-0,96 (0,92)	-0,98 (0,96)
Latvia	-0,66 (0,43)	0,50 (0,25)	-0,07 (0,00)
Lithuania	-0,76 (0,58)	-0,14 (0,02)	-0,76 (0,58)
Luxembourg	-0,82 (0,67)	0,81 (0,66)	-0,83 (0,69)
Malta	-0,84 (0,70)	0,02 (0,00)	-0,16 (0,02)
Poland	-0,60 (0,36)	-0,67 (0,45)	-0,98 (0,96)
Portugal	-0,68 (0,46)	0,89 (0,79)	-0,72 (0,52)
Slovakia	-0,79 (0,62)	-0,39 (0,15)	-0,99 (0,98)
Slovenia	0,31 (0,10)	0,71 (0,50)	-0,70 (0,49)
Spain	-0,11 (0,01)	-0,66 (0,43)	-0,95 (0,90)
Sweden	-0,67 (0,45)	-0,41 (0,17)	-0,97 (0,94)
United Kingdom	0,35 (0,12)	0,81 (0,66)	-0,98 (0,96)

r – correlation coefficient; in bracket are presented values of coefficient of determination (r^2)

Source: Own calculations.

The considerable divergences among the EU member countries exist also in the case of linear dependence of labour efficiency and employment. Namely, correlation coefficient of labour efficiency changes and employment rate in EU member countries amounts to value from range $[-0,96; 0,89]$.² The highest, positive values of correlation coefficient exist in Greece and Portugal (0,89), which shows on relatively high ability in these countries to create new work places in conditions of growing labour efficiency. The lowest values of correlation coefficient exist in Italy (-0,96) and Czech Republic (-0,86), what implies, that in these countries the growth of labour efficiency about 1 % the accompanies the fall of employment rate about one percentage point. Therefore in these countries does not exist the ability to create employment in the conditions of growing labour efficiency.

Additionally, the results of empirical studies show, that exists negative correlation between changes of employment rate and changes of unemployment rate in all EU member countries. The highest values of correlation coefficient have noted in Slovakia (0,99), Ireland (0,99), Italy (0,98), Poland (0,98), Finland (0,98) and in United Kingdom (0,98). Therefore the value of correlation coefficient similar to unity means, that in these countries the share of new work places occupied by registered unemployed people amounts to near 100%. However the remaining part of additional work places (about 1-2%), is occupied by hidden reserves of national workforce as well as by foreign immigrants.

Next the lowest values of correlation coefficient in turn were noted in Luxembourg (0,07) and Greece (0,09). This means, that in these countries comparatively the high percentage of new work places (about 91-93%) occupy the hidden reserves of workforce as well as foreign employees.

The factors that influence in essential degree on diversification between the EU member countries in the range of unemployment rate, employment rate and growth rate of GDP are follows:

- a) policy of active labour-market;
- b) system of unemployment benefits;
- c) taxes;
- d) the low elasticity of labour market and wages.

Policy of active labour-market assumes that unemployment can be limited by different type of employment agencies in the country. These offices are obliged to lead trainings for the unemployed, which aim is creating the new work places and retraining the unemployed, which will contribute to fall of the unemployment. But these trainings have often opposite results, i.e. contribute to increase of the unemployment in the country. Namely, it can appear the crowding out effect, which consist in substitution "old" employees for "new" employees return for certain compensations from government. Moreover, the employing the unemployed people put strong pressure on salaries reduction, which limits the susceptibility for take up the work.

The relatively high sums of unemployment benefits affect on growth of unemployment by influence on the level of salaries in the economy, as well by decreasing of susceptibility for seek a job among unemployed. Moreover, wage setting and job search behaviour are also affected by the maximum duration of unemployment benefits payments and the effects are qualitatively similar to the effects arising from higher benefit levels.

On the level of unemployment influences also the level of wage taxes in the given country. The taxes influence on unemployment rate by change relation between employee income (wages) and unemployed income (unemployed benefits). If the relation between wages and unemployed benefits worsens, then the workers will be to the larger extent

² Value of correlation coefficient in Poland amounts to - 0,67, what means, that the growth of labour efficiency about 1% accompanies the fall of employment about 0,7%. Thus in Poland doesn't exist ability to creating employment in conditions of increasing labour efficiency.

interested in escape to “the black labour market”, which will finally influence on the growth of unemployment in the country. Therefore, the higher tax wage, the greater unemployment rate and vice versa. The correlation coefficient of tax wage and unemployment rate in the EU member countries amounts to on average about 0,23 (Mortensen, 2004).

Also progressive tax - system can affect on growth of unemployment. The larger degree of progression means that workers get smaller and smaller benefits from wage increase before taxation because the additional increase of wages becomes taxed higher and higher tax rate. Therefore workers are not interested in getting additional wages (Calmfors, Holmlund, 2000).

The one of the reasons of the short-term employment changes in the EU member countries is also nominal rigidity of wages. Wage agreements are often fix for one or several years and are based on expectations concerning the general development of wages and prices in the given economy. If prices are higher than expected at the time of wage setting, then the real wage will be lower than intended. This situation will contribute to temporary decline of unemployment, and disappears as wages adjust to the higher prices.

Therefore, it can suppose that that nominal wage rigidity have only temporary effects on unemployment. But changes in relative demand and supply for goods and production factors cause relative wage adjustments, involving real wage reductions for employees in companies. At a moderate inflation rate, these wage adjustments can take place without nominal wage cuts, if wages increase at a slower rate than prices. If inflation rate is zero or close to zero, then relative or real wage adjustment may require nominal wage cuts, what may be difficult to achieve (e.g. for the sake of strong position of trade union in the country). Hence, nominal wage rigidity together with very low inflation may therefore give rise to real wage rigidities as a result of high unemployment rate (Calmfors, Holmlund, 2000).

Conclusions

The results of empirical studies conducted in the EU member countries disclose following tendencies:

- a) exists comparatively low and negative correlation between unemployment rate and deviation of current GDP from potential GDP what shows, that exist comparatively limited possibilities to reduction unemployment thanks to economic growth;
- b) exists low and positive correlation between labour efficiency and the employment, what shows on relatively limited ability to creating employment in EU countries in conditions of increasing labour efficiency;
- c) exists negative correlation between changes of employment and unemployment (this relationship can be unclear due to political and social factors);
- d) the increase of labour supply leads to growth of employment and significant fall of labour efficiency, however increase of labour supply is the result of high unemployment rate;
- e) the reduction of real wages leads to improve international competitiveness of the country, but this alter the labour-intensity of production in the short and long term;
- f) the increase of part-time employment may change the correlation between growth rate of GDP and employment rate (Walterskirchen, 1999).

The considerable disparity appearance among EU member countries in the rage of efficiency increases and unemployment rates, it discloses simultaneously the slow convergence of labour efficiency and unemployment rate towards the EU average level of labour efficiency.

Moreover results of empirical researches conducted among the EU member countries show that countries which in initial situation had the low share of agriculture in creating GDP,

at present are on high level of economic development, and their growth rate of GDP is relatively low. However, in the regions which characterized in the moment of EU membership by high share of agriculture in creating GDP, at present takes place the considerable fall of this sector share in creating GDP and considerably higher from average the growth rate of GDP. Moreover, these countries reveal the small fall of employment rate. On the other hand, the regions specialized in services, characterize by the low growth rate of efficiency and the increasing employment rate.

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