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## CONVERGENCE IN LOCAL LABOUR MARKETS

**Abstract.** The purpose of presented study was to verify a hypothesis of convergence on local labor markets in Poland. Convergence phenomenon, understood as economic development levels balancing (falling differentiation) has been known since the mid-1950s. In Poland the convergence problems have been a specific subject of research since the accession to the European Union and the implementation of cohesion policy whose financing is largely related to compensating some imbalances within the Polish regions, i.e. achieving convergence. Some earlier studies show that the outside convergence process (understood as reducing the distance of Poland's development in relation to the EU) does occur, whereas inside convergence processes (understood as reducing the development distance between the regions of Poland) do not occur. This pessimistic conclusion concerns studies on economic growth in the regions (e.g. using GDP base), and below we show that the hypothesis of convergence on local labor markets in Poland could be positively verified. This conclusion was derived on the basis of standard tools which are used to verify a beta and sigma type of convergence and statistical data for the period 1999-2008 taken from Labor Force Survey.

### 1. INTRODUCTION AND METHODS

In Poland, the analyzed period (1999-2008) can be divided into sub-periods: 1999-2002-2003, when which the level of employment was falling, and 2004-2008 when it was rising (see charts below).

The charts show that after 2003 employment increased in Poland by over 2 million people (by 2,230 thousand to be precise). The regional employment indicators, following the changes in the country, increased in the years 2004-2008 and decreased between 1999 and 2003.

The question we ask in this paper is whether the changes contributed to the regional job markets in Poland reaching convergence, or not. The classic literature operates two basic concepts of convergence<sup>1</sup>.

Beta convergence (absolute) occurs when less developed economies grow faster than highly developed economies<sup>2</sup>. In this study, beta convergence is im-

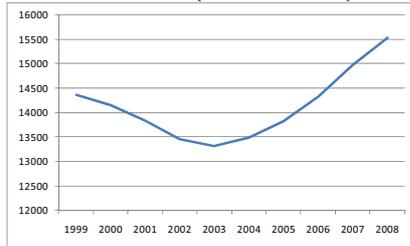
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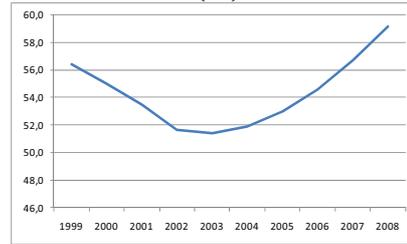
<sup>1</sup> Sala-i-Martin X., [1995], *The Classical Approach to Convergence Analysis*, Economics Working Paper 117, Yale University and Universitat Pompeu Fabra, (Jun.), p.3.

plied, when evidence can be found that the regions where particular indicator's value is low in the compared year (1999) changed more than those where the indicator's value was initially high.

**Chart 1. Employment in Poland, 1999-2008 (in thousands)**



**Chart 2. Employment rate in Poland (%)**



Source: developed by the author.

Beta convergence was tested empirically using a regression equation<sup>3</sup>:

$$\frac{1}{T}(\ln y_T - \ln y_0) = \alpha_0 + \alpha_1 \ln y_0, \quad (1)$$

where:

$y_T$  – the indicator of a labour market in the final year,

$y_0$  – the indicator of a labour market in the initial year,

$T$  – number of years.

Beta convergence occurs when the  $\alpha_1$  parameter is negative, which is graphically illustrated with a negatively inclined distribution of the points between the initial value and the growth rate.

Sigma convergence takes place when the differentiation (typically measured with the standard variance of the logarithms or with the share of standard variance in the mean) of a particular indicator between regions decreases in time.

$$sd(\ln y_t) = \alpha_0 + \alpha_1 t, \quad (2)$$

where:

$sd(\ln y_t)$  – standard variance of (log) variable in  $t$  year.

Sigma convergence occurs when the  $\alpha_1$  parameter is negative. This is graphically shown by a decreasing distribution of the points characterising the differentiation of a particular variable in time.

<sup>2</sup> Rapacki R. (ed.), [2009], *Wzrost gospodarczy w krajach transformacji. Konwergencja czy dywergencja?*, PWE, Warszawa, p. 147.

<sup>3</sup> The error term is omitted.

## 2. STATISTICAL DATA AND ESTIMATION RESULTS

The analysis makes use of the Central Statistical Office' data (mostly the Regional Data Bank on [www.stat.gov.pl](http://www.stat.gov.pl)) and the data derived from the individual, non-identified questionnaires used by the Labour Force Surveys (LFS) – selected profiles – and the data on the age group 15-64 years (the generally available profiles concern the data for the 15+ cohort). The analysis covers 16 NTSII regions in Poland<sup>4</sup>.

Regional employment indicators increased, following the changes in the entire country, in the years 2004-2008 and decreased between 1999 and 2003<sup>5</sup>. In 1999, the difference between the regions where the employment rate was the lowest (Warmińsko-Mazurskie) and the highest (Podlaskie) amounted to 11.2 p.p. In 2008, the difference (but for different regions, i.e. Zachodniopomorskie and Mazowieckie) was only 6.7 percentage points.

**Tab. 1. Regional employment rate 15-64**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
dolnośląskie	54.7	51.9	48.9	47.8	46.6	47.4	49.5	52.9	55.0	56.9
kujawsko-pomorskie	55.0	52.8	52.5	50.8	50.5	50.4	51.7	51.3	53.8	55.6
lubelskie	58.0	58.6	57.5	56.3	55.8	54.7	56.2	56.9	59.8	59.0
lubuskie	52.3	49.7	48.2	46.1	46.0	48.1	51.3	53.0	55.6	56.9
łódzkie	59.0	56.2	53.6	53.0	53.1	53.4	54.3	56.2	59.0	61.3
małopolskie	58.5	58.8	58.1	54.8	53.8	54.9	55.1	55.9	58.1	60.9
mazowieckie	60.2	60.0	58.9	57.2	56.9	57.2	57.7	59.0	60.9	64.6
opolskie	55.6	55.0	53.3	50.5	49.4	51.2	52.8	55.0	56.1	57.4
podkarpackie	55.4	55.0	54.0	53.3	52.2	51.4	52.4	53.8	56.5	57.8
podlaskie	60.9	58.7	57.6	55.1	54.0	56.2	57.0	56.9	59.3	61.7
pomorskie	54.8	53.4	53.4	50.4	49.9	49.7	51.1	53.7	56.4	58.7
śląskie	52.7	48.7	48.2	47.1	47.2	48.3	49.7	51.4	54.1	56.3
świętokrzyskie	56.1	55.0	51.9	50.5	49.7	49.5	51.7	54.6	58.3	60.8
warmińsko-mazurskie	49.8	49.2	48.7	46.1	47.4	48.3	49.0	50.7	54.4	55.8
wielkopolskie	58.6	57.4	54.5	53.1	54.1	53.8	54.1	55.2	57.6	60.1
zachodniopomorskie	53.4	52.1	49.6	46.0	46.3	48.1	48.5	49.5	51.9	54.2
Poland	56.4	55.0	53.5	51.7	51.4	51.9	53.0	54.5	57.0	59.2

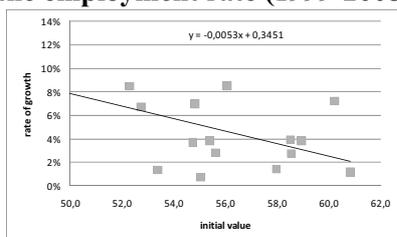
*Source: developed by the author based on the LFS data.*

<sup>4</sup> In Poland, the NTSII regions are called voivodeships.

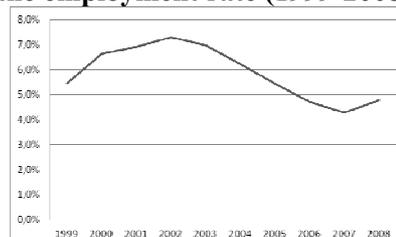
<sup>5</sup> The labour market did not recover in all regions at the same time – the situation first improved (as early as 2003) in the Wielkopolskie, Zachodniopomorskie and Warmińsko-Mazurskie regions. In most regions, (Śląskie, Podlaskie, Mazowieckie, Opolskie, Małopolskie, Łódzkie, Lubuskie and Dolnośląskie) recover could be observed in 2004. The labour markets responded the latest (in 2005) in Świętokrzyskie, Pomorskie, Podkarpackie, Lubelskie and Kujawsko-Pomorskie.

The gap between the regions where the employment rate was the highest and the lowest decreased. To find out if convergence is attainable, the beta and sigma convergence tests were applied.

**Chart 3. Beta convergence for the employment rate (1999-2008)**



**Chart 4. Sigma convergence for the employment rate (1999-2008)<sup>6</sup>**



Source: developed by the author.

As a convergence rate for beta convergence was not calculated, the rate of growth was used for the variable's levels. In the case of sigma convergence, the standard deviation's share in the mean was calculated.

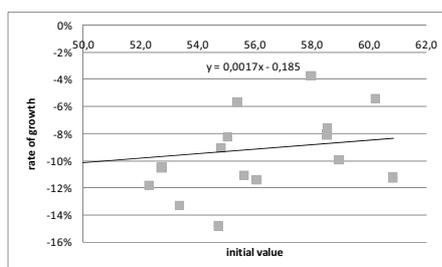
The left-hand chart above shows beta convergence for the employment rate. To enable concluding, the growth rate must be negatively correlated with the initial value of the variable (according to the rule that regions where the initial situation is poorer must outpace other regions).

This situation is shown on the first chart: the horizontal axis represents the employment rate's values for 1999 and the vertical axis shows the growth rate of that indicator calculated for the period 1999 – 2008. The inclination of the distribution of the points is negative, proving that the higher the initial value, the lower the growth rate (or the lower the initial value, the higher the growth rate), hence the convergence occurs.

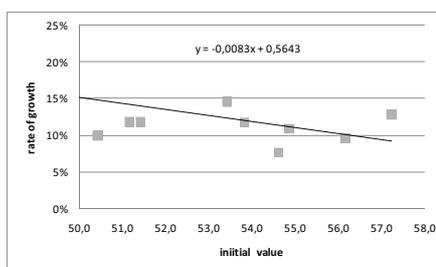
The graphic illustration of sigma convergence (the right-hand side chart, top) shows something else. Because particular points on the chart show differentiation between the voivodeships in particular periods<sup>6</sup>, we can see that it was not steadily declining throughout the analyzed period. Increased differentiation is noticeable between 1999 -2002, and its fall after 2003. If we divided the analyzed period into two subperiods, then the beta convergence tests would show that differentiation decreased only in the 2<sup>nd</sup> sub-period (cf. the charts below).

<sup>6</sup> Regional differentiation in the employment rate (the 7.3 in 2002 means that the standard variance for 16 voivodeships in 2002 constituted 7.3% of the average employment rate for the voivodeships).

**Chart 5. Beta convergence for the 1999-2003 employment rate**



**Chart 6. Beta convergence for the 2004-2008 employment rate**



Source: developed by the author.

The above charts show that between 1999 and 2003, when the employment rates were falling (cf. table 1), the changes made regional differentiation grow (as shown by the figures in the table, according to which the gap between the regions with the lowest and the highest rate was 10.9, the phenomenon being less extensive than in 1999). The interregional differentiation of the employment rate was decreasing only after 2003, hence interregional divergence of the employment rates occurred in the period 1999-2003 and convergence between 2004 and 2008.

The sigma convergence tests corroborate this, showing the period in which differentiation was rising and falling (as measured by the product of standard variance and the mean, see chart 4).

The results of the sigma and beta convergence tests for selected labour market indicators are shown in Table 2.

A negative (and statistically significant, i.e. having at least one star) indicator represents convergence. All variables (except for the share of employment in agriculture) point to beta convergence in the years 1999-2008. However, if the period is divided into two sub-periods, there is no convergence in most cases before 2004, perhaps sometimes divergence occurs.

**Tab. 2. The parameter values of the equations testing beta and sigma convergence<sup>7</sup>**

Employment rate	BETA 99-08	BETA 99-03	BETA 04-08	SIGMA 99-08	SIGMA 99-03	SIGMA 04-08
15-64	-0.005**	+0.002	-0.008***	-0.002**	+0.004*	-0.004**
15-64 M	-0.006**	-0.001	-0.010***	-0.002*	+0.004**	-0.006*
15-64 W	-0.005*	+0.001	-0.006	-0.002**	+0.002	-0.002***
15-24	-0.019**	-0.006	-0.040**	-0.002	+0.013*	-0.006
15-24 M	-0.024***	-0.011	-0.041***	-0.004	+0.013**	-0.018
15-24 W	-0.016*	-0.007	-0.037	-0.002	+0.012	+0.006
25-54	-0.005***	+0.002	-0.007***	-0.002**	+0.004*	-0.005***
25-54 M	-0.006***	0.000	-0.008***	-0.002**	+0.003**	-0.005**
25-54 W	-0.005**	+0.002	-0.007**	-0.002**	+0.003	-0.004**
55-64	-0.021***	-0.008*	-0.021***	-0.014***	-0.012	-0.019***
55-64 M	-0.021***	-0.007*	-0.027***	-0.013***	-0.008**	-0.025**
55-64 W	-0.019***	-0.015**	-0.011*	-0.011**	-0.020	-0.002
for the disabled	-0.015**	-0.001	-0.037***	-0.002	+0.009	-0.023*
share of sector I workers	+0.002	-0.002	+0.003	+0.004*	+0.000	+0.012*
share of sector II workers	-0.007**	-0.001	-0.007*	-0.003***	-0.001	-0.006**
share of sector III workers	-0.006**	+0.000	-0.006***	-0.002*	+0.002	-0.005*

Source: developed by the author.

Note: M-men, W- women, stars indicate the p-value of the parameter as 10%, 5% and 1% - one, two and three stars respectively.

### 3. DISCUSSION AND CONCLUSIONS

In Poland, convergence problems have been a special area of the researchers' interest since the country joined the European Union and cohesion policy started to be implemented as a result, which is largely used to fund activities reducing the differences in the development of Polish regions, i.e. enabling convergence. International studies show that although the EFRD allocates its funds to the poorest regions<sup>8</sup>, regional disparities are still growing in the member states. Following the first observations of this kind that were made in the period 1988-1999, the European Commission acknowledged that some exchange of convergence processes took place at the national and regional

<sup>7</sup> For beta convergence, we use the rate of growth (2008-1999, 2008-2004 or 2003-1999) on the left-hand side and the value of the variable (of 1999 or 2004) on the right-hand side of the equation (because the speed of convergence was not calculated – only the sign of the coefficients was important). For sigma convergence – the standard deviation's share in the mean of the variable was used.

<sup>8</sup> The allocation rule takes into account regions with GDP per capita being less than 75% of the EU mean.

levels<sup>9</sup>. The European Commission claims that national disparities regarding differences in income between the regions indicate the initial state, as economic activity aims at agglomeration in the most effective areas. For this reason, economic acceleration initially takes the forms of specialization, polarization and regional differentiation. Some more pessimistically-minded authors (Boldin and Canova, [2001]) argue that the allocation of investments in the most underdeveloped regions is ineffective and hinders the acceleration process. This argument gains importance when the principle of addition is taken into account, which determines regional allocation and national public and private investments based rather on re-distribution than effectiveness.

The above paragraph provides arguments challenging convergence as a criterion for assessing the performance of various economic policies. However, this article does not view cohesion as a result of any policy (e.g. EC's cohesion policy), so a hypothesis about convergence being a confirmation of any policy's positive outcomes has not been formulated. Convergence has not been even treated as a desirable phenomenon and divergence as an undesirable one. Such opinions are usually provided by evaluation studies that aim to show the results of cohesion policy, which should bring about convergence. As this study does not aspire to evaluate any labor market policy, its statements about convergence are only indicative and do not provide any evaluations<sup>10</sup>.

Convergence problems have been a special subject of research in Poland since the country's accession to the European Union and the resulting implementation of cohesion policy, which is mostly used to fund projects aimed to offset differences within Polish regions, i.e. to ensure convergence. The existing studies show that while the external convergence processes (understood as bridging the development gap between Poland and the EU) occur, the internal convergence processes (understood as bridging the development gap between regions inside Poland) cannot be found<sup>11</sup>.

This pessimistic conclusion is provided by the research into regions' economic growth based, for instance, on GDP, but this article shows that the hypothesis about converging local labour markets in Poland can be corroborated for the period 1999-2008. A thing that is even more interesting is that when we divide this period into two sub-periods, convergence appears in the second one, i.e. after Poland's accession to the EU. Although this article discusses arguments

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<sup>9</sup> Perez J., Dones M., Liano C., [2009], *An interregional impact analysis of the EU structural funds in Spain (1995-1999)*, Papers in Regional Science vol. 88, no 3, Blackwell Publishing, (Aug.)

<sup>10</sup>The author believes that it is difficult to determine whether convergence understood as diminishing differences between the levels of economic activity and inactivity is a positive phenomenon.

<sup>11</sup> Confer: Gorzelak, G., [2009], *Fakty i mity rozwoju regionalnego*, Studia Regionalne i Lokalne, nr 2(36)/2009, Wydawnictwo Naukowe „Scholar”, Warszawa.

challenging convergence as a criterion for determining the performance of some economic policies, labor markets maybe an area representing a positive exception to this negative rule.

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## KONWERCENCJA NA LOKALNYCH RYNKACH PRACY

Celem prezentowanych badań było zweryfikowanie hipotezy o występowaniu konwergencji na lokalnych rynkach pracy w Polsce. Zjawisko konwergencji, rozumianej jako wyrównywanie się poziomów rozwoju badanych gospodarek (zmniejszaniu się ich zróżnicowania) znane jest od połowy lat 50. W Polsce problemy konwergencji stanowią szczególnie przedmiot badań od momentu przystąpienia do Unii i w konsekwencji realizacji polityki spójności, której finansowanie dotyczy w dużym stopniu wyrównywania dysproporcji rozwojowych polskich regionów, czyli osiągnięciu konwergencji.

Przeprowadzone dotychczas badania pokazują, że o ile zachodzą w Polsce procesy konwergencji zewnętrznej (rozumianej jako zmniejszanie dystansu rozwojowego Polski w stosunku do UE), to proces konwergencji wewnętrznej (rozumianej jako zmniejszanie dystansu rozwojowego pomiędzy regionami Polski i wewnątrz nich) – nie zachodzi. Taki wniosek wypływa z badań nad wzrostem gospodarczym w regionach (mierzonym PKB per capita). W referacie pokazano, że w przypadku lokalnych rynków pracy w Polsce można stwierdzić, w wielu przypadkach, ich konwergencję. Wniosek ten wprowadzono na podstawie standardowych narzędzi stosowanych do weryfikacji hipotezy o konwergencji typu beta i sigma oraz danych statystycznych z okresu 1999-2008 zaczerpniętych z Badania Aktywności Ekonomicznej Ludności.