

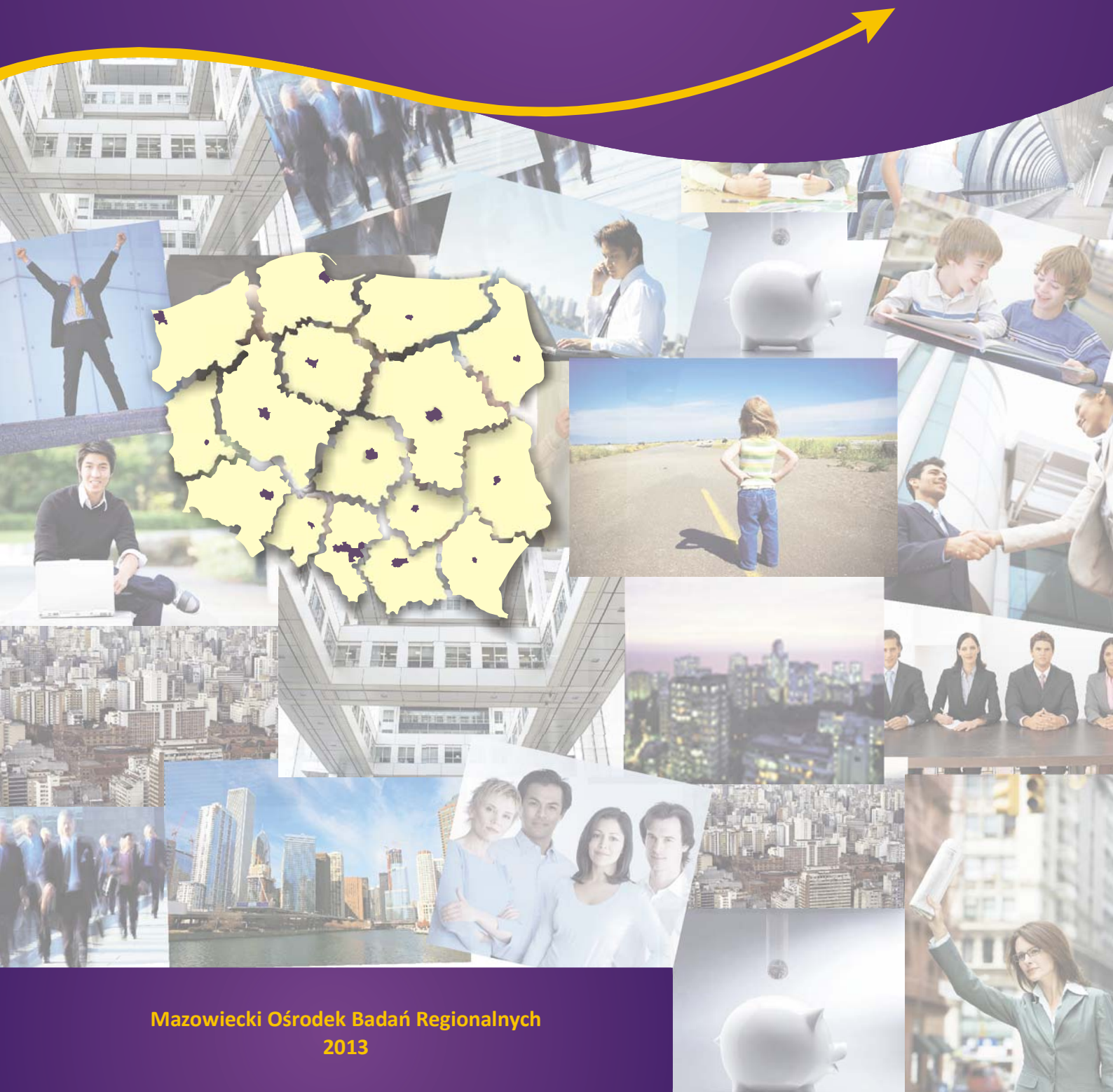


Urząd Statystyczny w Warszawie
ul. 1 Sierpnia 21, 02-134 Warszawa
tel.: 22 464 20 85 faks 22 846 78 32
e-mail: InformatoriumUSWAW@stat.gov.pl
<http://warszawa.stat.gov.pl>



MIĘDZYNARODOWY
ROK STATYSTYKI

IMPACT OF THE DEMOGRAPHIC AND ECONOMIC POTENTIAL OF THE CAPITAL CITIES ON THE CONDITION OF VOIVODSHIPS



Elaborated by:
Anna Antoszczak
Emilia Murawska

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INTRODUCTION

Cities have a significant impact on demographic and economic potential of the regions. They are human, economic, technological and cultural capital hubs. Cities are a specific form of spatial organization, which features intense build up and high population density. Due to their significance, urban areas are in the centre of attention of both spatial policy of the country, defined in the *Conception of Spatial Development of the Country 2030*, and regional policy, defined in the *National Strategy of Regional Development 2010-2020*. Both documents underline the importance of the development of cities as a factor for growth. Bearing in mind the fact that one of the indicators of the level of development of the cities is the number and variety of their functions, the most important role in the development of regions is played by the capital cities of the voivodships. These cities are characterised by a high demographic and economic potential, through which they influence the condition of the regions.

A good example for the above argument may be Mazowieckie voivodship, which is the largest and the best developed region of Poland. In comparison with the other voivodships it has a favourable demographic and economic situation, with indicators above the country average. However, the positive image of Mazovia based on statistical data is very misleading, because the favourable statistics of the voivodship are strongly affected by Warsaw. In a similar way to many metropolitan areas around the capital cities of the European Union member states, Warsaw with its administrative and financial functions, raises statistical indicators for the region. The capital city cumulates the economic, financial and intellectual potential, which puts it ahead of the other regions and contributes to spatial discrepancies in the development of the area of Mazowieckie voivodship.

Differentiation of the level of development in Mazovia results in differences in the quality of life of the inhabitants. Small towns within Warsaw agglomeration, despite their administrative independence, have convenient communication connections thanks to which their inhabitants can profit from Warsaw's labour market, developed social infrastructure and cultural assets while local companies can cooperate with the ones in the capital city. In comparison, the areas situated peripherally with respect to the centre of the region, are not different from the least developed areas in the whole country.

Bearing in mind the above remarks, this report has been elaborated as an attempt to assess the impact of demographic and economic potential of the capital cities of voivodships on the results of the regions. The study is based on indicators of demographic and economic potential of 16 voivodships. Subsequently, in order to show the impact of the capital cities on the level of the potential of the whole region, the data for the cities have been excluded and compared with the data

for the whole voivodships. This way we presented not only the impact of the cities on the condition of the regions, but also the scale of their impact. Special attention was devoted to Mazovia.

The publication is divided into 2 parts. Part I presents the level of demographic potential and its indicators, part II presents the level of economic potential. Both kinds of potential were calculated using the synthetic index method by J. Perkal, which allows to compare particular measures and calculate one synthetic index of the level of potential of the region. The highest value of the index characterises the region with the highest potential, the lowest value – the region with the lowest potential.

The elaboration was based on the data for 2011 available in the Local Data Base on the website of the Central Statistical Office.

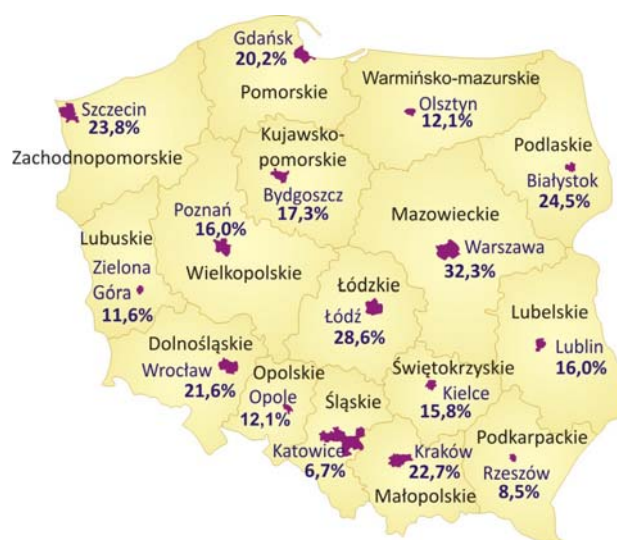


DEMOGRAPHIC POTENTIAL

Demographic potential is a significant factor determining the development of the regions. It is most often defined as the 'driving force' drawn from the population, that is first of all its size and age structure.

When presenting demographic potential it is worth to start with pointing to the position of Mazowieckie voivodship in the country regarding the size of the population. Mazovia is the largest region of Poland. According to the 2011 data, updated with the results of the National Census of Population and Housing 2011, the population of Mazowieckie voivodship was 5285.6 thousand people, which amounted to 13.7% of the population of Poland. Apart from that, Mazovia is one of the most urbanised regions of the country, in which 64.2% of the population lives in urban areas – in comparison, in the whole population of Poland this proportion is 60.7%. It is also worth adding that as much as 32.3% of the inhabitants of Mazovia are registered as living in Warsaw, which is the highest proportion among all voivodship capital cities.

Map 1. Proportion of the population of the capital city in the total number of population in voivodships



Selecting indicators for the assessment of demographic potential, the ones considered in the first place were natural increase rate and net migration. Not only are they good measures of demographic processes, but also they are evidence for strengthening or weakening of demographic potential. Natural increase is expressed as the difference between the number of live births and the number of deaths, whereas net migration is the difference between inflow and outflow of the population. Hence the two selected indicators influence not only the size of the population of a given area, but also the shape of its age structure. The importance of the age structure of the population has to be underlined as it conditions the pace of demographic changes and the future trends in

fertility and mortality. From the socio-economic point of view this indicator influences i.a. the labour market situation, healthcare and social insurance market. In the elaboration the structure of population according to economic groups of age was included. Such a grouping aims to capture the size of the cohorts of population in working age, i.e. legally allowed to work and population below working age, thus the potential future workforce. In assessing demographic potential it is also important to consider the proportion of persons in non-working age (pre- and post-working) per 100 persons in working age, expressed here by the economic dependency ratio¹. A high level of this ratio is evidence of the population ageing and high burden on the working-age group caused by the non-working age groups (e.g. financing old age pensions of the persons in post-working age with the social insurance contributions of the persons in working age).

Eventually, for assessing demographic potential we have used indicators of the structure of population according to economic age groups, as well as natural increase and spatial mobility of the population. The selected variables were used for calculation of the synthetic index following J. Perkal's method. The variables and description of the phases of calculation are presented in Annex 1 in the end of this publication.

On the basis of the value of the synthetic index, voivodships have been ranked and divided into groups with different levels of demographic potential. The ranking has been created by putting voivodships in descending order according to the value of the synthetic index. The classification has been done according to the level of demographic potential, where the **classes I-III** have been defined as follows:

Class I – voivodships with **the highest** level of demographic potential;

Class II – voivodships with **medium** level of demographic potential;

Class III – voivodships with **low** level of demographic potential.

The values of the index, rank and class of each voivodship are presented in tables 1 and 2, while the spatial differentiation of the value of the synthetic indicator is presented in maps 2 and 3.

¹ Economic dependency ratio used in this elaboration is calculated on the basis of the following economic age groups: persons in pre-working age: 0-17 years old, in working age: women 18-59 years old, men 18-64 years old, and in post-working age: women aged 60 years and more, men aged 65 years and more.

Table 1. Ranking of voivodships according to the level of demographic potential

Rank	Specification	Perkal's index	Class
1	Pomorskie	0.889	I
2	Wielkopolskie	0.752	I
3	Mazowieckie	0.497	I
4	Lubuskie	0.495	I
5	Małopolskie	0.490	I
6	Dolnośląskie	0.404	I
7	Zachodniopomorskie	0.382	I
8	Warmińsko-mazurskie	0.261	II
9	Kujawsko-pomorskie	0.090	II
10	Podkarpackie	0.009	II
11	Śląskie	-0.150	II
12	Opolskie	-0.241	II
13	Podlaskie	-0.638	III
14	Świętokrzyskie	-1.055	III
15	Lubelskie	-1.085	III
16	Łódzkie	-1.100	III

Table 2. Ranking of voivodships excluding their capital cities according to demographic potential

Rank	Specification	Perkal's index	Class
1	Pomorskie excluding Gdańsk	1.086	I
2	Wielkopolskie excluding Poznań	0.979	I
3	Małopolskie excluding Cracow	0.471	I
4	Zachodniopomorskie excl. Szczecin	0.445	I
5	Mazowieckie excluding Warsaw	0.445	I
6	Lubuskie excluding Zielona Góra	0.376	I
7	Dolnośląskie excluding Wrocław	0.309	II
8	Kujawsko-pomorskie excl. Bydgoszcz	0.291	II
9	Warmińsko-mazurskie excl. Olsztyn	0.103	II
10	Śląskie excluding Katowice	-0.072	II
11	Podkarpackie excluding Rzeszów	-0.150	II
12	Opolskie excluding Opole	-0.358	III
13	Łódzkie excluding Łódź	-0.626	III
14	Podlaskie excluding Białystok	-1.062	III
15	Świętokrzyskie excluding Kielce	-1.072	III
16	Lubelskie excluding Lublin	-1.166	III

Map 2. Spatial differentiation of the index of demographic potential in voivodships



Map 3. Spatial differentiation of the index of demographic potential in voivodships excluding their capital cities



class zamiast klasa w legendach, opisy w mapie 3 – jak w tablicy 2

Class I, with the highest level of demographic potential consists of 7 voivodships, among which the highest level of the index was recorded in: Pomorskie, Wielkopolskie and Mazowieckie. The high rank of Pomorskie and Wielkopolskie voivodships resulted from the highest natural increase, whereas of Mazovia – from the highest net migration. Due to their medium level of demographic potential 5 voivodships have been classified into class II. Class III consists of 4 voivodships with low demographic potential: Podlaskie, Świętokrzyskie, Lubelskie and Łódzkie. These voivodships have low values of all indicators: negative net migration, natural decrease and relatively high economic dependency ratio.

After excluding data for the voivodship capital cities, 3 voivodships haven't changed their position in the ranking, in 8 cases demographic potential went down and in 5 – it increased.

Table 3. **Change of demographic potential after excluding the capital cities of the voivodships**

		Change of position in ranking:		
		no change	upwards	downwards
Classification before excluding capital cities:	I	Pomorskie, Wielkopolskie	Małopolskie, Zachodniopomorskie	Mazowieckie, Lubuskie, Dolnośląskie,
	II	Opolskie	Kujawsko-pomorskie, Śląskie,	Warmińsko-mazurskie, Podkarpackie,
	III		Łódzkie	Podlaskie, Lubelskie, Świętokrzyskie

a) Voivodships which have not changed their rank after excluding capital cities

Among 3 voivodships which have not changed their ranking there are 2 regions from the class with the highest demographic potential: Pomorskie and Wielkopolskie, as well as Opolskie voivodship, which – although it has not changed its rank – after excluding Opole has recorded relatively lower demographic potential and has been downgraded from class II to III. Such a result is evidence of lack or little impact of the capital cities on the results of these regions.

b) Voivodships of which the rank has increased after excluding capital cities

The rank has increased after excluding the capital cities for 5 voivodships: Kujawsko-pomorskie, Łódzkie, Małopolskie, Śląskie and Zachodniopomorskie. However, the size of the impact of the city on the situation of the voivodship was varied. The biggest increase, by 3 ranks, has occurred in the case of Zachodniopomorskie (from rank 7 to rank 4) and Łódzkie (from 16th to 13th place). A slightly smaller change – by 2 ranks – was registered for Małopolskie (from 5 to 3), whereas other regions from this group increased by 1 rank. Increase in the ranking of the above listed voivodships proves that their demographic potential is not concentrated in the capital cities but also in other centres of the region.

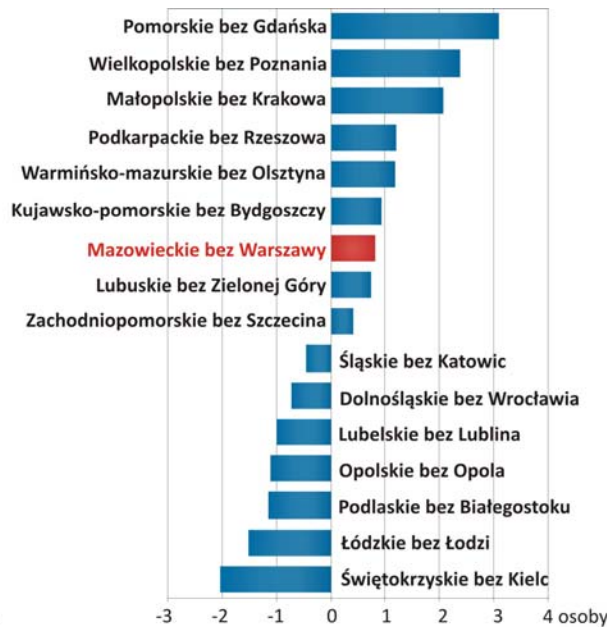
Considering the values of the variables used for calculating demographic potential, the increase in the ranking was mostly affected by the natural increase per 1 thousand population. It has to be noted that the natural increase not only affects the size of the population of a given area, but also shapes its age structure. The highest increase of this indicator was observed in Łódzkie, in which after the exclusion of Łódź natural decrease was reduced from -2.7 to -1.5 persons per 1 thousand population. Also Zachodniopomorskie deserves attention, as it has natural decrease as a whole, while after excluding Szczecin, the region has a natural increase of 0.4 person per 1 thousand inhabitants.

Natural increase rate per 1 thousand inhabitants by voivodships and its change upon excluding voivodship capital cities are presented in Graphs 1 and 2.

Graph 1. Natural increase per 1 thousand population by voivodships



Graph 2. Natural increase per 1 thousand population by voivodships excluding their capital cities



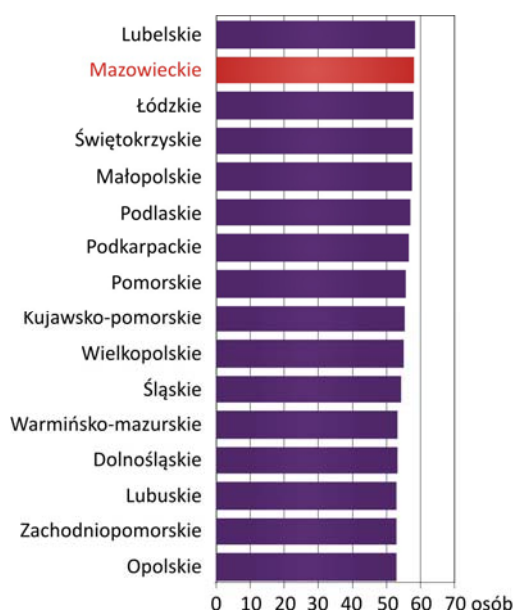
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opisy w wykresie 3 – jak w tablicy 2

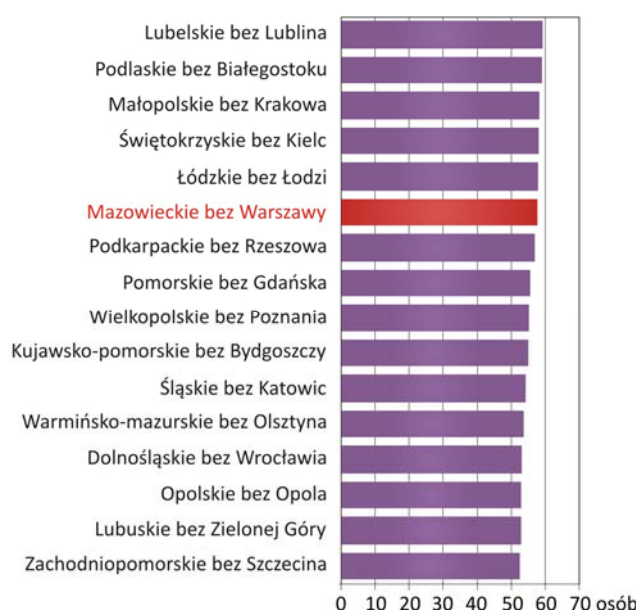
In addition, the regions of which the rank has increased after excluding their capital cities, have recorded a small increase of net migration per 1 thousand inhabitants and a decrease of the economic dependency ratio. One exception is Małopolskie voivodship which, without Cracow, had a higher value of economic dependency ratio – 58.3 against 57.4 persons in non-working age per 100 persons in working age. It is worth pointing out that Zachodniopomorskie voivodship, belonging to this group, after excluding Szczecin had the lowest economic dependency ratio in the country: 52.5 persons in non-working age per 100 persons in working age. It shows the demographic structure of the region is 'younger' when considered without its capital city.

Changes of the economic dependency ratio in voivodships are shown in Graphs 3 and 4.

Graph 3. Economic dependency ratio by voivodships



Graph 4. Economic dependency ratio by voivodships excluding their capital cities



na końcu osi x: persons

opisy w wykresie 3 – jak w tablicy 2

c) Voivodships, whose rank decreased after excluding their capital cities

Decrease of the position in the ranking after exclusion of the capital cities was observed in the case of 8 voivodships: Dolnośląskie, Lubelskie, Lubuskie, Podkarpackie, Podlaskie, Mazowieckie, Świętokrzyskie and Warmińsko-mazurskie. The most significant decrease concerned 2 voivodships: Mazowieckie (from 3rd to 5th) and Lubuskie (from 4th to 6th). The other voivodships decreased by 1 rank. Decrease of these voivodships in the ranking shows that the demographic potential of these regions focuses to a large extent in their capital cities.

It is worth noticing that in the group of voivodships which decreased their rank there are all regions belonging to Eastern Poland². After excluding voivodship capital cities from their statistics, the problem of natural decrease, that is low birth rate, exceeded by death rate, aggravates in these regions. The largest change of this indicator after excluding the capital city has been recorded in Podlasie, where natural decrease dropped from -0.4 to -1.2 person per 1 thousand inhabitants (see graph 2).

Data concerning the age structure of the population of Eastern Poland are equally alarming. After excluding voivodship capital cities, economic dependency ratio in these regions increases. The highest increase was observed in Podlaskie voivodship, where per 100 persons in working age, there were 57.0 in non-working age, whereas after excluding Białystok the value has increased to 59.0. It is worth noticing that one of the voivodships in this group, Lubelskie, registered the highest level of economic dependency

² Eastern Poland includes the following voivodships: Podlaskie, Świętokrzyskie, Lubelskie, Podkarpackie, Warmińsko-mazurskie, according to: *Strategia Rozwoju Społeczno-Gospodarczego Polski Wschodniej do 2020 r.*, MRR.

ratio of all regions. In addition, after excluding Lublin from the statistics the problem deepens – the value increases from 58.3 to 59.2 persons in non-working age per 100 persons in working age (see Graph 4).

Apart from the regions of Eastern Poland, in the group of voivodships which decreased their rank after excluding their capital cities there are also Dolnośląskie, Lubuskie and Mazowieckie voivodships. The rank of two latter ones decreased by 2 places, the decrease resulted first of all from the decrease of net migration.

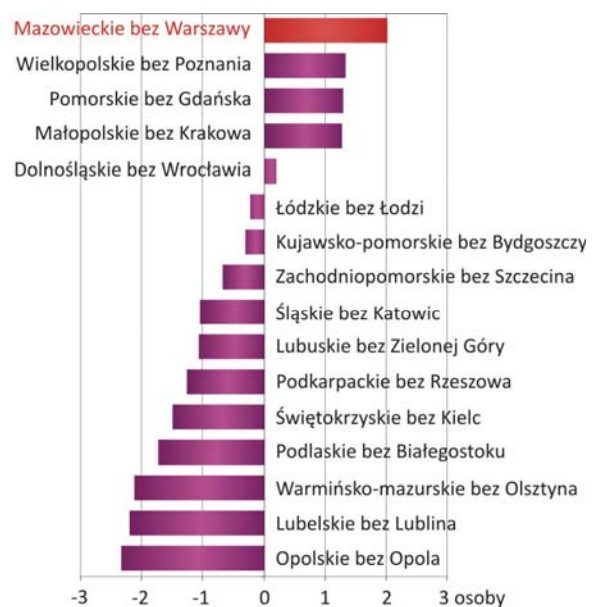
Situation of Mazowieckie voivodship deserves special attention. This region has the highest net migration per 1 thousand inhabitants in Poland. Although after excluding Warsaw the voivodships has the highest drop of this indicator among all voivodships, its value, even without Warsaw, is higher than in any other voivodship – even if they are counted including their capitals. Considering the level of net migration, the highest position of Mazovia is evidence of the region’s attractiveness for settlement. Bearing in mind the fact that the volume and direction of migratory flow is most often determined by economic situation and level of development, high positive net migration in Mazovia can be a result of the migrants’ looking for better living conditions. It can be also assumed that high costs of living in the capital city make migrants move to areas surrounding it, allowing them to still profit from the labour market and infrastructure of the metropolis. As a result, even after excluding the capital city, Mazovia ranks first with respect to net migration.

Graph 5. Net migration per 1 thousand population by voivodships



na końcu osi x: persons

Graph 6. Net migration per 1 thousand population by voivodships excluding their capital cities



opisy w wykresie 3 – jak w tablicy 2

Despite the fact that the decrease of the rank of Mazovia resulted mostly from net migration, it is also worth to look at the age structure of the inhabitants, which distinguishes the region not only from this group of voivodships, but also from the other analysed regions. After excluding data for the

capital city, Mazovia has the highest of all regions decrease of economic dependency ratio – from 58.1 to 57.7 persons in non-working age per 100 working-age persons. As can be seen from these data, Mazovia without its capital has a ‘younger’ demographic structure. After excluding Warsaw there is an increase (by 1.5 percentage points) of the proportion of population in pre-working age³, often called young age ratio. It is worth noticing that this indicator is a potential growth factor as it reflects the future potential workforce entering the labour market.

Analogously, after excluding the statistics for Warsaw, the voivodship registers a decrease in the proportion of persons in post-working age⁴ in the population. This proportion decreases by 1.6 percentage points, which is the largest decrease observed among all voivodships. It has to be added that as much as 38.4% of the voivodship population in this age group are registered as residents in the capital city.

Summing up, it can be stated that voivodship capital cities have influence on the demographic potential of their regions; the scale of this influence among the analysed cities is varied.

After excluding voivodship capital cities, 5 regions registered an increase of their demographic potential. This effect was the largest in Zachodniopomorskie and Łódzkie voivodships. This shows that the demographic potential of these voivodships is not concentrated in the capital cities but is located also in other centres. After excluding voivodship capitals from the regional statistics, natural increase improves, which is a sign of future demographic potential, attractiveness of the region for settlement, measured by net migration increases, and last but not least economic dependency ratio decreases.

A decrease of the demographic potential after excluding voivodship capital cities was registered in 8 regions, 5 of which belong to the so-called Eastern Poland. A decrease in ranking points to the fact that the demographic potential of these regions concentrates in their capitals. After excluding them from the statistics the natural increase decreases and economic dependency ratio increases, which is evidence for ageing of the society and high burden of the persons in non-working age on the working-age population. One exception is Mazowieckie voivodship, which, after eliminating Warsaw, registers a decrease of economic dependency ratio and a „younger” population structure. Decrease of Mazovia’s ranking is first of all the effect of the largest of all voivodships drop in net migration. However, it has to be underlined that with respect to this indicator, even without the capital city the region ranks first in the country.

³ Persons 0-17 years old.

⁴ Women aged 60 years and more, men aged 65 years and more.



ECONOMIC POTENTIAL

Economic potential is one of the most important factors for development of any territorial unit. High level of economic development usually creates conditions allowing to provide higher level of living, understood as the degree of fulfilling the needs of the inhabitants for goods, including material, cultural, educational as well as in the fields of healthcare and security.

In the analysis of the level of economic potential the following indicators have been included: number of entities of national economy per 1 thousand inhabitants, investment outlays of enterprises per 1 inhabitant, number of the unemployed per 1 thousand inhabitants.

On the basis of selected variables, J. Perkal's synthetic index has been calculated to assess the economic potential of entire voivodships and voivodships excluding their capital cities. The value of the index has been used for the construction of ranking and classification according to the level of economic potential. The choice of variables and description of the method can be found in *Annex 1* in the end of the report. The synthetic index has been presented in Tables 4 and 5, and its spatial distribution – in Maps 4 and 5.

Table. 4. Ranking of voivodships according to the level of economic potential

Rank	Specification	Perkal's index	Class
1	Mazowieckie	1.796	I
2	Dolnośląskie	0.912	I
3	Wielkopolskie	0.824	I
4	Śląskie	0.701	I
5	Pomorskie	0.648	I
6	Małopolskie	0.223	II
7	Opolskie	0.116	II
8	Zachodniopomorskie	0.054	II
9	Lubuskie	-0.010	II
10	Łódzkie	-0.090	II
11	Kujawsko-pomorskie	-0.564	III
12	Podlaskie	-0.613	III
13	Świętokrzyskie	-0.773	III
14	Lubelskie	-0.855	III
15	Podkarpackie	-1.085	III
16	Warmińsko-mazurskie	-1.284	III

Table. 5. Ranking of voivodships excluding their capital cities according to the level of economic potential

Rank	Specification	Perkal's index	Class
1	Śląskie excluding Katowice	1.240	I
2	Dolnośląskie excluding Wrocław	1.039	I
3	Wielkopolskie excluding Poznań	0.822	I
4	Pomorskie excluding Gdańsk	0.521	I
5	Lubuskie excluding Zielona Góra	0.518	I
6	Opolskie excluding Opole	0.288	II
7	Mazowieckie excluding Warsaw	0.278	II
8	Zachodniopomorskie excluding Szczecin	0.150	II
9	Łódzkie excluding Łódź	0.116	II
10	Małopolskie excluding Cracow	-0.117	II
11	Kujawsko-pomorskie excl. Bydgoszcz	-0.352	II
12	Podlaskie excluding Białystok	-0.497	III
13	Świętokrzyskie excluding Kielce	-0.702	III
14	Podkarpackie excluding Rzeszów	-0.986	III
15	Lubelskie excluding Lublin	-1.035	III
16	Warmińsko-mazurskie excl. Olsztyn	-1.284	III

Map 4. Spatial distribution of the index of economic potential in voivodships



Map 5. Spatial distribution of the index of economic potential in voivodships excluding their capital cities



Classification of regions according to the value of Perkal's index has shown that the leader in the ranking of economic potential was Mazowieckie voivodship, while the last rank was occupied by Warmińsko-mazurskie voivodship. Regarding classification, class I, with the highest level of economic potential was composed of the following voivodships: Mazowieckie, Dolnośląskie Wielkopolskie, Śląskie and Pomorskie. Voivodships with the highest values of the index are mainly the ones with large urban agglomerations. A slightly less favourable situation has been registered in voivodships belonging to class II with medium level of economic potential, including: Małopolskie, Opolskie, Zachodniopomorskie, Lubuskie and Łódzkie. The weakest, with respect to economic potential, voivodships have been placed in class III, to which belong Kujawsko-pomorskie and 5 voivodships of the so-called Eastern Poland: Podlaskie, Świętokrzyskie, Lubelskie, Podkarpackie and Warmińsko-mazurskie.

After eliminating the data for the voivodship capital cities: 7 voivodships have not changed their rank, 3 voivodships have decreased in ranking and 6 – increased their position.

Table.6. Change of the level of economic potential after excluding the voivodship capital cities

		Change of position in ranking:		
		no change	upwards	downwards
Classification before excluding capital cities:	I	Dolnośląskie, Wielkopolskie	Śląskie, Pomorskie	Mazowieckie
	II	Zachodniopomorskie	Opolskie, Lubuskie, Łódzkie	Małopolskie
	III	Kujawsko-pomorskie, Podlaskie, Świętokrzyskie, Warmińsko-mazurskie	Podkarpackie	Lubelskie

a) Voivodships which have not changed their rank after excluding capital cities

Voivodships which have not changed place in the ranking are: Dolnośląskie, Wielkopolskie, Zachodniopomorskie, Kujawsko-pomorskie, Podlaskie, Świętokrzyskie and Warmińsko-mazurskie. They display little or no influence of their capital cities on the economic potential of the region.

b) Voivodships of which the rank has decreased after excluding capital cities

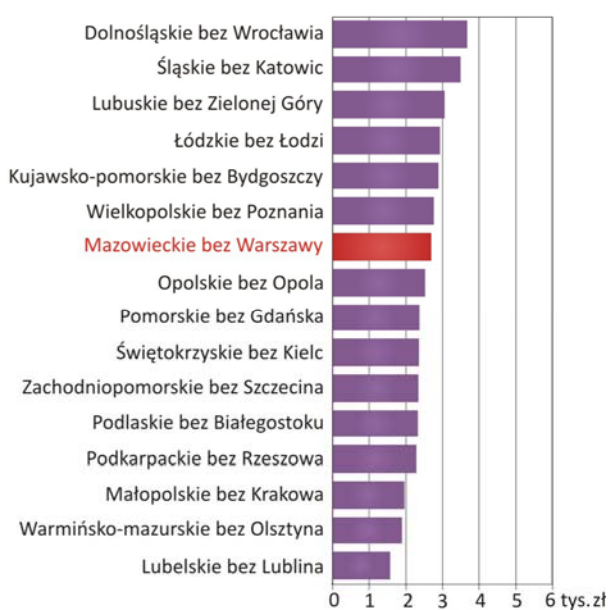
Three voivodships have recorded a drop in the ranking: Mazowieckie (from the 1st place to the 7th), Małopolskie (from 6th to 10th) and Lubelskie (from 14th to 15th rank), which confirms the impact of Warsaw, Cracow and Lublin on the situation of their voivodships. In the case of Warsaw and Cracow this impact is very large, in the case of Lublin it is smaller, as the voivodship has decreased only by one rank.

The largest drop in the ranking as well as change from class I – with the highest economic potential, to class II – with medium potential, has been observed in the case of Mazovia. This change was to a large extent influenced by the size of investment outlays of enterprises. Mazowieckie voivodship is the leader in the investment market, the value of investment outlays per 1 inhabitant is the highest among all voivodships. In 2011 investment outlays of enterprises in Mazovia added up to 29687.6 million zł which equalled 22.7% of investment outlays in the whole country. It also has to be underlined that 67.7% of investment outlays in the voivodship were spent in Warsaw. Hence, excluding the capital city results in halving the outlays per 1 inhabitant (from 5629 to 2686zł).

Graph 7. Investment outlays per 1 inhabitant by voivodships



Graph 8. Investment outlays per 1 inhabitant by voivodships after excluding the capital cities

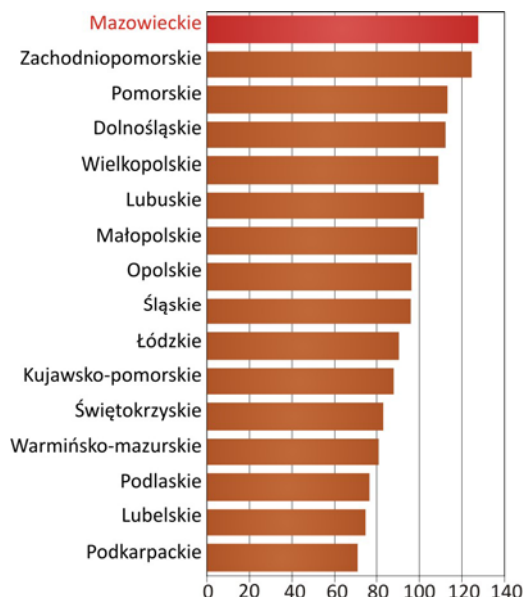


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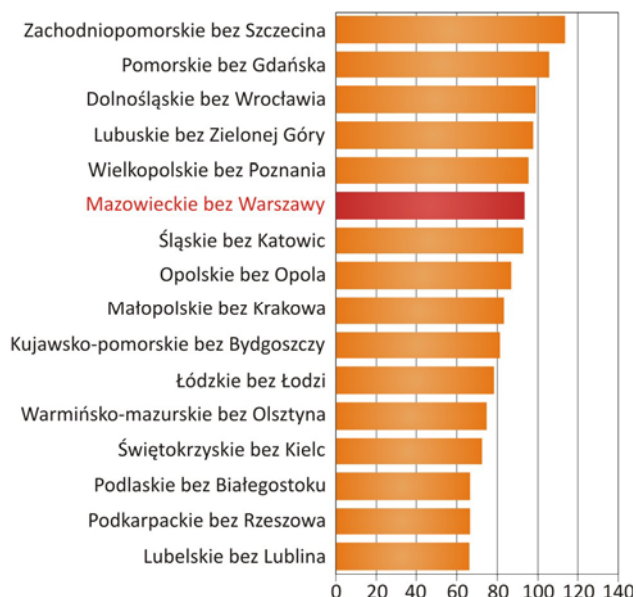
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Mazowieckie voivodship also has the largest of all voivodships number of entities of national economy registered in REGON and half of them have their registered office in Warsaw. Changes in the number of economic entities per 1 inhabitant are presented in Graphs 9 and 10.

Graph 9. Entities of national economy per 1 inhabitant by voivodships



Graph 10. Entities of national economy per 1 inhabitant by voivodships after excluding capital cities

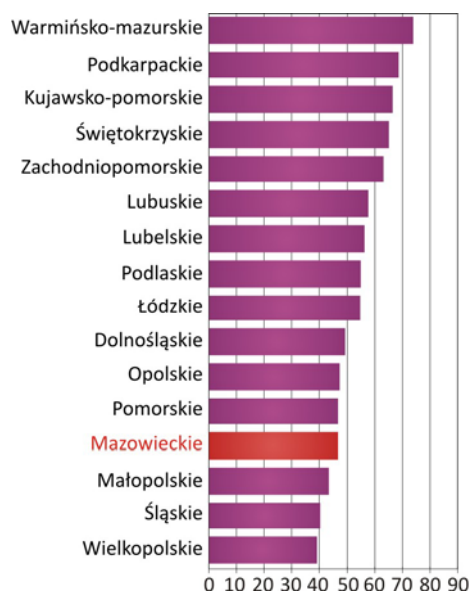


opisy w wykresie 10 – jak w tablicy 2

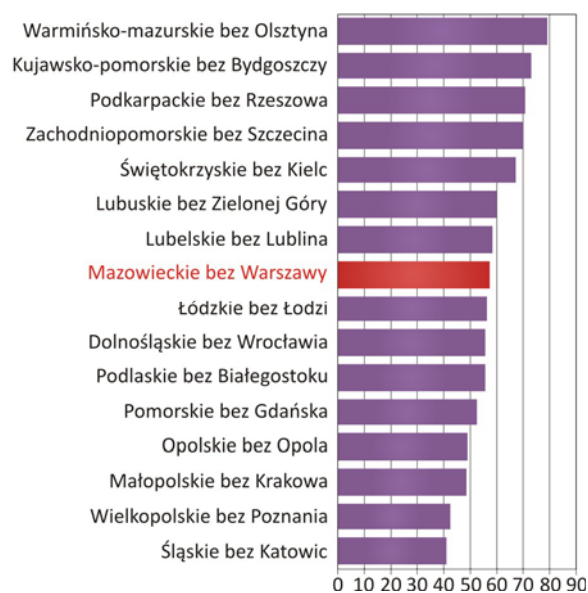
In the case of the other two voivodships whose position in the ranking has declined after excluding the data for their capital cities, the tendencies observed are the same as in the case of Mazovia, i.e. decline of the number of economic entities and of investment outlays per 1 inhabitant. In the case of Małopolskie voivodship the value of the synthetic index has been affected the most by the number of unemployed persons per 1 thousand inhabitants; Małopolska features one of the lowest number of the unemployed per 1 thousand inhabitants among all voivodships.

After excluding the voivodship capital cities, all voivodships have observed an increase of the number of the unemployed per 1 thousand inhabitants, which proves that a large proportion of workplaces are generated by economic entities located in the cities. The highest increase of the indicator has been observed in Mazowieckie voivodship, where after excluding Warsaw the number of the unemployed increased from 47 to 57 persons per 1 thousand inhabitants.

Graph 11. The number of the unemployed per 1 thousand inhabitants by voivodships



Graph 12. The number of the unemployed per 1 thousand inhabitants by voivodships after excluding the capital cities



opisy w wykresie 10 – jak w tablicy 2

b) Voivodships of which the rank has increased after excluding capital cities

Increase of the position in the ranking after excluding the voivodship capital cities has been registered in six voivodships: Śląskie, Pomorskie, Opolskie, Lubuskie, Łódzkie and Podkarpackie. The most significant increase occurred in Lubuskie voivodship (from the 9th rank to the 5th) and Śląskie (from the 4th rank to the very top), which can be evidence for a high influence of Katowice and Zielona Góra on the voivodship statistics. The remaining voivodships have increased their rank by one place. Improving of the ranking of Śląskie voivodship proves that the economic potential of the region is concentrated not only in Katowice but also in other cities of the region. In Śląskie voivodship the number of cities and towns over 20 thousand inhabitants as well as the proportion of urban population – 78.0% – are the highest of all regions. Hence excluding the data for Katowice has not weakened the economic potential of the voivodship.

The increase of the ranking of Lubuskie voivodship resulted from the size of investment outlays per 1 inhabitant. This is the only voivodship which has registered a slight increase of investment outlays after excluding data for the capital city. Increasing its position in the ranking resulted also in the change of class: from class II (medium level of potential) to class I (the highest level of economic potential).

In search for confirmation of the results of the above elaboration of data, the value of GDP per capita has been analysed. This indicator is a measure reflecting well the economic potential of an area, as it shows the value of all goods and services produced in a given area over a year. Hence it is

treated as the primary indicator of material welfare and of the level and pace of economic development.

Due to the lack of data for all voivodship capital cities (GDP is aggregated on the level of subregions according to NUTS classification) the section below present statistics only for the voivodships of which the capital cities have the status of subregions.

The top five, both in the ranking of the value of the synthetic indicator and according to the level of GDP per capita, are the following voivodships: Mazowieckie, Dolnośląskie, Wielkopolskie, Śląskie and Pomorskie. They are regions with large urban agglomerations with high level of development. Moreover, they boast diversified structure of economy, good communication accessibility, large pool and high quality of human capital and high attractiveness for investment.

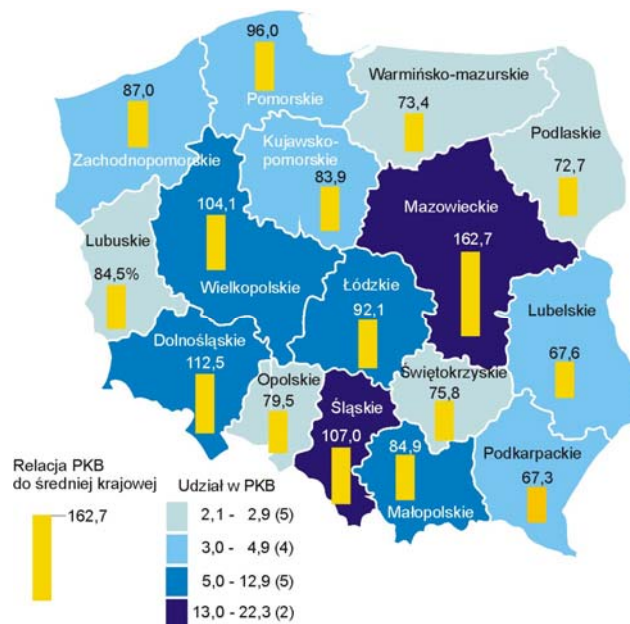
According to the latest available values of GDP for 16 voivodships of Poland for 2010, the highest level of this measure per 1 inhabitant has been registered in Mazovia – 60359 zł, equating 162.7% of the country average. The level of GDP per capita in Dolnośląskie voivodship has given it second rank. However, its level in comparison to the country average was much lower than for Mazowieckie voivodship – GDP per capita was 41750 zł, i.e. 112.5% of country average. GDP per capita above country average has been registered also in the following voivodships: Śląskie – 107.0% of the country average and Wielkopolskie – 104.1% of country average. These are the voivodships which ranked high also according to the synthetic indicator of economic potential.

It is worth underlining that the impact of Warsaw on the statistics of Mazovia is confirmed by the high share of Warsaw in generating GDP of the voivodship. In 2010 Warsaw generated 60.7% of the GDP of Mazowieckie voivodship. High share in generating GDP is a common feature of metropolitan cities, which feature high share of market services and technically advanced industries, with high work efficiency.

Voivodships which have registered the lowest position in the ranking according to economic potential have also low GDP per capita. They are voivodships of the so-called Eastern Poland: Podkarpackie, Lubelskie, Podlaskie, Warmińsko-Mazurskie and Świętokrzyskie. Value of GDP per capita in these voivodships is between 67.3% and 75.0% of country average.

Differences in the level of economic development of voivodships are presented in Map 6.

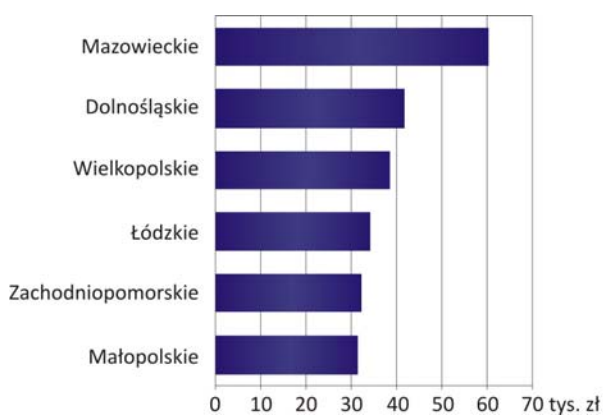
Map 6. Differences in the level of economic development of voivodships in 2010 (GDP of Poland per capita = 100)



GDP per capita in comparison to country average Share in GDP of Poland . zamiast ,
 moje propozycje dla uściślenia

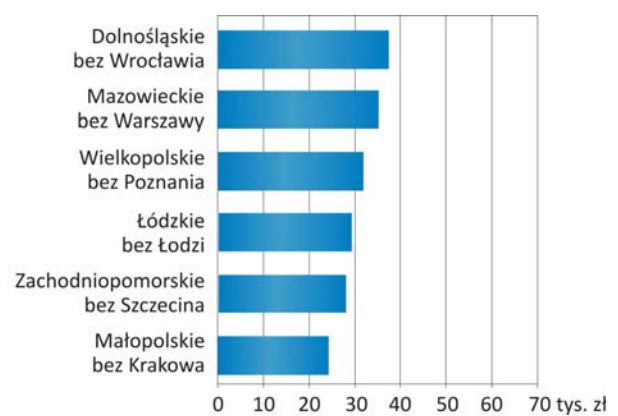
After excluding the cities with subregion status the biggest change is observed in Mazowieckie voivodship. Mazovia without Warsaw registers the largest drop of GDP per capita, which confirms large impact of the capital city on the statistical indicators for the voivodship. In the case of other regions economic potential concentrates also in other subregions of the voivodship, hence these cities do not affect the regions' results to such a large extent.

Graph 13. Value of GDP per capita in 2010 in selected voivodships



thousand zł

Graph 14. Value of GDP per capita in 2010 in selected voivodships after excluding voivodship capitals



opisy jak w tab 2 thousand zł

Considering both the level of economic potential measured by Perkal’s synthetic index and the level of GDP it can be stated that economic potential of voivodships to a large extent concentrates in voivodship capitals.

In all regions after excluding indicators for the cities, a decline of the number of entities of national economy, investment outlays, GDP per capita and an increase of the number of the unemployed are observed. The highest impact of the voivodship capital on the situation of the region is visible in Mazovia. Excluding the data for Warsaw results in reduction of economic potential for the whole region.



CONCLUSIONS

The conducted analysis confirms that voivodship capital cities have large influence on the level of demographic and economic potential of the regions. However the strength of their impact on regions is varied.

Regions with potential not concentrated solely in the capital cities, but also in other centres, after excluding statistics for cities have registered an increase in the level of demographic and economic capital, thanks to which their position in the ranking of voivodships has increased. With respect to demographic potential the largest increase has been registered in Zachodniopomorskie and Łódzkie voivodships, whereas regarding economic potential – in Lubuskie voivodship. As follows from the analysis, after excluding Szczecin and Łódź Zachodniopomorskie and Łódzkie voivodships have got a 'younger' demographic structure of the population and in consequence – lower economic dependency ratio. Moreover, after excluding the cities these voivodships have more favourable natural increase indicators. In Łódzkie voivodship the level of natural decrease of the population has been reduced, while in Zachodniopomorskie voivodship without Szczecin has recorded natural increase, compared to natural decrease registered in the region as a whole. A similar situation can be observed regarding economic potential of Lubuskie voivodship. Increase of the rank of the voivodship after excluding its capital city shows that economic potential is not limited to Zielona Góra, but present also in other regional centres. It has to be underlined that this voivodship as the only one among 16 voivodships has recorded a slight increase of the investment outlays per 1 inhabitant after excluding data for the capital.

On the other hand, there are regions with potential concentrated mostly in their capital cities. After excluding statistics for the capitals, these voivodships record a decrease of the level of demographic and economic potential, which results in the lowering of their position in the ranking. With respect to demographic potential the largest decrease has been observed for two voivodships: Mazowieckie and Lubuskie; regarding economic potential – for Mazowieckie voivodship. As follows from the analysis in Mazowieckie and Lubuskie voivodships, after excluding statistics for Warsaw and Zielona Góra, respectively, attractiveness for settlement measured by net migration decreases. It is worth underlining that in the case of Mazovia even after excluding the statistics of the capital city the level of this indicator remains the highest in the country. Also the economic potential of Mazowieckie voivodship concentrates mostly in Warsaw. After excluding the statistics of the capital city, this voivodship registers a decrease in entrepreneurship measured with the number of entities of national economy per 1 inhabitant, a decrease of the investment outlays per 1 inhabitant and the increase of unemployment rate. Therefore we can assert that Warsaw overstates economic indicators more than the demographic ones.

The role of Warsaw in the process of development and modernisation of the economy of the voivodship is underlined in the *Strategy for Development of Mazowieckie voivodship up to 2020*. As it has been rightly noted, the ways of exploiting the potential of the capital city will determine further development of the remaining part of the region. Authors of the above document assume both an optimistic scenario, in which Warsaw remains the main driver of growth of the voivodship, and a negative one, in which the development of the metropolitan area of Warsaw is uncontrolled and incoherent and at the same time the polarisation of the voivodship territory increases.

Therefore the future development of Mazovia and implementation of the cohesion policy in the region will depend to a large extent on the ways of employing Warsaw's potential.



CHOICE OF VARIABLES AND DESCRIPTION OF RESEARCH METHOD

The first step of the conducted analysis has been the identification of the variables describing the object of the research.

Initially selected diagnostic variables for evaluating demographic potential:

- x_1 — economic dependency ratio,
- x_2 — natural increase per 1 thousand population,
- x_3 — net migration per 1 thousand population (persons),
- x_4 — proportion of population of mobile working age in the total number of the population (%),
- x_5 — proportion of population in pre-working age in the total number of the population (in %),
- x_6 — population density (persons/km²).

Initially selected diagnostic variables for evaluating economic potential:

- x_1 — number of employed persons per 1 thousand population,
- x_2 — number of entities of the national economy⁵ per 1 thousand population,
- x_3 — newly registered entities of the national economy per 1 thousand population,
- x_4 — natural persons conducting economic activity per 1 thousand population,
- x_5 — number of registered unemployed persons per 1 thousand population,
- x_6 — proportion of long-term unemployed persons (as % of the total number of the unemployed),
- x_7 — proportion of persons working in private sector (in %),
- x_8 — investment outlays in enterprises per 1 inhabitant,
- x_9 — sold production of industry per 1 inhabitant.

In the preliminary analysis the variables have been examined with regard to the level of their correlation, in order to eliminate the ones containing repetitive information. The correlation coefficient of $r = |0.75|$ has been adopted as cut off value.

Ultimately, the following variables have been selected for the evaluation of the potential of the whole voivodships and voivodships without their capital cities:

– for the evaluation of demographic potential:

- x_1 — economic dependency ratio,
- x_2 — natural increase per 1 thousand population,
- x_3 — net migration per 1 thousand population,

– for the evaluation of economic potential:

- x_2 — number of entities of the national economy⁵ per 1 thousand inhabitants,
- x_5 — number of registered unemployed persons per 1 thousand inhabitants,
- x_8 — investment outlays in enterprises per 1 inhabitant.

The next step of the procedure has been normalization, allowing to transform values of variables expressed in different units to a comparable form. Normalization has been conducted according to the formula:

for stimulants:

$$z_{ij} = \frac{(x_{ij} - \bar{x}_j)}{s_j}, (j = 1, 2, \dots, n)$$

⁵ Excluding persons running private farms in agriculture.

for de-stimulants:

$$z_{ij} = -\frac{(x_{ij} - \bar{x}_j)}{S_j}, (j = 1, 2, \dots, n)$$

where:

z_{ij} – normalised value of x_{ij} ,

$S(x_j)$ – standard deviation for variable j .

Economic dependency with respect to the demographic potential, and the number of registered unemployed persons per 1 thousand inhabitants in the case of economic potential have been identified as de-stimulants. The remaining variables have been treated as stimulants.

As the last step of the procedure, *Perkal's synthetic index*⁶ has been calculated for each object. Perkal's index as a method of linear ordering allows to place multidimensional objects in order according to a synthetic criterion, which is a function of the input variables. This method has been used with the aim of creating a ranking of objects according to a given set of characteristics. The higher value of the synthetic index the more favourable situation of the object (voivodship) with respect to the level of the evaluated potential. The synthetic index has been calculated according to the formula:

$$w_s = \frac{1}{p} \sum_{j=1}^p z_{ij}$$

where:

$j = 1, 2, \dots, p$

p – number of analysed characteristics,

w_s – synthetic index.

Classification of the objects (voivodships) according to the level of potential has been conducted using two parameters of the taxonomic measure, i.e. arithmetic mean and standard deviation. On this basis the following three classes have been distinguished:

– **class I** – with **the highest** level of potential; to this group belong the objects for which the value of the synthetic index exceeds the sum of the arithmetic mean and half of the standard deviation:

$$w_s > \bar{w}_s + \frac{1}{2} S_{w_s};$$

– **class II** – with **medium** level of potential; this group consists of objects with the value of the synthetic measure within the range: $\bar{w}_s + \frac{1}{2} S_{w_s} \leq w_s < \bar{w}_s - \frac{1}{2} S_{w_s}$;

– **class III** – with a **low** level of potential; to this group belong the districts, whose value of the synthetic measure is not more than the difference between the mean and half of the standard deviation: $w_s \geq \bar{w}_s - \frac{1}{2} S_{w_s}$.

where:

w_s – value of Perkal's synthetic index,

\bar{w}_s – arithmetic mean of the synthetic index w_s ,

S_{w_s} – standard deviation of the synthetic index w_s .

⁶See J. Parysek, L. Wojtasiewicz, *Metody analizy regionalnej i metody planowania regionalnego*, Studia KPZK PAN, T. 69, p. 26.