

## URBAN DETERMINANTS OF POLARISATION OF ECONOMIC DEVELOPMENT IN POLAND

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**Key words:** regional development, convergence, urbanisation processes.

### Abstract

Studies which deal with the reasons for disparities between the levels of regional development are an important part of economics theory. According to the neoclassical approach, all differences are transient and they will gradually diminish, owing to various factors, including perfect mobility of the means of production. On the other hand, according to the theories from New Economic Geography, regional polarisation of economic development is a relatively permanent process and the mechanism of its increase is based on so called agglomeration benefits.

Based on this concept, the study assumed that one of the basic reasons for the disparities between the levels of economic development is the diversity of the development of an urban settlement network. In order to verify the hypothesis, sixteen provinces were divided into three groups with different levels of economic development, measured by the value of GDP *per capita*. Subsequently, the development of urban settlement network was evaluated within such groups by means of such indexes as: urbanisation index, city density index, structure of urban centre by size.

The analyses performed have confirmed the assumption. At least partially, economic development of provinces depends on urbanisation processes. However, it means that development disparities between regions are likely to grow in the future.

## URBANIZACYJNE DETERMINANTY REGIONALNEJ POLARYZACJI ROZWOJU GOSPODARCZEGO W POLSCE

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**Słowa kluczowe:** rozwój regionalny, konwergencja, procesy urbanizacyjne.

### Abstract

Badania nad przyczynami dysproporcji poziomu rozwoju regionalnego stanowią istotną część teorii ekonomii. Zgodnie z podejściem neoklasycznym wszelkie różnice mają charakter przejściowy i stopniowo zanikają dzięki m.in. doskonałej mobilności czynników produkcji. Z kolei w myśl teorii z nurtu Nowej Geografii Ekonomicznej regionalna polaryzacja rozwoju gospodarczego jest procesem względnie trwałym, a mechanizm jej zwiększania opiera się m.in. na tzw. korzyściach aglomeracji.

Na podstawie tej koncepcji w pracy przyjęto założenie, że jedną z podstawowych przyczyn regionalnych dysproporcji poziomu rozwoju gospodarczego w Polsce jest zróżnicowanie stopnia rozwoju miejskiej sieci osadniczej. W celu weryfikacji tej hipotezy szesnaście województw podzielono na trzy grupy różniące się poziomem rozwoju gospodarczego mierzonym wartością regionalnego PKB *per capita*. Następnie w wyodrębnionych grupach oceniono stopień rozwoju miejskiej sieci osadniczej, za pomocą takich wskaźników, jak: wskaźnik urbanizacji, wskaźnik gęstości miast, struktura ośrodków miejskich, według ich wielkości.

Wyniki analizy pozwalają na potwierdzenie słuszności przyjętego założenia. Rozwój gospodarczy województw, przynajmniej częściowo, jest uwarunkowany różnicami w przebiegu procesów urbanizacyjnych. Oznacza to jednak, że obserwowane obecnie regionalne dysproporcje rozwojowe w przyszłości prawdopodobnie będą wzrastać.

## Introduction

The issue of regional development is a significant part of economic thought. In the past few decades, regional development has been increasingly seen as the main determinant of the development of a country. As a consequence, a view has been adopted that macro development reflect and are a consequence of the processes on the local and regional scale.

Increasing interest in regional issues is probably caused by growing disparities between the levels of economic development of the regions. Despite considerable efforts taken within economic policy of the European Union and by individual states, this results in regional divergence rather than convergence. The differences are particularly noticeable between the peripheries and urban (metropolitan) areas.

It would be interesting to consider the issue of whether such tendencies are noticeable in our country. It is a little more than ten years since administrative reforms were implemented to make regional policy more effective and five years since our accession to the European Union, which has made Poland the greatest beneficiary of Community funds. A considerable part is allocated to equalising the level of regional economic development. Confirming or excluding regional economic convergence would be a test of effectiveness of actions taken within operational programs of regional development or it would be a reason for reformulating the principles, tools and goals of the programs. If processes of regional development are really affected by urbanisation processes or even metropolisation of space, it is difficult to consider effective equalisation of the level of economic development. This stems from the fact that it is very difficult, if at all possible, to "control" urbanisation. Therefore, if one of the basic factors which determines developmental disparities cannot be controlled, the basic goal of economic policy (understood so far as equalising the value of regional GDP per capita) is in doubt and actions taken in this respect are ineffective.

## **Aim, scope and methods of the study**

Although there are symptoms of change, equalising the level of economic development of regions, i.e. economic coherence, is the supreme goal of economic policy, both in the domestic dimension and on the pan-European scale, with the GDP per capita being its main measure. Equalising the level of regional development within the entire Community is the priority, but this indirectly means that efforts should be made aimed at regional convergence within individual states. While trying to achieve this goal, nearly 170 billion PLN had been spent by the end of 2009 in Poland alone. Moreover, it is estimated that our country will receive nearly 23 billion Euros to carry out the ROP within the 2007–2013 financial perspective (PRUSEK, KUDEŁKO s. 468). The effectiveness of the policy will be measured by economic convergence between Polish regions.

The aim of the study described in this paper was to analyse regional diversity between the levels of economic development of Polish regions in 1995–2006, which indirectly may also enable evaluation of the effectiveness of economic policy. A study hypothesis has been adopted for the purpose in which it was assumed that the disparities in regional economic development have increased during the past dozen or so years.

The study analysed the factors which affect the process of regional economic divergence. A literature analysis has provided grounds for another study hypothesis, which assumes that the level of urbanisation is one of the major reasons of polarisation of provincial economic development.

The study was a two-stage process. At the beginning, the first study hypothesis was verified. To this end, the function of regression was estimated, which analysed whether the original level of provincial economic development had affected their growth rate in subsequent years. Confirmation of the relationships between those values will provide grounds for a positive verification of the first study hypothesis and it will indirectly indicate a low effectiveness of actions taken in order to equalise the level of regional development.

Regional GDP per capita has been used to determine the level and growth rate of regional economic development. It is one of the synthetic measures most frequently used to describe economic development, both for scientific purposes and to operationalise the economic policy. Despite a large scale of aggregation, it enables one to take into account the structure of business activities in the region, the structure of the means of production, price relationships and demographic factors (STRAHL 2009, p. 17). Subsequently, based on the data on GDP per capita in 2006, the provinces were divided into three groups with different levels of economic development.

Within such groups, an analysis was carried out of the urbanisation processes in the regions. To do this, the city density index, urbanisation index and an analysis of the structure of urban centres in relation to their population were used. Confirmation of the positive relationship between the level of economic development of the groups of provinces and the level of their urbanisation will provide grounds for accepting or rejecting the other of the study hypotheses.

The city density index was calculated according to the following formula:

$$\text{City density index} = \frac{\text{Region area, km}^2}{\text{Number of cities in the region}}$$

The index shows the area per city in a province. Considering the stimulation of economic growth in a region, lower values are better, because it means that a larger part of an area is economically affected by cities.

The urbanisation index is calculated as the percentage of urban population in the total population of the area in question. Taking into account the assumptions made in the study, it can be expected that a higher level of economic development is observed in regions with a relatively higher share of the urban population.

The terms “region” and “province” are used interchangeably in this paper. Although, according to the new nomenclature, the term “region” (referred to as NUTS I) denotes a group of provinces, whereas a single province is a single unit of statistical data aggregation (NUTS II), a simplified assumption was made – taking into account the study objective and the practice used in the literature after the 1999 administrative reform – that an economic region is identical with an administrative unit, i.e. a province.

These statistical analyses will be preceded by a brief review of selected publications about the relationship between urbanisation processes and regional economic development.

The time scope of the study in which the process of regional convergence was analysed covers the years 1995–2006. The level of province urbanisation was determined with the use of 2006 data obtained from open statistical databases (including primarily the Regional Data Bank, <http://www.stat.gov.pl/bdr>) and a study by the Central Statistical Office, entitled *Cities in figures*, 2005–2006.

## **Convergence or regional polarisation? – a brief review of selected literature**

As Prof. Gorzelak points out, there have always been two opposite tendencies clashing in the economy: a tendency to concentrate and to disperse economic activities. The former causes disparities of economic development, the other favours convergence (GORZELAK 2009, p. 6).

Assuming stability of the effects of scale, proponents of the classic theories stress that the tendency to disperse economic activity is the dominant one. Differences between the marginal values of capital and labour productivity between regions with lower and higher level of economic development, and, consequently, differences in profits and salaries, cause the capital and labour force of a high degree of mobility to migrate in the opposite directions. This causes extreme capital and labour productivity rates and, consequently, the levels of regional development, to converge (STACKELBERG von., HAHNE 1998, p. 55–56). The processes largely explain the dynamic increases in the BIZ volume in recent decades.

The latest publications in the New Economic Geography in turn emphasise the objective character of polarisation processes. Considerations within the NGE focus on pointing to the sources of benefit of scale, which are responsible for increases in productivity of the means of production, until now included as a residual value in models of economic growth (KRUGMAN 1995, p. 371).

“Agglomeration benefits”, which increase with progressing urbanisation processes, are usually indicated as the basic determinant of the growing benefits of scale. Agglomeration benefits which are present in big cities and metropolises can be described in four dimensions as: benefits of scale in the area of consumption and production, reduction of the cost of consumption and production, reducing transaction costs and diversification of sources of supply and demand (QUIGLEY 1998, p. 131). Moreover, according to Glaeser, large urban centres create exceptionally favourable conditions for developing and diffusion of knowledge and innovation, which also explains the tendency to concentrate high-tech industries in or close to large urban agglomerations (GLAESER 1992, p. 1130). A high density of modern localisation factors (transport availability, large resources of qualified labour, the presence of universities and research institutes, leisure opportunities) causes the most competitive and innovative business entities to locate their investment in those areas, which in turn deepens the developmental gap between more or less-developed regions.

Economic practice confirms these theoretical considerations. For example, the region with the highest level of economic development in Europe is the “pentagon”, i.e. the area situated between London, Paris, Milan, Munich and

Copenhagen. It is the most urbanised region of Europe, occupying only 14% of its area, but “responsible” for nearly 40% of the EU production output. Moreover, its advantage over the other parts of the continent is still growing (*State of...*, 2008).

The data raise the question: can such processes also be observed in Poland? Do the urbanisation processes determine regional economic polarisation – as in the EU – or does the economic development level equalise, owing to, for example, Community funds?

### **Processes of regional convergence in Poland in 1995–2006**

There are two types of convergence distinguished in the literature:  $\beta$  and  $\sigma$ . In the first case, regions with a low level of economic development at the beginning of the study period later develop faster than the other areas. The most frequently used measure of the level and dynamics of economic development is the value and, expressed in percent, annual dynamics of GDP per capita changes (OLEKSZA 2008, s. 272).

In the other type of convergence, income diversity between the economies under study (national, regional) in the absolute dimension decreases. The diversity is basically measured by the variance or standard deviation of GDP *per capita*. Achieving convergence of the first type is necessary but not sufficient to achieve the  $\sigma$  type convergence. This may be because the original level of diversity of regional GDP per capita is so large that the absolute differences between the level of income cannot be reduced even by the highest growth rate in the poorer regions (PRÓCHNIAK 2004, p. 28).

For a start, in order to verify the first study hypothesis, the nature of the relationship between the regional development level in 1995 and their income diversity in 2006 was determined. The natural logarithm of regional GDP per capita was adopted as the measure of development and the difference of natural logarithms of GDP per capita in 2006 and 1995 as the measure of their growth rate. Subsequently, a linear correlation index was calculated for those two values. A negative value of such an index will mean that there was a negative relationship in 1995–2006 between the original level of regional economic development and their later growth rate. In other words, it would mean that there was  $\beta$  type convergence present in Poland. Calculations were made with the use of MS Excel and Statistica 8.0.

The results are:

$$R = 0,37$$
$$p = 0,157$$

This value of correlation coefficient suggests that there was a positive, yet weak, relationship between the regional development in 1995 and its later value. In other words,  $\beta$ -type convergence was not observed in Polish regions in the years 1995-2006. Moreover, this means the absence of the other type of convergence, which provides grounds for positive verification of the first study hypothesis.

In order to verify the other hypothesis, the Polish provinces were divided into three groups with different levels of economic development. The amount of regional GDP per capita for 2006, expressed at current prices, referred to the similar index for the entire country was used as the criterion (in 2006 it amounted to PLN 27,799).

The first group included the provinces in which the regional production output per capita was at least 95% of the national GDP *per capita*. These are the provinces of: Mazovia (159.65%), Lower Silesia (106.98%), Silesia (106.11%), Wielkopolska (105.32%) and Pomerania (98.47%).

The second group comprises 2 provinces with a GDP per capita ranging from 80% to 95% of the national level: The provinces of Łódź (91.81%), West Pomerania (91.1%), Lubuskie (88.97%), Kuyavia and Pomerania (87.42%), Małopolska (86.73%) and Opole (80.39%).

Group 3 comprises the provinces in which the value of regional production output per capita is below 80% of the national average. Those are the other provinces, referred to as "the eastern wall": Świętokrzyskie (76.01%), Warmia and Mazury (75.56%), Podlasie (73.37%), Podkarpacie (68.43%) and Lublin (67.55%).

In order to check whether the growing regional disparity between the levels of economic development in 1995–2006 can be explained by a different urbanisation index in different groups of provinces, an analysis of their urban settlement network development was carried out.

## **Diversity of the urbanisation level in regions of Poland**

One of the measures used to describe the progress of urbanisation processes in an area is an urbanisation index. It is calculated as the percentage ratio of the urban population to the total population in the area. Its values in individual provinces are shown in Table 1.

Considering the diversity of the index values, one may notice a positive relationship between the level of economic development in groups of regions and the level of their urbanisation. The percentage of urban population was the highest in the best developed regions and the decrease in the index is accompanied by the regional production output per capita. It is particularly

Table 1

Urbanisation index in selected groups of provinces in Poland in 2006

| Group   | Portion (%) or urban population in the total population |
|---------|---|
| Group 1 | 68.04   |
| Group 2 | 59.28   |
| Group 3 | 49.07   |
| Poland  | 61.30   |

Source: Cities in figures, 2005–2006, [http://www.stat.gov.pl/gus/45\\_731\\_PLK\\_HTML.htm](http://www.stat.gov.pl/gus/45_731_PLK_HTML.htm).  
Calculations made by the authors.

noteworthy that three provinces with the lowest urbanisation indexes – Podkarpacie (urbanisation index = 40.5%), Świętokrzyskie (45.3%) and Lublin (46.6%) are, at the same time, the regions with the lowest GDP per capita values in the entire country, whereas those with the highest value of the index – Silesia (78.5%) and Lower Silesia (70.9%) are the best-developed regions.

The data should be supplemented with information about the structure of cities, depending on their population. Considering the stimulating effect of cities on regional development, it is the most favourable if a relatively large part of all the urban centres are large cities, with a population of over 200 thousand, because their impact on the region is the greatest and the strongest.

Table 2 shows that the provinces in group I have the best structure of cities. Large cities account for over 5% of all the urban centres. Additionally, as many as 9 out of the 17 Polish cities with a population in excess of 200 thousand lie in the five provinces. But the lower the GDP level, the more the structure favoured the increased share of small cities with a population smaller than 50 thousand. The portion of large and medium-sized cities in the poorest provinces is very small, whereas small cities account for nearly 90% of all the urban

Table 2

Structure (%) of the city size in the groups of provinces (as of 31.12.2006)

| Group   | Small cities<br>(less than 20 thousand) |  | Medium-sized<br>cities (20 to 100<br>thousand) | Big cities |   |
|---------|---|--|--|------------|---|
|         | total                                   | including<br>5 thousand<br>and smaller |  | total      | including<br>200 thousand<br>and bigger |
| Group 1 | 71.61                                   | 29.90                                  | 22.86  | 5.53       | 2.26                                    |
| Group 2 | 79.66                                   | 35.86                                  | 16.55  | 3.79       | 1.72                                    |
| Group 3 | 76.62                                   | 38.81                                  | 20.40  | 2.99       | 1.49                                    |
| Poland  | 75.37                                   | 33.86                                  | 20.25  | 4.39       | 1.91                                    |

Source: Cities in figures, 2005–2006, [http://www.stat.gov.pl/gus/45\\_731\\_PLK\\_HTML.htm](http://www.stat.gov.pl/gus/45_731_PLK_HTML.htm).  
Calculations made by the authors.

centres. There are only three large cities – Kielce, Lublin and Białystok – in the five poorest provinces. It is symptomatic that there is no medium-sized city (with a population of over 50 thousand) in the provinces. It indicates extreme weakness of the urban network in the regions and their dependence on the centres – their capitals.

It is relatively frequent that the city density index is used to describe the development of the urban settlement network. Its value shows how large is the part of an area per one city. The index values in the three province groups are shown in Table 3.

As in the previous case, it should be said that the regions included in the first group: Mazovia, Upper and Lower Silesia, Great Poland and Pomerania, are the most developed in terms of their urban settlement network. An analysis of the city size distribution in the group of provinces yields an image of regions where urbanisation processes clearly and positively affect economic development. The poorest region, where the average city density is twice as low as that in the provinces in group I, are on the opposite extreme. Comparison of two provinces the city tells a lot: the area per city in the province of Silesia is equal to 174 km<sup>2</sup> whereas such an area in the province of Lublin is equal to 612 km<sup>2</sup>. Again, these provinces are at extreme ends of the spectrum of their economic development.

Table 3

City density index in Poland in 2006

| Group   | Provincial area per city, km <sup>2</sup> |
|---------|---|
| Group 1 | 291.40                                    |
| Group 2 | 336.78                                    |
| Group 3 | 492.80                                    |
| Poland  | 362.85                                    |

Source: Cities in figures, 2005–2006, [http://www.stat.gov.pl/gus/45\\_731\\_PLK\\_HTML.htm](http://www.stat.gov.pl/gus/45_731_PLK_HTML.htm).  
Calculations made by the authors.

These studies show that economic development of Polish regions is at least partly affected by the progress of urbanisation processes in provinces. Therefore, this also allows for positive verification of the other of the study hypotheses.

## Summary and conclusions

The analyses in this study corroborate the thesis that despite considerable Community funds which have been allocated with the aim of equalising the level of economic development of different regions, the disparities between

regional economic development levels have grown during the past dozen or so years. The provinces with the highest level of regional GDP also achieved a higher growth rate of production output per capita during the following 11 years.

Among the best developed regions in Poland are the provinces of Mazovia, Silesia, Lower Silesia, Wielkopolska, Pomerania. The regions situated in the centre along the north-south axis and along the western border of Poland (the provinces of Kuyavia-Pomerania, Łódź, Małopolska, Opole, Lubuskie and West Pomerania) are a little less-developed than the national average. The five regions situated in the east of the country (the provinces of Warmia and Mazury, Podlasie, Lublin, Podkarpacie and Świętokrzyskie) are clearly the least economically developed of all the regions in Poland.

No regional convergence, either  $\beta$  or  $\sigma$  type, can be observed during the analysed period, which corroborates the first of the study hypotheses. This also indirectly corroborates the thesis of ineffectiveness of regional policy tools applied in order to equalise the level of regional development.

In order to verify the other study hypothesis, an analysis of the development of the urban settlement network was carried out in groups of provinces isolated with respect to the level of economic development. It found that the level of urbanisation decreases from the south northwards and from the west eastwards. These results suggest the following conclusions.

1. There is a clear relationship between the level of economic development of provinces and the progress of urbanisation processes in those provinces. Regions with the highest values of production output per capita (those were the regions with the highest production output growth rate) were also among the best urbanised. The lower the development of the urban settlement network, the lower the level of economic development.

Obviously, the urban network is not the only factor which affects the economic development of regions, but a model approach requires "isolation" of selected study areas in order to gain a fuller understanding of the relationship between them and to extrapolate future tendencies.

2. These facts corroborate the New Economic Geography. The processes of economic development are diverse in various regions, with the processes of urbanisation being one of its reasons. Cities, their surroundings and agglomeration benefits which they generate, create favourable conditions for conducting economic activities, especially in high-tech industries. Therefore, as a knowledge-based economy develops in Poland, one may expect further diversification of the level of regional economic development, with the provinces with the best-developed urban centre network benefiting from the process. It is in those urban regions that the most innovative and technologically advanced and, consequently, competitive and profitable production industries. On the other

hand, production of standardised, low-processed goods will be transferred to poorer regions where wages are lower.

3. City size structure and their distribution is a stable element of socioeconomic potential of regions, so it is very likely that processes of regional development will be further diversified. At the same time, relative stability of urbanisation processes means that any actions aimed at forced equalisation of economic development level may face significant obstacles. This makes the justifiability and effectiveness of such goals of economic policy debatable.

Translated by JERZY GOZDEK

Accepted for print 26.04.2010

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