

**REGIONAL VARIATION OF POTENTIAL  
AND ACTUAL LABOR RESOURCES IN POLAND  
IN THE LIGHT OF FORECASTS THROUGH 2040**

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**Key words:** potential labor resources, actual labor resources, population ageing process, territorial diversity, Poland, voivodships, poviats.

**A b s t r a c t**

The article aims to analyze the territorial diversity of the subpopulation that corresponds to the potential labor resources in Poland, both as it appeared between 2000–2014 and in the light of forecasts produced by the Central Statistical Office. The analysis comprises the working age subpopulation in Poland, including the current change of the pension age threshold. In addition, the age structure of this subpopulation has been analyzed according to territorial and temporal aspects.

**REGIONALNE ZRÓŻNICOWANIE POTENCJALNYCH I REALNYCH ZASOBÓW PRACY  
W POLSCE W ŚWIETLE PROGNOZ DO ROKU 2040**

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**Słowa kluczowe:** potencjalne zasoby pracy, realne zasoby pracy, starzenie się populacji, zróżnicowanie regionalne, Polska, województwa, powiaty.

**A b s t r a k t**

Celem artykułu jest analiza terytorialnego zróżnicowania subpopulacji tworzącej potencjalne zasoby pracy w Polsce w latach 2000–2014, a także w świetle prognoz Głównego Urzędu Statystycznego. Przeanalizowano subpopulację będącą w wieku produkcyjnym, z uwzględnieniem zmian w wieku emerytalnym, polegających na stopniowym wydłużaniu czasu aktywności zawodowej ludności. Dodatkowo badano strukturę wieku tej subpopulacji, zarówno w przekroju terytorialnym, jak i czasowym. Źródłem informacji stanowiących podstawę badania były publikacje Głównego Urzędu Statystycznego.

## Introduction

The literature defines potential labor resources (potential labor force) as composed of a working age subpopulation. However, the working age is not identical everywhere: Europe and many countries (including Poland) are now reforming the state pension scheme, changing the retirement age thresholds, which is why labor resources are often considered in the context of biological age groups. Hence, potential labor resources are most frequently defined as people aged 15 to 64 years, while the individuals in these age brackets who are active in the labor market constitute actual labor resources.

The objective of this article has been to analyze the territorial diversity of the subpopulation that corresponds to the potential labor resources in Poland, both as it appears today and in the light of forecasts produced by the Central Statistical Office. The analysis comprises the working age subpopulation (divided according to economic age groups) in Poland, including the current change of the pension age threshold, which will be gradually raised<sup>1</sup>. In addition, the age structure of this subpopulation has been analyzed according to territorial and temporal aspects.

The data for the analyses originated from publications by the Central Statistical Office (GUS) in Poland regarding the age structure of the Polish population observed in 2000–2014 and estimated until 2040 (forecast).

### Demographic characteristics of potential labor resources

The structure of the Polish population has been changing over the past few decades, and the most distinct change is the lowered percentage of the pre-working age subpopulation while the post-working age subpopulation has grown in number. These tendencies will persist over the following decades (cf. Fig. 1). The progressive changes in the shares of these two subpopulations generate both economic and social outcomes. A declining size of potential labor resources, observable in Poland since the early 2010s, is an example of the economic consequences.

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<sup>1</sup> Until the year 2012, the working age subpopulation in Poland referred to the fraction of the population aged 18 to 59 (women) and 18–64 (men). Following the reform of the state pension scheme (Ustawa z 11 maja 2012 o zmianie...) the upper threshold of the working age (and therefore the lower threshold of the retirement age) has been gradually increased since 2013 and will continue to grow until it reaches 67 years of age. The changes in the subsequent years (*Prognoza ludności na lata 2014–2050...* 2014, p. 147): 2012 – men 65, women 60, 2013 – men 65.25, women 60.25, 2014 – men 65.5, women 60.5, 2015 – men 65.75, women 60.75, 2020 – men 67, women 62, 2025 – men 67, women 63.25, 2030 – men 67, women 64.5, 2035 – men 67, women 65.75, 2040 – men 67, women 67.

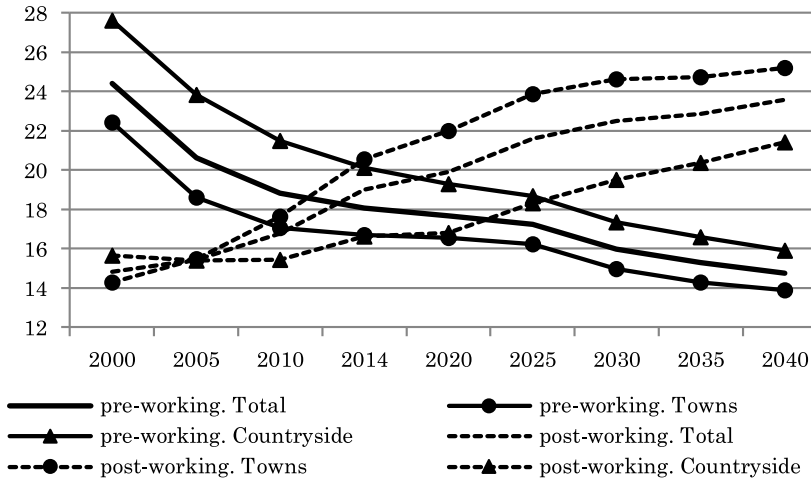


Fig. 1. Shares of pre- and post-working subpopulation in Poland in 2000–2040 [%]  
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

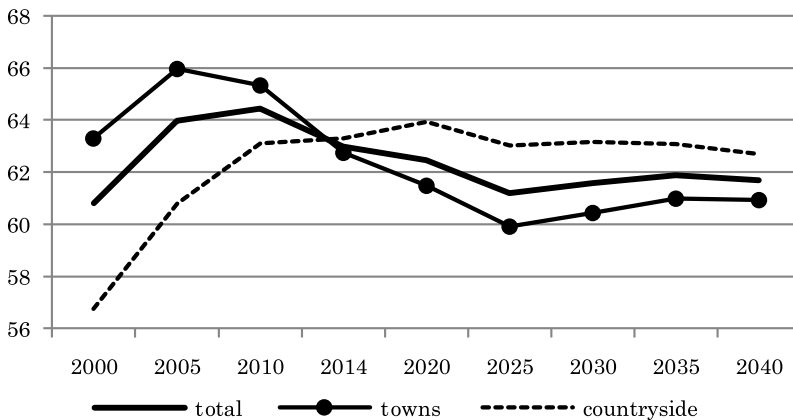


Fig. 2. Share of the working age subpopulation\* in Poland in 2000–2040 [%]

\* Including the gradual increase of the retirement age threshold.  
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

The percentage of the post-working age urban residents tended to increase from the onset of the 20<sup>th</sup> century until 2007, after which it began to decline and, according to the GUS projections, it will continue to decrease until 2025. In the countryside, the percentage of the retirement age subpopulation is predicted to increase consistently from 2000 to 2020 (cf. Fig. 2).

In 2000–2014, the working age population increased by 3.6% in the whole of Poland, while decreasing by 0.9% in towns and rising by 11.5% in villages (cf. Fig. 3). In the next few years, this fraction is expected to decrease and its largest decline is predicted to occur in 2025, when the oldest representatives of the subpopulation (i.e. people born in the late 1950s) will have entered the pension age brackets (cf. Fig. 4). As compared to 2014, in 2025 the share of potential labor resources will have decreased by 2.8% countrywide (by 4.5% in towns and 0.5% in villages); in 2040, the decrease will reach 2% (2.9% in towns and 1% in the countryside).

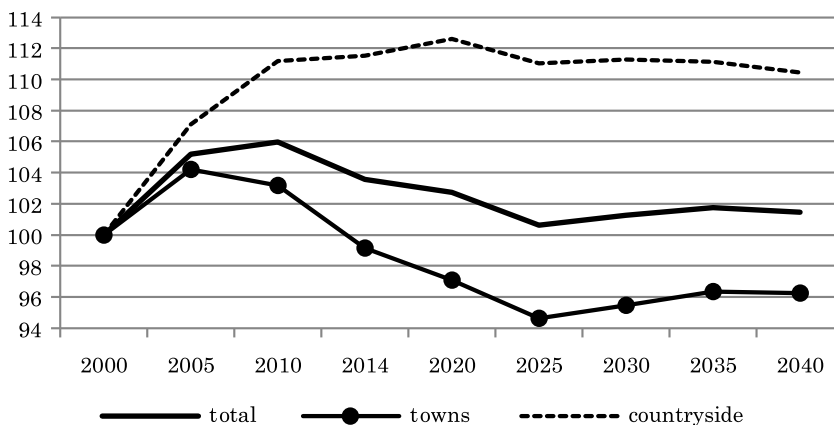


Fig. 3. Dynamics of the changing share of the working age subpopulation in Poland in 2000–2040 (2000=100)

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

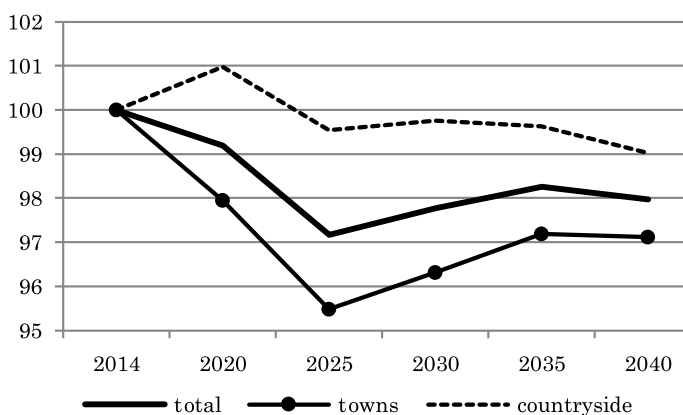


Fig. 4. Dynamics of the changing share of the working age subpopulation in Poland in 2014–2040 (2014=100)

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

In Poland, the working age population demonstrates territorial diversity, which manifests itself in the differences both between the provinces, i.e. Polish voivodships (cf. Tab. 1) and between smaller administrative units, called poviats (cf. figs 5–8). In 2014, the lowest fraction of potential labor resources could be found in central Poland (mostly the voivodships of łódzkie and mazowieckie) while the highest ones appeared in areas lying in the west and north of Poland (especially the voivodships of opolskie and warmińsko-mazurskie). In 2020, the smallest share of this fraction will most likely be recorded in the łódzkie voivodship while the highest one is predicted in the opolskie voivodship. In the following years, the smallest percentage of the working age subpopulation will be found on the peripheries of the Polish provinces (mainly in central and eastern Poland), and the population representing the potential labor resources will concentrate mostly around large cities.

More detailed considerations of the differentiation within the above subpopulation across the NTS4 units in 2014–2020 (cf. Figs 5–8) demonstrate that the lowest percentage of the potentially available working age population appeared in the town of Sopot and in the poviats hajnowski and bielski (59.8–60.1%), followed by the puławski powiat, as well as the towns of Kalisz, Łódź and Warszawa (60.5–60.8%); the highest percentages occurred in the poviats łączyński, opolski, koszaliński, bełchatowski and policki (66.0–66.4%). In 2020, a relatively low share of potential labor resources (up to 60.9%) will most likely appear in cities and large towns (the lowest ones in Sopot, Jelenia Góra, Łódź and Warszawa, where the said percentage should range from 58.7 to 59.6%), as well as in the poviats hajnowski, pruszkowski and żyrardowski; whereas the highest percentage will be found in the poviats krapkowicki, dąbrowski, kolbuszowski, nizański and opolski (65.5–66.5%). In 2030, the smallest potential labor resources will most likely be recorded in the hajnowski powiat (56.8%), and in the following towns: Jelenia Góra, Sopot, Wałbrzych and Słupsk (57–58%). The highest shares will be seen in the poviats kolbuszowski, gdański, bydgoski and wrocławski (65.1–65.9%). Finally, in 2040 the least favorable situation in terms of potential labor resources will be found in the hajnowski powiat (where the percentage of the working age population is expected to equal 55.7%) and in such towns as Tranobrzeg, Włocławek, Jelenia Góra, Przemyśl and Chełm (57.3–58%). Meanwhile, the poviats poznański, policki, gdański and wrocławski will enjoy the best position (64.6–66.2%).

The changes, observed and presented in this article, regarding the shares of potential labor resources in the total population, are mainly a consequence of changes in the age structure (i.e. the progressive aging of the general population), although a significant role is also played by migrations (the majority of migrants are working age persons, inclined to search for professional opportunities). A large outflow of people is mostly noticed in the peripheries of voivodships, especially in the east of Poland. Since the mid-1990s, a depopu-

Table 1  
 Percentage of the working age subpopulation in Poland and in the Polish voivodships in 2000–2040 (in %)

Voivodship	Total										Towns										Countryside									
	2000		2014		2020		2030		2040		2000		2014		2020		2030		2040		2000		2014		2020		2030		2040	
Poland	60.8	63.0	62.5	61.6	61.7	63.3	62.8	61.5	60.4	60.9	63.3	62.8	61.5	60.4	60.9	63.3	63.3	63.9	63.1	62.7	56.8	63.3	63.9	63.1	62.7	63.9	63.1	62.7	63.9	
Dolnośląskie	62.2	63.5	62.3	61.4	62.1	63.6	62.8	61.2	60.1	61.1	63.6	62.8	61.2	60.1	61.1	63.6	65.0	64.8	64.0	63.9	58.6	65.0	64.8	64.0	63.9	64.8	64.0	63.9	63.9	
Kujawsko-pomorskie	61.0	63.3	62.8	61.7	61.5	63.0	62.9	61.8	60.4	60.5	63.0	62.9	61.8	60.4	60.5	63.8	64.2	63.3	62.8	62.8	57.6	63.8	64.2	63.3	62.8	64.2	63.3	62.8	62.8	
Lubelskie	58.4	62.4	62.5	61.4	61.1	63.1	63.1	61.8	60.0	59.8	63.1	63.1	61.8	60.0	59.8	61.9	63.0	62.6	62.1	62.1	54.3	61.9	63.0	62.6	62.1	63.0	62.6	62.1	62.1	
Lubuskie	61.5	63.8	62.7	61.6	62.0	63.2	63.1	61.6	60.4	61.1	63.2	63.1	61.6	60.4	61.1	64.9	63.5	63.2	63.2	63.2	58.4	64.9	64.6	63.5	63.2	64.6	63.5	63.2	63.2	
Łódzkie	61.0	61.9	61.3	60.7	61.0	63.5	61.9	60.4	59.5	60.2	63.5	61.9	60.4	59.5	60.2	62.1	62.8	62.4	62.2	62.2	56.4	62.1	62.8	62.4	62.2	62.8	62.4	62.2	62.2	
Małopolskie	59.7	62.8	63.0	62.3	62.2	63.0	62.6	61.8	61.1	61.7	63.0	62.6	61.8	61.1	61.7	64.1	63.3	63.3	62.7	62.7	56.4	63.0	64.1	63.3	62.7	64.1	63.3	62.7	62.7	
Mazowieckie	60.7	62.0	61.4	61.6	62.3	63.4	61.7	60.4	61.0	62.2	63.4	61.7	60.4	61.0	62.2	62.4	63.1	62.6	62.4	62.4	55.9	62.4	63.1	62.6	62.4	63.1	62.6	62.4	62.4	
Opolskie	61.5	64.3	64.2	62.1	61.1	63.6	63.4	62.4	60.4	59.8	63.6	63.4	62.4	60.4	59.8	65.2	66.0	63.9	62.4	62.4	59.1	65.2	66.0	63.9	62.4	63.9	62.4	62.4	62.4	
Podkarpackie	58.2	63.5	63.9	62.6	61.8	61.8	63.9	62.6	60.4	60.4	61.8	63.9	62.6	60.4	60.4	55.7	64.7	64.0	62.8	62.8	55.7	63.2	64.7	64.0	62.8	64.7	64.0	62.8	62.8	
Podlaskie	58.0	63.4	63.6	61.6	60.6	61.6	64.8	63.9	61.0	60.3	61.6	64.8	63.9	61.0	60.3	52.9	63.0	62.5	61.1	61.1	52.9	61.2	63.0	62.5	61.1	63.0	62.5	61.1	61.1	
Pomorskie	61.4	62.8	62.2	61.5	61.9	63.2	62.2	61.1	60.4	61.0	63.2	62.2	61.1	60.4	61.0	57.5	63.9	64.1	63.2	63.2	57.5	63.9	64.1	63.3	63.2	64.1	63.3	63.2	63.2	
Śląskie	63.1	63.2	62.2	60.8	60.9	64.1	63.1	61.7	60.2	60.5	64.1	63.1	61.7	60.2	60.5	59.3	63.6	62.5	62.1	62.1	59.3	63.6	63.7	62.5	62.1	63.6	62.5	62.1	62.1	
Świętokrzyskie	58.9	62.6	62.4	61.0	60.8	63.1	62.4	60.9	58.8	58.7	63.1	62.4	60.9	58.8	58.7	55.3	63.6	62.6	62.2	62.2	55.3	62.7	63.6	62.6	62.2	63.6	62.6	62.2	62.2	
Warmińsko-mazurskie	60.2	64.2	63.6	61.7	61.4	62.4	63.9	62.7	60.5	60.5	62.4	63.9	62.7	60.5	60.5	57.0	64.9	63.4	62.7	62.7	57.0	64.7	64.9	63.4	62.7	64.9	63.4	62.7	62.7	
Wielkopolskie	61.0	63.1	62.5	62.0	62.3	63.2	62.7	61.5	60.7	61.3	63.2	62.7	61.5	60.7	61.3	58.1	63.7	63.3	63.3	63.3	58.1	63.6	63.7	63.3	63.3	63.7	63.3	63.3	63.3	
Zachodniopomorskie	62.2	63.8	62.7	61.4	61.7	63.9	63.2	61.7	60.3	60.8	63.9	63.2	61.7	60.3	60.8	58.3	65.2	63.6	63.4	63.4	58.3	65.2	64.9	63.6	63.4	64.9	63.6	63.4	63.4	

Note: data for the years 2000 and 2014 are the actual ones while those for the years 2020, 2030 and 2040 are the ones projected by GUS  
 Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

lation processes in Poland has also been recorded in non-rural areas, wherein urban residents migrate to the countryside, settling mostly in the vicinity of large towns and cities. This trend can be expected to continue in the following decades, which will probably lead to the territorial differentiation of potential labor resources as implicated in this paper (cf. Fig. 8).

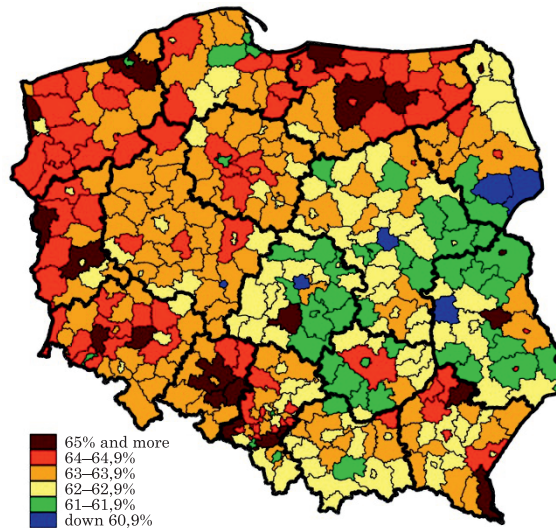


Fig. 5. Percentage of the working age subpopulation in poviats in 2014  
Source: GUS data – *Bank danych lokalnych* (2015); map by the author.

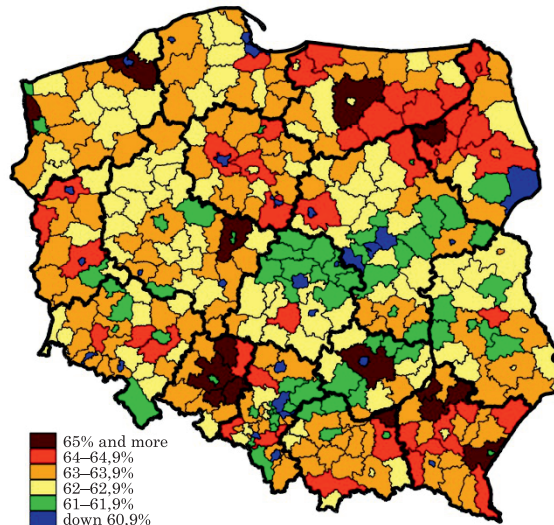


Fig. 6. Percentage of the working age subpopulation in poviats in 2020  
Source: GUS data – *Prognoza ludności na lata 2014–2050...* (2014); map by the author.

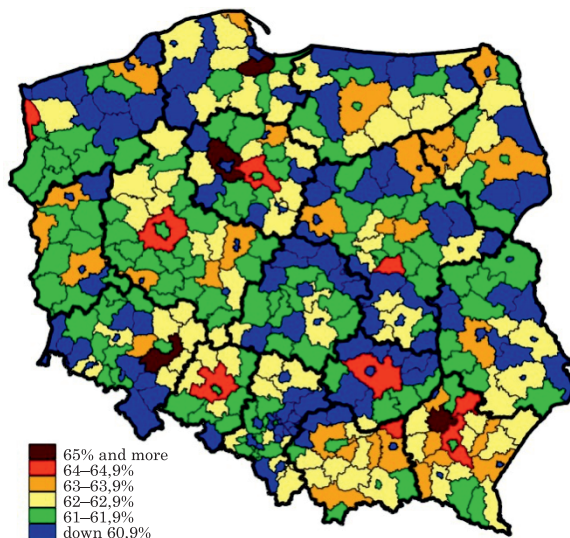


Fig. 7. Percentage of the working age subpopulation in poviats in 2030

Source: GUS data – *Prognoza ludności na lata 2014–2050...* (2014); map by the author.

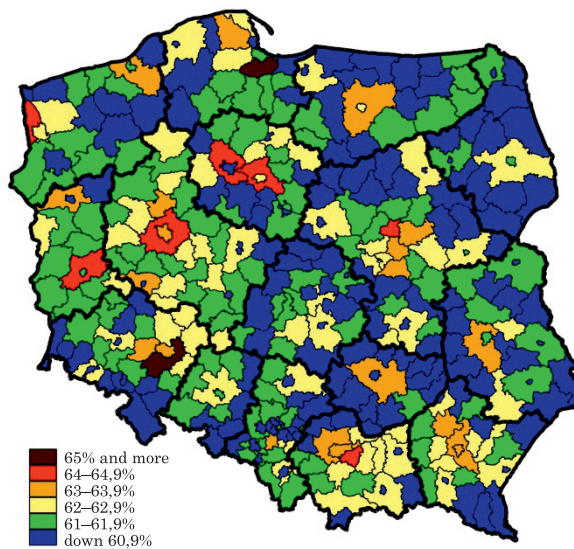


Fig. 8. Percentage of the working age subpopulation in poviats in 2040

Source: GUS data – *Prognoza ludności na lata 2014–2050...* (2014); map by the author.

One of the consequences of the changing structure of the working age population in Poland is the increase in the value of indices that express the load of the working age population with the fraction of people in the post-working age brackets. In towns, this load has been increasing progressively and demonstrably since the beginning of the analyzed period, while in villages



a tendency toward growth appeared in 2010 and will continue in the following decades (cf. Fig. 9). In 2014, there were 33 post-working age persons per 100 working age people in towns, compared to 26 post-working age persons per 100 working age people in the countryside. In the future, the value of this ratio is bound to increase. For example, it is predicted to reach 41 in towns and 31 in villages by 2030.

The dynamics of change in this ratio implicates its gradual increase in the years to come (cf. Fig. 10). For instance, in 2030 this ratio in the whole of Poland will be higher by 40.4% compared to its value in 2010, and more specifically by 50.9% in towns and by 26.5% in the country. It should be noted that such considerable changes in the load of the working age population with the fraction of people at the post-working age results from both a declining size

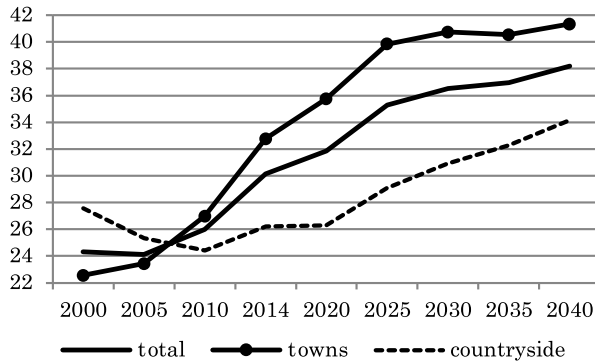


Fig. 9. Number of post-working age persons per 100 working age people (load ratio) in Poland in 2000–2040

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

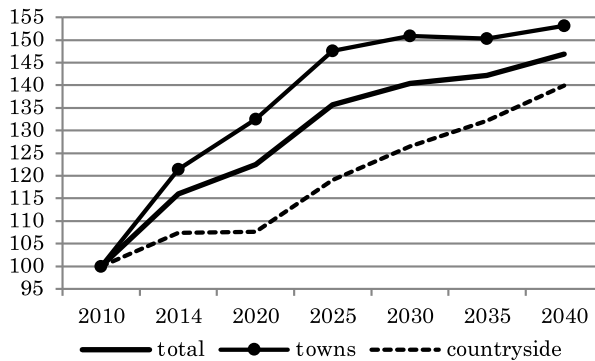


Fig. 10. Dynamics of the load ratio of post-working to working age population in Poland in 2010–2040 (2010=100)

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

Table 2  
Number of post-working age people per 100 working age people (demographic load ratio) in Poland and in the Polish voivodships in the years 2000–2040

Voivodship	Total										Towns										Countryside									
	2000		2014		2020		2030		2040		2000		2014		2020		2030		2040		2000		2014		2020		2030		2040	
Poland	24.3	30.2	31.8	36.5	38.2	22.5	32.8	35.8	40.7	41.3	27.6	26.2	26.3	30.9	34.2															
Dolnośląskie	24.1	31.0	33.8	38.5	38.6	23.7	34.1	37.7	42.5	41.8	25.2	24.3	25.9	31.0	33.0															
Kujawsko-pomorskie	22.7	29.1	31.1	36.4	38.5	22.0	32.5	35.7	41.7	43.1	23.9	24.1	24.8	29.9	33.1															
Lubelskie	27.5	31.2	32.6	37.8	40.9	19.7	31.7	35.8	43.1	45.7	35.5	30.8	29.9	33.7	37.4															
Lubuskie	21.3	28.2	31.1	36.8	37.8	20.3	31.0	34.8	40.6	40.5	23.2	23.5	25.4	31.1	33.9															
Łódzkie	27.7	34.2	35.9	40.0	40.9	25.3	36.4	39.8	44.7	44.7	32.8	30.6	29.8	33.1	35.8															
Małopolskie	24.8	28.9	29.4	33.5	35.8	23.7	33.0	35.0	38.8	39.6	26.2	25.1	24.6	29.1	32.9															
Mazowieckie	27.1	31.5	32.5	34.9	35.6	25.5	33.8	35.7	37.1	36.5	30.4	27.4	27.1	31.2	34.0															
Opolskie	23.6	30.4	32.0	39.2	43.4	21.1	33.3	36.6	44.1	47.1	26.5	27.5	27.5	34.5	40.0															
Podkarpackie	24.6	27.9	28.9	34.7	38.7	20.1	29.7	33.7	41.7	44.0	28.1	26.6	25.8	30.4	35.5															
Podlaskie	27.6	29.9	30.9	37.8	42.3	20.2	27.7	30.9	39.7	43.4	39.8	33.4	31.0	34.9	40.7															
Pomorskie	21.3	28.2	30.0	34.0	35.1	22.3	32.8	35.4	39.2	39.5	19.1	19.9	21.1	26.1	28.8															
Śląskie	22.5	31.6	33.9	39.4	40.9	21.7	32.8	35.8	41.5	42.5	25.7	27.7	28.1	33.3	36.6															
Świętokrzyskie	28.2	32.6	34.4	40.3	42.9	22.4	35.5	40.1	48.4	50.3	33.7	30.3	30.1	34.9	38.2															
Warmińsko-mazurskie	21.2	26.5	29.0	36.0	38.6	20.2	29.3	32.9	40.5	42.1	22.8	22.5	23.6	30.1	34.0															
Wielkopolskie	22.2	28.0	29.6	33.8	35.2	21.7	31.6	34.5	39.2	40.2	23.0	23.6	24.2	28.2	30.5															
Zachodniopomorskie	21.5	29.3	32.5	38.2	39.1	21.3	32.5	36.4	42.1	42.2	21.9	22.6	24.6	30.8	33.5															

Note: data for the years 2000 and 2014 are the actual ones while those for the years t 2020, 2030 and 2040 are the ones projected by GUS  
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

of the working age subpopulation and a relative increase in the post-working age fraction (cf. Figs 1 and 2).

The values of the ratio corresponding to the loading of the working age subpopulation with the post-working age fraction vary considerably across Poland (cf. Tab. 2). In 2000–2030, the lowest values of this measure have been

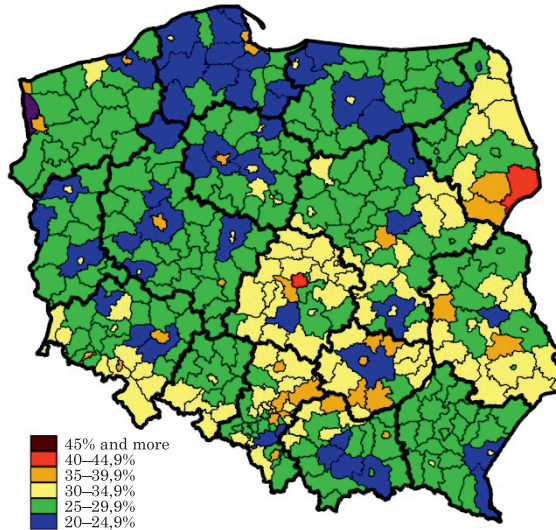


Fig. 11. Number of post-working age people per 100 working age people (load ratio) in poviats in 2014  
Source: GUS data – *Bank danych lokalnych* (2015); map by the author.

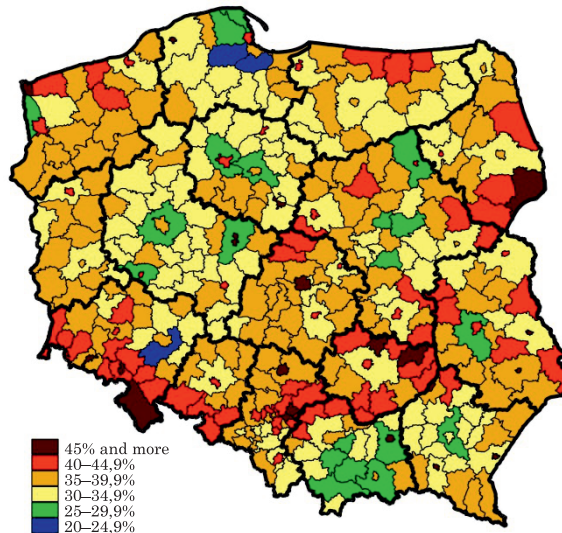


Fig. 12. Number of post-working age people per 100 working age people (load ratio) in poviats in 2030  
Source: GUS data – *Prognoza ludności na lata 2014–2050...*(2014); map by the author.

(and most likely will continue to be) noted in the voivodships podlaskie and warmińsko-mazurskie, while in 2040 it will be the highest in the voivodships mazowieckie, pomorskie as well as łódzkie and świętokrzyskie. In the countryside, this ratio has or will have fallen to the lowest levels for the entire time period analyzed in the voivodship pomorskie, while being the highest in the voivodship łódzkie.

On the NTS4 level, the lowest values of the ratio in 2014 were recorded in the poviats (cf. Fig. 11): policki in the voivodship zachodniopomorskie as well as in the poviats kartuski and gdański in the voivodship pomorskie (where there were 20 persons in the post-working age per 100 working age persons), while the highest ones appeared in the city of Łódź (41 persons) the powiat hajnowski (44 persons) and the town of Sopot (47 persons). It is predicted that in 2030, the ratio will reach the lowest values in the poviats (cf. Fig. 12) gdański, kartuski and wrocławski (where there will be 23–24 persons in the post-working age per 100 working age individuals), and the highest in the powiat hajnowski (56 persons) within the following towns: Sopot, Wałbrzych and Jelenia Góra (51–53 persons).

The values of the ratio representing the load of the working age subpopulation with the subpopulations of people in the pre- and post-working age<sup>2</sup> followed a slightly different course (cf. Fig. 13). At the beginning of the analyzed time period, the values of this measure were characterised by a high level of discrepancy between towns and the countryside, with the values being much higher in rural areas (owing to a relatively low percentage of post-working age people and a relatively high percentage of the subpopulation composed of children). In 2013, the values of this ratio in towns and villages converged and equalled 57.6 (which meant that there were about 58 persons in the pre- and post-working age per 100 of working age persons). In the next several years we can expect the values of this measure to grow and reach higher values in towns (due to the post-working age fraction being larger than in the countryside, at relatively lower shares of the pre- and working age subpopulations).

As mentioned previously, quantitative changes in potential labor resources result from changes in the age structure of the population, which is reflected by a decreasing pre-working age subpopulation and an increasing post-working age fraction. In 2013, the two subpopulations in Poland reached the same number of people (in towns, this took place in 2010 and in the countryside it will occur after 2025). It is worth emphasizing that the quotient of the older of these two fractions by the younger one demonstrates a linear character

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<sup>2</sup> The index is calculated as the quotient of the pre- and post-working subpopulations to the working age fraction of the population.

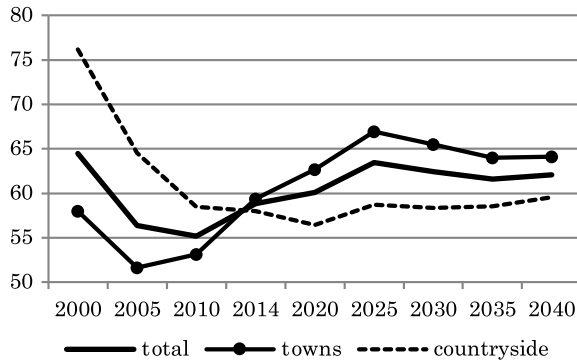


Fig. 13. The load ratio of the working age population with pre- and post-working age fractions in Poland in 2000–2040

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

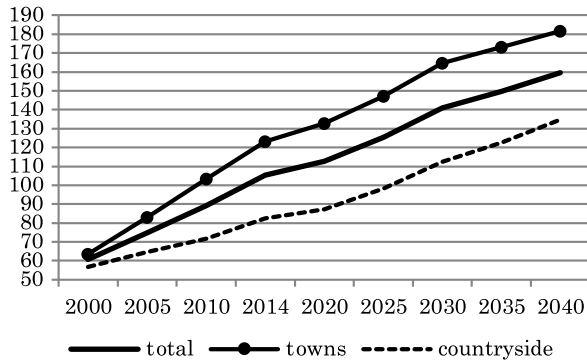


Fig. 14. Quotient of the post-working age population to the pre-working age population in Poland in 2000–2040

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

and increases with time. In 2000, there were 61 persons in the post-working age per 100 persons in the working age (64 in towns and 57 in villages); whereas in 2014, there were 105 persons in the post-working age (123 in towns and 83 in villages) per 100 working age persons. In the next several years, we can expect a growing disproportionality between these two fractions (as the older of these subpopulations continues to grow larger, while the younger is decreasing in number) and consequently an increasing value of the discussed quotient. For example, in 2030 it will most likely reach 141 in the whole of Poland (with 165 in towns and 112 in the countryside) (cf. Fig. 14).

The subpopulation of working age people (i.e. potential labor resources) is internally diverse regarding the age structure. This diversity is evident in both the territorial and temporal context. Considering the data for Poland (cf. Tab. 3) it is possible to conclude that over the time period analyzed, the share of the two youngest age fractions (i.e. 18–19 and 20–24 years of age) has been decreasing and will continue to grow smaller until 2025, while the oldest fraction (from 55 to the pension threshold age) will tend to increase throughout the entire time period.

Table 3  
The structure of the subpopulation creating potential labor resources in Poland in 2000, 2014, 2030 and 2040 (total, towns, countryside)

2000										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	5.6	13.5	11.9	10.3	10.9	13.2	13.3	11.2	10.1
Towns	100.0	5.5	13.5	11.6	9.8	10.3	13.3	14.0	11.8	10.2
Countryside	100.0	5.8	13.3	12.5	11.4	11.9	13.2	12.1	10.0	10.0
2014										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	3.5	10.4	12.1	13.4	12.6	10.9	9.6	10.3	17.2
Towns	100.0	3.1	9.4	12.0	14.0	13.0	10.8	9.3	10.2	18.1
Countryside	100.0	4.2	11.9	12.2	12.5	12.0	11.1	10.0	10.4	15.7
2030										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	3.4	9.0	7.8	8.6	10.4	12.2	13.8	13.0	21.8
Towns	100.0	3.3	8.6	7.4	8.3	10.1	12.3	14.4	13.6	21.9
Countryside	100.0	3.6	9.4	8.3	9.0	10.9	11.9	12.9	12.2	21.8
2040										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	3.0	7.8	8.4	9.3	8.1	8.9	10.7	12.3	31.4
Towns	100.0	2.9	7.5	8.3	9.4	7.9	8.5	10.3	12.4	32.8
Countryside	100.0	3.2	8.3	8.6	9.3	8.4	9.3	11.2	12.2	29.6

Note: data for the years 2000 and 2014 are the actual ones while those for the years 2020, 2030 and 2040 are the ones projected by GUS

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

The increase of the share of the oldest age fractions within the working age subpopulation, coinciding with a decreasing contribution of the youngest fractions, has and will result in the aging of the potential labor force in Poland. In 2000–2014, the median age of the discussed subpopulation oscillated around 38 years, and was higher in towns (cf. Tab. 4). Over the next several years,

a further increase in the median value is foreseen, which will be due to the progressive demographic aging<sup>3</sup> of the Polish population as well as the gradual rising of the retirement age.

Table 4  
The median age (in years) of the subpopulation creating potential labor resources in Poland in 2000-2040 (total, towns, countryside)

Year	2000	2005	2010	2014	2020	2025	2030	2035	2040
Total	38.2	38.1	38.1	38.3	41.0	42.3	43.5	44.9	46.6
Towns	38.7	38.5	38.3	38.5	41.2	42.5	44.0	45.6	47.1
Countryside	37.4	37.5	37.7	38.1	40.7	41.8	43.0	44.2	46.1

Note: data for the years 2000 and 2014 are the actual ones while those for the years 2020, 2030 and 2040 are the ones projected by GUS

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

### Actual labor resources (actual labor force)

As previously mentioned, the actual labor force represents only a portion of the potential labor resources. The former are composed of people who are professionally active (including both employed people and unemployed ones who are seeking employment).

In 2014, the level of professional activity across the whole of Poland and within individual voivodships was comparable, being higher among men (cf. Tab. 5), which is a consequence of family roles played by women. In 2014, 56.2% of the general population, including 74.3% of the working age population, was professionally active (78.1% of men and 70.1% of women of working age). The highest professional activity was demonstrated by residents of the voivodship mazowieckie (79.7% of working age persons) and the lowest one was found in the voivodship warmińsko-mazurskie (68.1%).

In 2014, there were 67.5% of working age persons in employment, and the employment ratio was higher among men in all voivodships (cf. Tab. 5). The highest values of this index were observed in the voivodship mazowieckie (73.9%) and the lowest ones were in the voivodship warmińsko-mazurskie (61.4%).

<sup>3</sup> The demographic aging process is defined as an increasing number and percentage of older people in the population (as the threshold of old age is most commonly accepted as the age of 65 years). In Poland, like in other European countries, the main contributor to the aging of the population is the decreasing total fertility rate, much below the one ensuring the replacement rate (i.e. 2.1). Another significant factor is the decreasing mortality rate in elder groups of the population. More on demographic aging of populations, including its consequences, has been contained in publications prepared i.e. by *Sytuacja demograficzna osób starszych...* (2014), KURKIEWICZ (2010, 2012), NYCE, SCHIEBER (2005), ROSSA (2012). *Global tendencies of aging...* (2015).

In Poland, 9.2% of the population composed of professionally active and working age people remained unemployed. The unemployment rate is characterized by a high spatial variation (cf. Tab. 5). In 2014, it was the highest in podkarpackie (14.4%) and the lowest in mazowieckie (7.3%).

Table 5  
Activity rate of the total population and working age subpopulation, employment ratio and unemployment rate among working age people in Poland and in Polish voivodships in 2014 [%]

Voivodship	Activity rate						Employment rate of working age population			Unemployment rate among working age people		
	total			working age people								
	T	M	W	T	M	W	T	M	W	T	M	W
Poland	56.2	64.7	48.5	74.3	78.1	70.1	67.5	71.4	63.1	9.2	8.6	9.9
Dolnośląskie	55.1	64.3	46.9	74.2	77.6	70.4	67.3	70.5	63.6	9.3	9.1	9.8
Kujawsko-pomorskie	55.3	64.6	46.9	73.1	78.2	67.3	65.2	71.1	58.7	10.8	9.2	12.8
Lubelskie	56.3	63.4	49.7	74.8	77.3	71.9	67.2	70.0	64.0	10.1	9.4	10.9
Lubuskie	54.1	62.1	46.6	71.6	75.5	67.1	65.6	69.5	61.1	8.4	7.9	9.6
Łódzkie	58.3	66.9	50.6	77.3	80.2	74.1	70.3	73.2	66.9	9.0	8.7	9.6
Małopolskie	55.9	63.6	48.7	73.4	77.3	69.1	66.5	70.5	62.1	9.4	8.7	10.0
Mazowieckie	61.5	69.6	54.2	79.7	83.0	76.1	73.9	77.4	70.1	7.3	6.7	7.9
Opolskie	54.0	63.2	46.0	73.1	78.0	67.8	67.1	72.6	61.6	8.0	6.9	9.2
Podkarpackie	54.5	63.1	46.4	72.5	76.8	67.4	62.1	66.2	57.2	14.4	13.9	15.1
Podlaskie	55.9	63.9	48.5	75.4	78.7	71.6	68.3	71.6	64.8	9.4	9.0	9.9
Pomorskie	55.7	65.2	46.8	72.9	78.6	66.7	66.5	71.7	60.8	8.9	8.8	8.7
Śląskie	53.8	61.6	46.7	71.6	74.7	68.1	65.3	68.8	61.5	8.8	8.0	9.7
Świętokrzyskie	55.3	63.3	47.5	73.5	76.5	69.8	64.8	67.3	61.9	11.8	12.3	11.1
Warmińsko-mazurskie	51.1	59.4	43.6	68.1	72.0	63.8	61.4	64.9	57.3	10.0	9.6	10.1
Wielkopolskie	57.7	67.8	48.5	75.1	80.5	69.1	69.2	75.4	62.4	7.9	6.4	9.7
Zachodniopomorskie	52.6	61.7	44.7	70.8	75.0	66.1	64.7	68.4	60.7	8.6	8.8	8.2

Note: the following designations were used: T – total, M – men, W – women

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

At present (data from 2014), the potential labor force (i.e. working age people) in Poland consists of 24.1 m people, but in the following 15 to 25 years they will most likely decrease by 1.3 m and 2.2 m, respectively (cf. Tab. 6), despite raising the retirement age<sup>4</sup>.

<sup>4</sup> It is worth noticing that according to the GUS forecasts, the total population of Poland will decrease in the following decades and will fall to 35.7 m in 2040.



Table 6  
Potential and actual labor resources (in millions) and percentages of actual labor resources in total population in Poland and in Polish voivodships in the years 2014–2040

Voivodship	Potential labor resources [m]				Actual labor resources [m]				Actual labor resources as % of total population			
	2014	2020	2030	2040	2014	2020	2030	2040	2014	2020	2030	2040
Poland	24.23	23.82	22.89	22.01	18.00	17.70	17.01	16.35	46.8	46.4	45.7	45.8
Dolnośląskie	1.85	1.79	1.70	1.64	1.37	1.33	1.26	1.21	47.1	46.3	45.5	46.1
Kujawsko-pomorskie	1.32	1.30	1.24	1.17	0.97	0.95	0.90	0.86	46.2	45.9	45.1	45.0
Lubelskie	1.34	1.31	1.23	1.14	1.00	0.98	0.92	0.85	46.7	46.7	46.0	45.7
Lubuskie	0.65	0.63	0.60	0.58	0.47	0.45	0.43	0.41	45.7	44.9	44.1	44.4
Łódzkie	1.55	1.49	1.40	1.31	1.20	1.15	1.08	1.02	47.9	47.4	46.9	47.2
Małopolskie	2.12	2.14	2.12	2.09	1.55	1.57	1.56	1.53	46.1	46.2	45.7	45.7
Mazowieckie	3.30	3.31	3.34	3.35	2.63	2.64	2.66	2.67	49.4	48.9	49.1	49.6
Opolskie	0.64	0.62	0.56	0.50	0.47	0.45	0.41	0.37	47.0	46.9	45.4	44.7
Podkarpackie	1.35	1.35	1.29	1.23	0.98	0.98	0.94	0.89	46.0	46.3	45.4	44.8
Podlaskie	0.76	0.74	0.69	0.64	0.57	0.56	0.52	0.48	47.8	47.9	46.5	45.7
Pomorskie	1.45	1.44	1.44	1.43	1.05	1.05	1.05	1.04	45.8	45.3	44.9	45.1
Śląskie	2.90	2.78	2.58	2.42	2.08	1.99	1.85	1.73	45.2	44.5	43.5	43.6
Świętokrzyskie	0.79	0.77	0.71	0.65	0.58	0.56	0.52	0.48	46.0	45.9	44.8	44.7
Warmińsko-mazurskie	0.93	0.90	0.85	0.80	0.63	0.62	0.58	0.54	43.7	43.3	42.0	41.8
Wielkopolskie	2.19	2.18	2.15	2.11	1.65	1.64	1.62	1.59	47.4	47.0	46.6	46.8
Zachodniopomorskie	1.09	1.06	1.00	0.96	0.78	0.75	0.71	0.68	45.2	44.4	43.5	43.7

Note: data for the years 2000 and 2014 are the actual ones while those for 2020, 2030 and 2040 are projected by GUS

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

In turn, the actual labor resources in Poland equal 18 m people and in 2014 corresponded to 46.8% of the working age population (the percentage was the highest in the voivodship mazowieckie and the lowest in the voivodship warmińsko-mazurskie). Assuming that the professional activity of the Polish population will remain at the same level as in 2014, the actual labor resources will decrease by 1 m in 2030 and 1.7 m in 2040, thus representing less than 46% of the working age population (cf. Tab. 6).

## Summary

The share of the potential labor resources in the Polish population, equated with the working age subpopulation, has been gradually decreasing<sup>5</sup>, which is a consequence of the changes in the age structure of the Polish population

(manifesting themselves mainly as an increasing percentage of elderly people and a decreasing percentage of children)<sup>6</sup>.

The subpopulation that creates potential labor resources in Poland is diversified spatially, and this diversification will continue to undergo modifications in the following decades. Currently, the highest percentage of the working age subpopulation occurs in the northern and western parts of Poland, while central Poland has the lowest share of this age fraction. In the following years, the smallest percentage of the working age subpopulation will be found in the peripheries of the Polish provinces (mainly in central and eastern Poland), and the population representing the potential labor resources will concentrate mostly around large cities.

The pension age threshold recently raised in Poland will not contribute to an increase in the potential labor resources in the long term. This fraction of the general population will decrease, most distinctly in towns (due to the outflux of the oldest portion of working age people to the subpopulation of post-working age, with a relatively low level of people entering the working age subpopulation). The actual labor resources will diminish as well (assuming the current level of activity of the population). Thus, the presented situation should encourage some action to promote professional activity among the entire population.

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<sup>5</sup> A similar situation has been observed in the majority of European countries: „Low fertility rates and an aging population will likely result in the shrinking of Europe’s working-age population in the coming years, notwithstanding a net inflow of migrants” (Eurostat 2015, p. 101).

<sup>6</sup> „The structure and profile of the EU’s population has changed considerably, due in part to: lower fertility rates; changes in patterns of family formation; a desire for greater personal independence; shifts in the roles of men and women; higher levels of migration; greater geographic mobility; and increases in life expectancy” (*Eurostat regional...* 2015, p. 45).

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