

RURAL AREAS IN POLAND: EDUCATIONAL ATTAINMENT VS. LEVEL OF ECONOMIC DEVELOPMENT

WIOLETTA KAMIŃSKA

Institute of Geography, Jan Kochanowski University in Kielce, Poland

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ABSTRACT: The aim of this article is to analyse relations between the educational attainment of the rural population and the level of economic development of the rural areas in Poland. A typology of communes in terms of the analysed relations is made. This is the first research of this type involving all the rural areas in Poland conducted at the level of the commune. The research has shown a significant linear relation between the educational attainment of the population and the level of economic development of rural areas. The correlation coefficient amounts to 0.565.

KEY WORDS: rural areas, education, economic development, communes

Wioletta Kamińska, Institute of Geography, Jan Kochanowski University, Świętokrzyska 15, 25-406 Kielce, Poland; e-mail: wioletta.kaminska@ujk.edu.pl

1. Introduction

Globalisation and European integration processes intensifying at the turn of the 20th and 21st centuries changed the conditions for operating a business. The global economy leads to the globalisation of enterprises' activity, which is expressed, e.g., in moving production to any place in the world.

Immaterial development factors, such as the education of a population, gain in importance in those new circumstances. One can even observe that economic success, both of regions and enterprises, is strongly related to the level of knowledge, skills and professional experience of the citizens. Bacon's (1620) thought has recently been more and more often cited in the literature on the subject: "knowledge is power". Thurow (1999: 422) adds that the competitive advantage of every

region depends on the "readiness and capability of making long-term social investments in qualifications, education, knowledge and infrastructure". Many authors also think that the underdevelopment of some countries is a consequence of the slow progress in education, which significantly delays the technology transfer (Thurow 1999; Adebisi, Oladele 2005; Przybyszewski 2007; Baldacci *et al.* 2008; Hanushek, Woessmann 2012; Jimenez *et al.* 2012).

In Poland, the most abundant resources of qualified workforce are concentrated in the cities. Rural areas have for years been characterised by an outflow of people (Eberhardt 1989, Rosner 2011), including the best educated ones. This is due to the unattractive living and working conditions in the countryside and the fact that agriculture was perceived as a sector hardly suitable for qualified workforce.

Meanwhile, along with the progressing European integration, Polish rural areas and agriculture turned out to be uncompetitive (Zegar 2000), while the monofunctional model of development did not fit the changing market conditions anymore (Stasiak 2000). Thus, new strategies for the development of the countryside aimed to make it multifunctional. Non-agricultural functions kept emerging dynamically but unequally in the rural space (Bański 2003, Kamińska 2005), leading to significant regional disproportions (Heffner, Rosner 2005, Kłodziński 2006, Rosner 2007, Kamińska 2011a). Differences in the educational attainment of the country people are more and more often numbered among factors favouring spatial divergence (Kamińska, Heffner 2010, 2011).

Therefore, a question arises of whether the population's education is a factor which stimulates the economic development of the Polish rural areas. This is an arguable question: my research (Kamińska 2012) conducted in the rural areas of Świętokrzyska Land has not confirmed there to be any relation between the level of the population's education and the level of economic development.

In the light of the above remarks, the aim of this article is to analyse the relations between the educational attainment of the population of the rural areas in Poland and the level of their economic development. Also, an attempt is made to create a typology of communes (*gminas*, principal units of Poland's territorial and administrative division) in terms of the analysed relations.

2. Research methods

The research process included three stages. First, spatial diversification of the educational attainment of the rural population was determined;

secondly, the level of economic development of each territorial unit was estimated; thirdly, the relation between the educational attainment of the population and the level of economic development was analysed. Each of these stages closed with a typology of communes by the analysed feature.

Such a procedure required the selection of appropriate measures (variables). It was assumed that the measures should be precisely defined, objective and credible, accessible and measurable, as well as uncorrelated (Grootaert, van Baste-laer 2002).

Three measures were adopted to analyse the educational attainment of the rural population (Table 1) involving its formal education. Their advantages and disadvantages have been described in detail in the literature on the subject (Judson 1998, Kamińska 2011b, and others).

The data concerning the education of the rural population (including farmers) give information about the possibilities for innovation creation and absorption. Those on the formal preparation of councillors allow drawing conclusions about the possibility of performing creatively their functions in local governments and the importance of education in making electoral decisions by the rural population.

It is assumed in the paper that economic development is a series of subsequent economic phenomena which, on the basis of common knowledge, may be assessed as more favourable for a given society than others (Hryniewicz 2000). Its level can be defined on the basis of the economic structure of rural areas (taking into consideration the agricultural and the non-agricultural sector), the labour market, and the wealth of the territorial units (Rosner 2007; Stanny, Czarnecki 2011).

Initially, 12 measures were adopted. Finally, after the statistical analysis and elimination of

Table 1. Coefficients of correlation between measures of educational attainment.

	Percentage of people with at least secondary education	Percentage of local councillors with higher education	Percentage of farms operated by people with at least secondary agricultural education
	M-1	M-2	M-3
M-1	1.000	0.320	0.010
M-2		1.000	0.113
M-3			1.000

Source: own calculations.

strongly correlated features, eight measures were selected (Table 2).

Measures describing the agricultural sector provide information about the condition of individually operated type of farming. This is an important aspect of the economy of Polish rural areas, which are characterised by a high share of the agricultural function, both in terms of employment and sources of income. The low workforce productivity, low marketability of production, and fragmentation of farms are barriers to the economic development of the countryside.

In turn, the measures adopted for describing the non-agricultural sector define the level of diversification and de-agrarisation of the local rural economy. A well-developed non-agricultural sector not only creates additional workplaces and sources of income for the rural population, but also accelerates structural transformation in agriculture, which leads to a decrease in agricultural employment.

The unemployment rate informs about the level of equilibrium in a labour market. As Ros-

ner and Stanny show (2007: 34), "excessive employment in agriculture (agrarian overpopulation) appears on family farms when the labour market is not in the state of equilibrium (...). A tendency to escape from the labour market into occupational inactivity and search for unearned sources of income intensifies". In turn, the number of people working outside agriculture per 100 people employed in agriculture informs about the diversification of the labour market and the local rural economy.

The mean of a commune's own revenue (between 2005 and 2011) per inhabitant served as a measure of the wealth of its local government. This measure provides indirect information about the economic activity of the rural population, the level of the commune's investment attractiveness as well as entrepreneurship and the local government's efficiency in obtaining EU funds.

Hellwig's (1968) method of a distance to a model object was applied in order to determine spatial differences in the level of human capital and economic development. It involves compar-

Table 2. Coefficients of correlation between the measures of economic development.

	Agricultural sector			Non-agricultural sector		Labour market		Financial standing of communes
	percentage of individual farms over 1 ha producing mostly for market	percentage of farms operating a business ¹	average area of individual farms with over 1 ha of cultivated land	percentage of employment in services ²	percentage of households not operating farms ³	number of registered job seekers per 100 people of working age (desstimulating factor)	number of people working outside agriculture per 100 people employed in agriculture	mean of commune's own revenue per inhabitant between 2005-2011 ⁴
	M-1	M-2	M-3	M-4	M-5	M-6	M-7	M-8
M-1	1.000	-0.194	0.317	-0.474	0.093	-0.273	0.273	-0.105
M-2		1.000	0.087	0.226	0.395	-0.178	0.115	0.253
M-3			1.000	-0.142	0.545	0.216	-0.097	0.055
M-4				1.000	0.241	-0.078	0.275	0.152
M-5					1.000	-0.330	0.228	0.268
M-6						1.000	-0.141	-0.119
M-7							1.000	0.406
M-8								1.000

¹Percentage of farms operating a business is strongly correlated with the number of private entities registered in the REGON (National Economy Register) system. The correlation coefficient amounts to 0.6624

²Percentage of employment in services is strongly correlated with the percentage of farms producing mostly for the market ($r = -0.5737$).

³Percentage of households not operating a farm is strongly correlated with the employment rate ($r = 0.554$).

⁴Mean of a commune's own revenue per inhabitant is correlated with the commune's investment expenditure ($r = 0.6121$).

Source: Own calculations.

ing a set of n objects ($i = 1, 2, \dots, n$) for p selected features ($k = 1, 2, \dots, p$), which can be presented in the form of a matrix:

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1p} \\ x_{21} & x_{22} & \dots & x_{2p} \\ \dots & \dots & \dots & \dots \\ x_{n1} & x_{n2} & \dots & x_{np} \end{bmatrix}$$

The coordinates of the model object were determined on the basis of the maximum values of the features observed in the whole set. The distance of each commune from the model object was calculated after standardisation according to the formula:

$$C_{i0} = \sqrt{\sum_{j=1}^k (z_{ij} - z_{0j})^2}$$

where:

C_{i0} - the distance between commune i and the model object

z_{ij} - the value of the j -th feature in the i -th commune after standardisation

z_{0j} - the value of the j -th feature in the model object.

Calculated next was the synthetic index d_i :

$$d_i = 1 - \frac{C_{i0}}{C_0}$$

where:

$$C_0 = \bar{C}_0 + 2S_0$$

C_{i0} - the commune's distance from the model object \bar{C}_0 ,

\bar{C}_0 - the arithmetic mean of the commune's distance from the model object,

S_0 - the standard deviation of the commune's distance from the model object.

A typology by the level of education and economic development of the analysed objects was made on the basis of the synthetic index d_i . Then, taking the relation between the analysed features as the criterion, nine types of commune were distinguished:

1. at a high level of education and a high level of economic development, if $d_i > \bar{d}_i + 0.5 S_0$ in both cases (where \bar{d}_i is the mean of measure d_i and S_0 the standard deviation of measure d_i),
2. at an average level of education and an average level of economic development, if $\bar{d}_i - 0.5 S_0 < d_i < \bar{d}_i + 0.5 S_0$,

3. at a low level of education and a low level of economic development, if $d_i < \bar{d}_i - 0.5 S_0$ in both cases,
4. at a low level of education ($d_i < \bar{d}_i - 0.5 S_0$) and a low level of economic development,
5. at an average level of education ($d_i > \bar{d}_i + 0.5 S_0$) and a low level of economic development,
6. at an average level of education ($\bar{d}_i - 0.5 S_0 < d_i < \bar{d}_i + 0.5 S_0$) and a high level of economic development ($d_i > \bar{d}_i + 0.5 S_0$),
7. at a low level of education ($d_i < \bar{d}_i - 0.5 S_0$) and an average level of economic development ($\bar{d}_i - 0.5 S_0 < d_i < \bar{d}_i + 0.5 S_0$),
8. at a high level of education ($d_i > \bar{d}_i + 0.5 S_0$) and an average level of economic development ($\bar{d}_i - 0.5 S_0 < d_i < \bar{d}_i + 0.5 S_0$), and
9. at an average level of education ($\bar{d}_i - 0.5 S_0 < d_i < \bar{d}_i + 0.5 S_0$) and a low level of economic development ($d_i < \bar{d}_i - 0.5 S_0$).

It is worth underlining that the first three types confirm the relation between education and the level of economic development, while types four and five diverge completely from the general regularity.

3. The influence of education on economic development - an outline of the issue

The relation between education and economic development has been proved in both, theoretical and empirical research.

The thesis to the effect that education and its appropriate use is one of the most important factors affecting the economic development of nations emerged in the papers of such economists as William Petty (1676, 1899), Adam Smith (1776, 1979), Karl Marx (1867, 1890), John Stuart Mill (1848, 1909) and others. However, it was only in the second half of the 20th c. that education was introduced permanently into the economy as a factor of production in development models.

These models, based on the concepts of human capital, show there to be a close relation between education and technological change (Nelson, Phelps 1966; Lucas 1988) as well as between knowledge and productivity and the pace of technology diffusion (Arrow 1962; Nelson,

Phelps 1966; Romer 1990). According to Jimenez *et al.* (2012: 4), in these models the authors “distinguish human capital’s contribution to economic growth by introducing two concepts. First, beyond the quantity of human capital, output also depends upon the average level of human capital. Second, human capital is endogenous, rather than exogenous, in the system in the sense that it is produced by using resources. The implication of these conceptual insights is that “knowledge” becomes a public good that spills over into the economy as an additional source of growth. For countries this means that they do not converge to a common steady state path; they can grow at different rates – as can per capita incomes. Another, equally important implication of this model is that, by virtue of the average stock of human capital being available to all, there might be social underinvestment in human capital formation”.

Also empirical studies provide ample proof of the relation between education and economic development. They focus on three areas (Wilson, Briscoe 2004):

1. rate of return on investment in education and improvement of qualifications,
2. significance of education for economic growth and the development of enterprises, and
3. positive externalities created due to investment in education.

The groundbreaking papers by Miller (1960) and Becker (1964) should be mentioned in the first group. The authors conducted calculations concerning the profitability of university studies and on that basis they found that the rate of return on an investment in studies is almost the same as in the case of investment outlays in the financial market, the real-estate market, or bank deposits. It has been unequivocally found that education increases individual revenues over the amount of outlays (Psacharopoulos, Patrinos 2004).

The above calculations were conducted at micro- and macro-levels, and concerned incomes of individual people¹. However, as Wilson and Briscoe (2004) conclude, what is good for individual people is also good for a whole society.

¹ An overview of literature on the rate of return on investment in education can be found in Sianesi, Van Reenen (2000), Harmon, Walker (2001), Blundell *et al.* (2001), Barret (2001), Cooray (2009), Acemoglu, Autor (2012), and Jimenez *et al.* (2012).

Buchinsky (1994) conducted a similar research in the USA, Mwabu and Schultz (1996) in South Africa, Harmon *et al.* (2003), Denny and O’Sullivan (2007) in Great Britain, and Jimenez *et al.* (2012) in European countries. In general, what results from them is that additional schooling reduces conditional wage dispersion and that education and abilities are substitutes in terms of the generation of earnings.

Also the research conducted in transforming economies (Fleisher, Wang 2004; Munich *et al.* 2004; Newell, Socha 2005; Flabbi *et al.* 2007) provides interesting results related to the rate of return on educational input. The authors found that returns to education increased from the “pre-transition” to the “early transition” period. Moreover, Fleisher and Wang (2004) suggest that the sharp increases in the returns to education took place during the early transition (the early 1990s). In turn, Flabbi *et al.* (2007) found that the examined countries can be classified into three broad groups: a “high” returns group (Hungary and Poland), an “average” returns group (Bulgaria, Latvia, Slovenia and Russia), and a “low” returns group (the Czech and Slovak Republics).

Studies conducted in the 1960s and ’70s (Kendrick 1961; Harbison, Meyers 1964; Denison 1971) and later (Heston *et al.* 2002; de la Fuente, Ciccone 2003; Schlump, Brenner 2010; Kharas, Kohli 2011) belong to the second group of the research papers describing the relations between education and the economic development of nations and enterprises. On the basis of their research, the authors found that:

- high outlays for education are necessary for the economic development of a nation (Kendrick 1961; Harbison, Meyers 1964; Mankiw *et al.* 1992),
- there is a direct relation between the condition of education and the level of economic development of a nation (Kendrick 1961; Harbison, Meyers 1964; Denison 1971; Heston *et al.* 2002),
- activity of research institutions and universities may influence employment growth (Kirchhoff *et al.* 2007),
- higher education of the population and existing research institutions affect employment growth in a local economy (Schlump, Brenner 2010),

- all nations understand that educational attainment is a basis for getting a job and achieving success in life (Harbison, Meyers 1964; Thurow 1999), and
- "a good education system is fundamental for equipping workers with the right skills, because an educated population earns more and education provides people with the cushion and the life skills to avoid falling back into poverty" (Jimenez *et al.* 2012).

Some researchers have sought to assess the influence of education on economic growth. Thus, Kendrick (1961) calculated that between 1889 and 1957 approximately 50% of production growth was a result of increased effectiveness and use of financial outlays thanks to the educational improvement of the workforce. Denison (1971) found that between 1929 and 1957 workforce productivity in the United States had increased by 19.6% as a result of qualifications improvement. This author also calculated that during his study period the education of an average employee grew by almost 2% per year, which translates into an increase of workforce productivity by almost 0.97%. Also Mankiw, Romer and Weil (1992) confirmed the significant influence of education on the wealth of nations. The authors calculated that a 10% increase in human capital translated into a growth of per capita GDP by 6.7-7.6%. Barro (1998) found that every additional year of learning at the secondary level resulted in an increase of the future economic growth rate by at least 0.7 pp. In turn, de la Fuente and Ciccone (2003) proved that every additional year of education in an average European state could lift workforce productivity by even 6%.

A positive correlation between the gross enrolment ratio (at the secondary and higher school levels) and per capita GDP has also been confirmed in the latest studies (Barro, Lee 2000, Heston *et al.* 2002, Fleischer *et al.* 2008, Cooray 2009).

The authors of recent researches put more emphasis on the quality of education than on its length. Hanushek and Woessmann (2008) found strong evidence that the cognitive skills of the population – rather than the mere school attainment – are closely related to individual earnings, to the distribution of income, and to economic growth. According to Jimenez *et al.* (2012: 5) "It is not only more years of education, or even high

quality education, that matters – it is also the type and amount of skills imparted by such education. Aside from the basic cognitive skills such as literacy and numeracy, two other skill types are important: generic skills such as team working and communication, and occupation-specific skills. Most occupations require a blend of different skill types, with a specific ability level within each".

The third field of research includes papers about positive externalities of investment in education (Acemoglu 1996, de Barros *et al.* 2000, McMahon 2001). The authors conclude that the benefits from investment in improving qualifications not only affect the people engaged in this investment, but they spill over to the whole society (Wilson, Briscoe 2004). Well educated citizens are characterised by a higher workforce productivity than their less educated colleagues, whereas companies employing highly qualified staff use their real capital in a superior way and invest more in research and training (Acemoglu 1996). According to de Barros *et al.* (2000: 43), "education has also an important direct impact on population growth, parental care and political participation. Through these channels education can further improve efficiency, reduce poverty and facilitate social mobility". McMahon (2001) estimates that approximately 75% of benefits may be of non-marketable character. And, though it is difficult to include them in growth models, their influence on economic development is indisputable. Those benefits are: health, life expectancy, natal mortality, reduction of delinquency, society's attitude towards the natural environment, democratisation of public life, civil rights enforcement, etc.

The research on the relations between education and the various aspects of the economic development of rural areas proving a correlation between these features has also been conducted in Poland (Kulikowski 2002; Janc, Czapiewski 2005).

It is worth underlining that there are studies which do not demonstrate a close relation between education and the level of economic development (Barro, Lee 1996; Caselli *et al.* 1996; Bils, Klenow 2000; Prichett 1999a, b, 2001). By applying advanced econometric tools, those authors have demonstrated the influence of education on the economic development rate to be negative, or not so obvious as described above. Critics of the

human capital theory argue that education which does not teach any real skills does not influence significantly either the nation's wealth or its management. However, because employers use it to evaluate candidates in the recruitment process or promotion, higher education leads to getting higher positions and bigger salaries (Grodzicki 2003; Wilson, Briscoe 2004).

4. Differences in the educational attainment of the rural population

The calculated synthetic index of the educational attainment of people living in the countryside oscillated between -0.022 and 0.823 . Five types of communes were distinguished using the value of the index as a criterion.

Type one, of communes with a very high educational attainment, included 79 units (3.6% of the total number of communes) inhabited by 949.8 thousand people, or 6.3% of the rural population (Table 3, Fig. 1). Those were primarily suburban areas of national and regional urban centres and, secondly, some communes with specific restructured fields of the economy, such as seaside communes or those located in the Bieszczady Mountains, which are popular and attractive for tourists. In both cases these areas were characterised by an extraordinary development of non-agricultural functions in relation to Poland (Bański, Stola 2002), net in-migration, as well as a 5% population increase over the last decade (Rosner 2011).

The biggest number of communes at a very high education level of the population, by voivodeship, were located in Mazovia (19), West

Pomerania (9) and Wielkopolska (9), and the least, in Świętokrzyska Land (1).

Areas at a high education level of the rural population constituted the second type of communes. This group included 161 (7.4%) territorial units inhabited by 1.5 million people (9.9% of the inhabitants of the Polish countryside). They usually border upon communes with the most favourable educational attainment of the population and are characterised by intense development of non-agricultural functions and growth in the number of inhabitants. This is natural, as a well-developed non-agricultural labour market is a factor which attracts highly qualified people. The biggest number of communes of the analysed type represented Silesia (23) and Mazovia (20) as well as Lublin, Subcarpathia and Wielkopolska (13 units in each). The least number of communes were located in Warmia-Mazuria (2) and Lubuska Land (3).

638 communes (29.4%) inhabited by almost one-third of the rural population of Poland, were included in type three, characterised by an average education level of country people. They differed in their share of the development of agricultural and non-agricultural functions in the economic structure (Bański, Stola 2002). However, the following regularity is evident: the shorter the distance between a commune and an urban centre, the more dominating the non-agricultural function in the commune's economic base. With the growth in the distance to a city, the importance of agriculture grows too, and it is usually intensive and commodity type of agriculture. It is worth underlining that these are areas of demographic stagnation or an insignificant (up to 5%) population decline (Rosner 2011).

Table 3. Differences in the education level of the rural population in Poland.

Education level	Number		Percentage	
	of communes	of people (thousands)	of communes	of people
very high	79	949.8	3.6	6.3
high	161	1,504.2	7.4	9.9
average	638	4,966.3	29.4	32.8
low	1,006	6,274.3	46.3	41.4
very low	289	1,458.0	13.3	9.6
total	2,173	15,152.6	100.0	100.0

Source: own calculations.

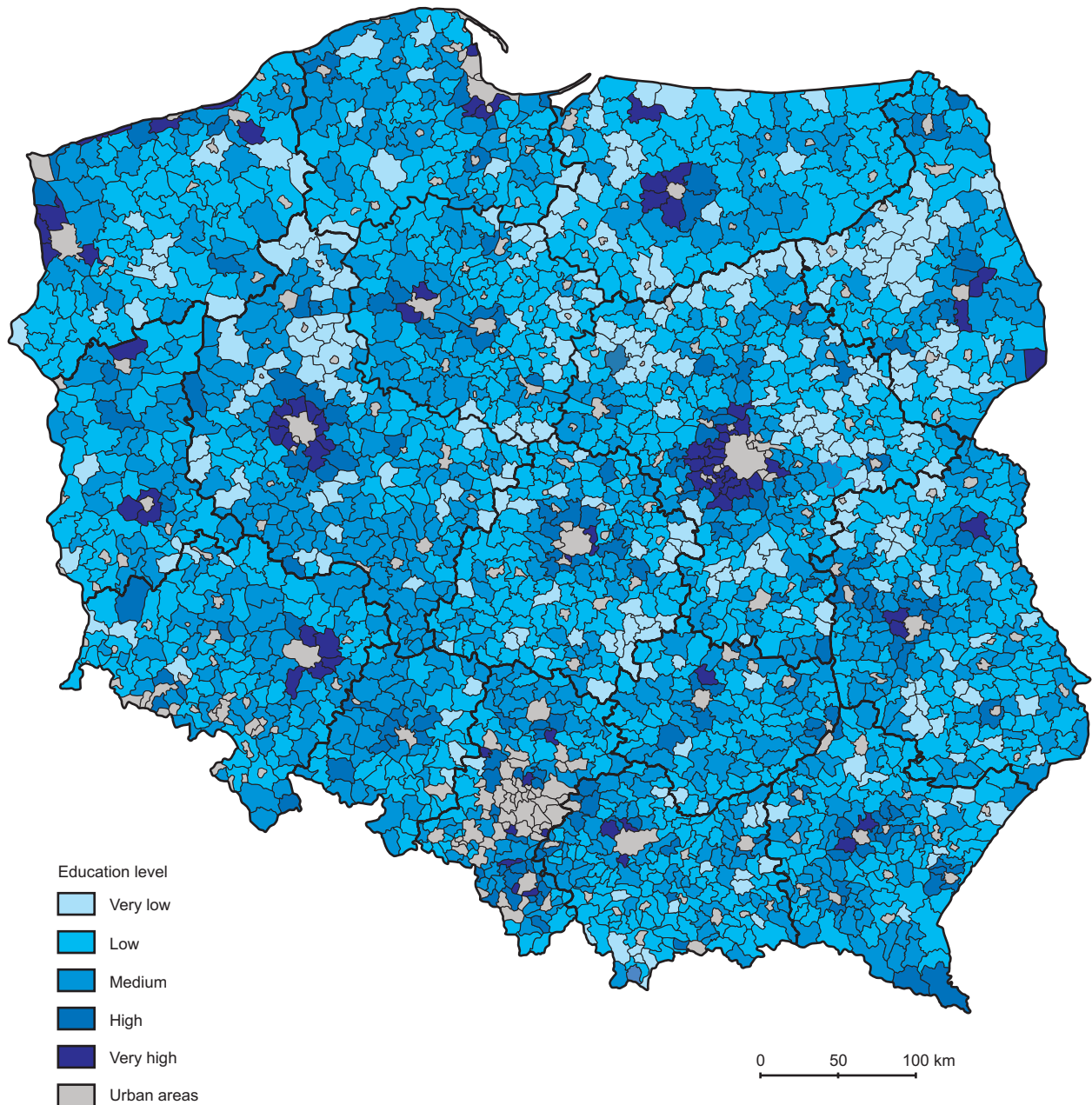


Fig. 1. Differences in the education level of the rural population – a synthetic index.
Source: own elaboration.

Finally, the fourth and the fifth types of communes are areas with a low and a very low educational attainment of the population. Altogether, these two types included as many as 1,295 communes (59.6%) inhabited by more than a half of Poland's rural population (51%). Their values of the synthetic index describing the education level were lower than the national average. These are spatial units located in the peripheries of the voivodeships. Their economic structure is dominated by agricultural functions, usually nei-

ther intensive nor commodity agriculture. Their net out-migration is a result of the drain of the best-educated part of society.

5. Spatial differences in the level of economic development

The synthetic index of the level of economic development in the rural areas of Poland oscillated between 0.0164 and 0.6743. With this index as

a criterion, five types of communes were distinguished: at a very high, high, average, low and very low level of economic development (Table 4, Fig. 2).

The first type included 182 units (8.4%) inhabited altogether by 11.6% of the rural population. One can distinguish here the communes located:

- in the suburban zones of the biggest Polish agglomerations with a strong domination of non-agricultural functions; and
- far from urban centres, but with well developed non-agricultural, usually industrial or tourist, functions. Industrial functions were connected with plants of supra-regional importance (e.g. the Bogdanka hard coal mine in the commune of Puchaczów in Lublin voivodeship, or the Bełchatów brown coal mine and power plant in the commune of Kleszczów in Łódź voivodeship), while tourist functions had developed on the basis of the attractiveness of a location for tourists (at the seaside and in the mountains).

The biggest number of communes from the first group are located in the following voivodeships: Silesia (30), Mazovia (25), Wielkopolska (23), and West Pomerania (22). Units located in only four voivodeships account for 55% of the total number of communes at a very high level of economic development. The lowest number of communes at the highest level of economic development are located in Lublin voivodeship and Świętokrzyska Land (one in each).

The second type – showing a high level of economic development – is represented by 211 (9.7%) units inhabited by 11.7% of the rural population. Also in this type one can determine areas located:

- in the suburban zones of agglomerations and centres of at least regional importance; in the

case of agglomerations, these communes are usually located in the second ring;

- in areas attractive for tourists but less popular than communes representing the first type (the seaside communes of Postomino, Darłowo, Trzebiatów, the mountainous commune of Krynica-Zdrój). Multifunctional development, including well developed tourist functions, are the main factors of the superior level of economic development here;
- far from urban centres, but developing on the basis of well functioning industrial works (e.g. Połaniec in Świętokrzyska Land, where a power plant is located); and
- far from cities, but distinguished by well developed, competitive agriculture (e.g. Brodnica in Wielkopolska). According to Bański (2008), such areas are characterised by high investment outlays for food management and high productivity of farms.

The biggest number of communes of the second type are concentrated in Małopolska (42), Silesia (26), Lower Silesia (26) and West Pomerania (25), and the least, in Lublin (0), Subcarpathia (1), Podlasie (3) and Świętokrzyska Land (3).

The third type included areas at an average level of economic development. This is the most numerous group, with as many as 1,157 communes (53.2%) inhabited by half of the rural population of Poland. Those are areas of a dominating agricultural function complemented (to various extents) by industrial, service, tourist, forest and residential functions. The biggest number of such units are located in the western and central voivodeships (Mazovia – 156, Wielkopolska – 122, Łódź – 101, Kujavia-Pomerania – 90), and the smallest, in Świętokrzyska Land (34) and Subcarpathia (40).

Table 4. Differences in the level of economic development of the rural areas in Poland.

Level of economic development	Number		Percentage	
	of communes	of people (thousands)	of communes	of people
very high	182	1,763.1	8.4	11.6
high	211	1,779.9	9.7	11.7
average	1,157	7,592.3	53.2	50.1
low	551	3,506.7	25.4	23.1
very low	72	510.6	3.3	3.4
total	2,173	15,152.6	100.0	100.0

Source: own elaboration.

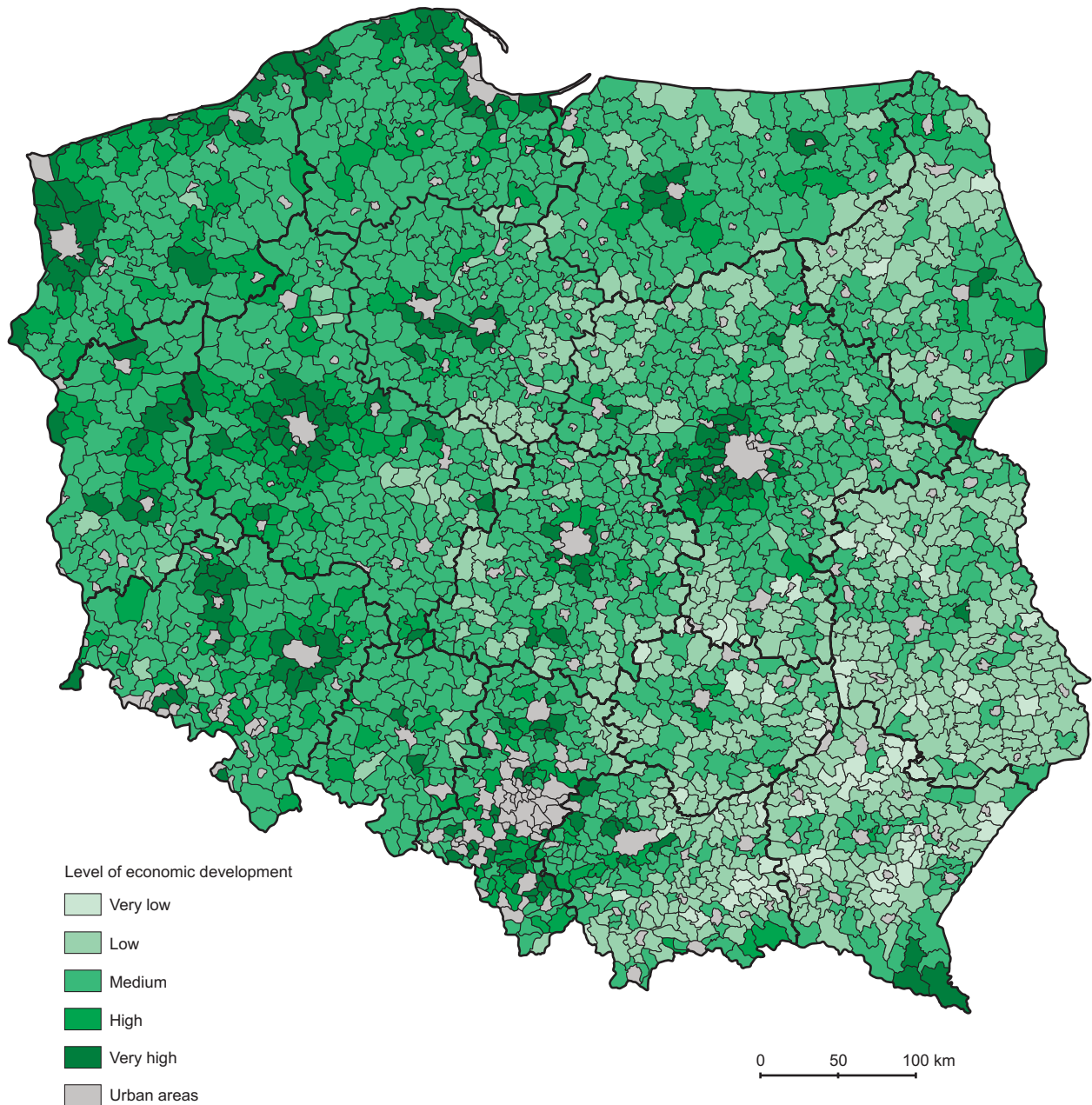


Fig. 2. Differences in the economic development of the rural areas in Poland – a synthetic index.

Source: own elaboration.

Types four and five embraced areas at a low and a very low level of economic development. Altogether they included 623 communes (28.7%) inhabited by 26.5% of the rural population. Their biggest clusters occur in south-eastern Poland (Świętokrzyska Land, Subcarpathia and Lublin), i.e. in areas dominated by family farming, neither intensive nor commodity oriented (Bański, Stola 2002). Agriculture, sometimes complemented by poorly developed non-agricultural functions, significantly dominates in their economic structure. A slightly bigger cluster of the least developed

communes is located in the north-western part of Podlasie. In other voivodeships, communes classified as types four and five are located peripherally.

6. The relation between education and the level of economic development

There was a significant relation observed between education and the level of economic development of the rural areas (Fig. 3). The correlation coefficient amounted to 0.565.

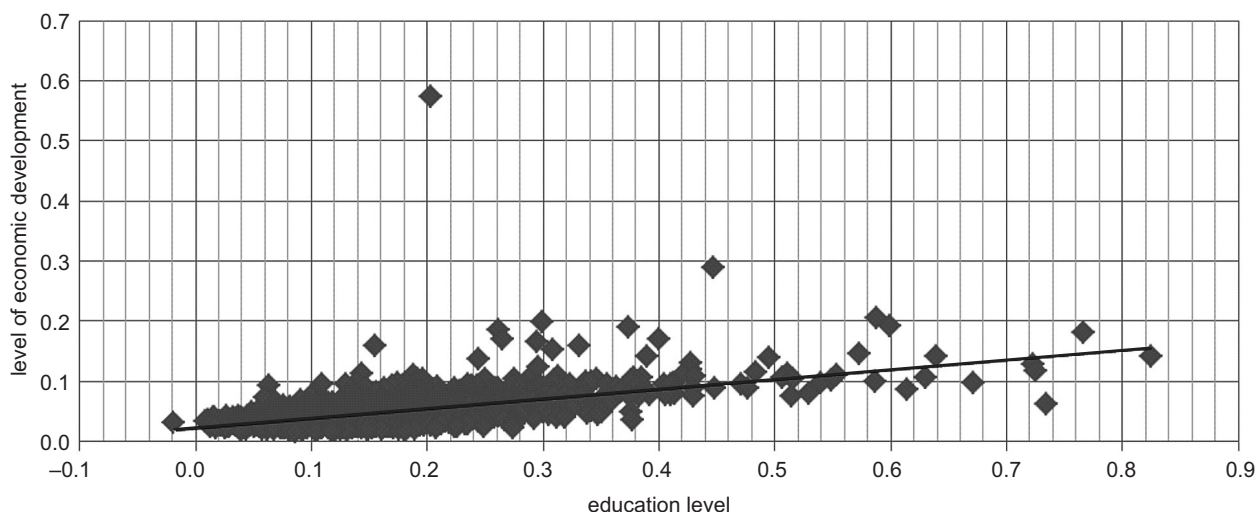


Fig. 3. Relation between education and the level of economic development in the rural areas of Poland.
Source: own elaboration.

There was a close relation between the analysed features (types 1–3) in 1,209 communes (i.e. 55.6% of their total number). From among this number, in only 230 units a high level of education is accompanied by a high level of economic development (Table 5, Fig. 4). Most of them are located in the direct neighbourhood of cities of supra-regional and national importance and/or have a well developed non-agricultural sector.

The biggest number of communes of this type are located in Silesia (44), Mazovia (35) and Wielkopolska (32), and the lowest, in Lubuska Land (0), Subcarpathia (3) and Świętokrzyska Land (3).

A low level of both analysed features was observed in 316 communes concentrated mainly in

eastern Poland. Those areas, among the poorest not only in the country but also in the entire Union at the moment of Poland's accession to the European Union, were included in a special operational programme for eastern Poland. They are usually areas of family farming, both fragmented and semi-subsistence.

An average level of educational attainment co-occurs with an average level of economic development in almost one-third of communes. The biggest number of such areas is located in the voivodeships of central (Wielkopolska – 77, Mazovia – 71, Łódź – 58, Kujavia-Pomerania – 49) and western Poland (Lower Silesia – 61).

The communes classified into types four and five deserve special attention. There are areas in

Table 5. Relation between education and the level of economic development in the rural areas of Poland.

Type number	Relation between education and level of economic development	Number of		Percentage of	
		communes	people (thousands)	communes	people
1	high EL/high ED	230	2,328.5	10.6	15.4
2	average EL/average ED	663	4,403.2	30.5	29.1
3	low EL/low ED	316	1,802.0	14.5	11.9
4	low EL/high ED	23	129.0	1.1	0.9
5	high EL/low ED	42	350.8	1.9	2.3
6	average EL/high ED	140	1,085.5	6.4	7.2
7	low EL/average ED	331	1,759.0	15.2	11.6
8	high EL/average ED	166	1,440.3	7.6	9.5
9	average EL/low ED	262	1,854.3	12.1	12.2
	Total	2173	151,526.0	100.0	100.0

Source: own elaboration. EL – education level, ED – economic development level.

type four where, despite a low education level, the level of economic development is extraordinary. There are 23 such communes, located in West Pomerania (7), Małopolska (3), Lower Silesia (3), Pomerania, Warmia-Mazuria, Wielkopolska (two in each) as well as in Silesia and Lubuska Land (one in each). Those are areas of high location rent resulting from their location on the western border of Poland or in areas attractive for tourists (e.g. Mikołajki and Orzysz in Warmia-Mazuria).

In turn, the fifth type includes areas where high educational attainment goes with a low level

of economic development. There are 42 such communes (almost 2% of the total number), inhabited by 2.3% of the Polish rural population. Almost all of them are located in south-eastern Poland: Subcarpathia (14), Świętokrzyska Land (9), Lublin (8), and Małopolska (5). Five communes are located in Mazovia, but all of them (with no exception) on the border with Świętokrzyska Land. In the spatial layout, those are primarily areas located peripherally in the voivodeships, which may prove that even a high education level of the inhabitants along with an unfavourable location

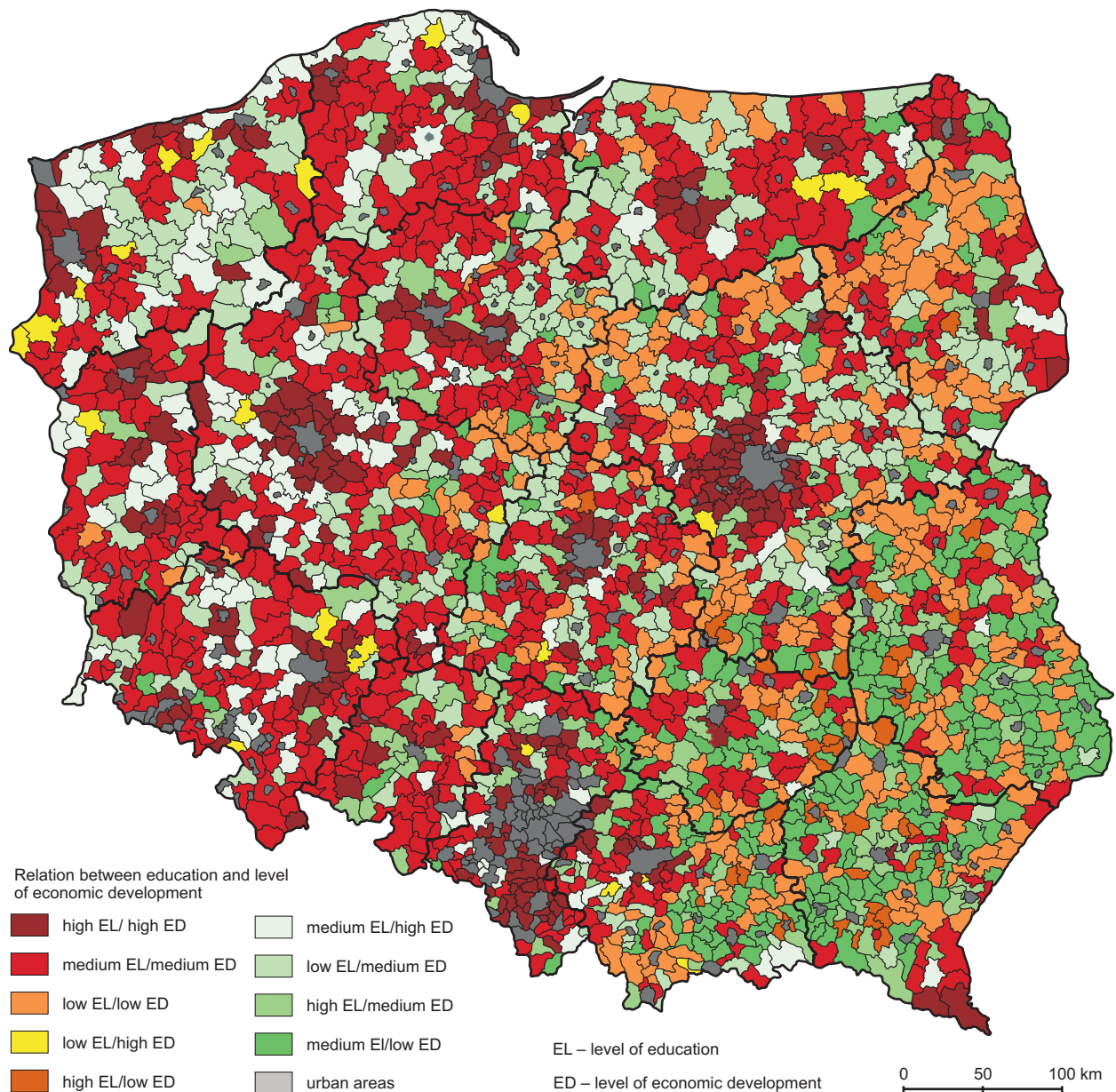


Fig. 4. Typology of communes by the relation between education and the level of economic development.

Source: own elaboration.

does not translate into a proportional level of economic development.

Types six to eight include communes where differences between the analysed features do not exceed one level (high – average, average – low). Altogether there are 899 units (41.3%) of this type, inhabited by 40.5% of rural inhabitants. Of course, the situation is more favourable in types six and eight than in types seven and nine. In areas where an average level of education goes with a high level of economic development (type 6), one can assume that the material factors of development are strong enough to create extraordinary economic growth. Usually such areas are characterised by a well developed non-agricultural labour market and a net in-migration. The following communes may serve as an example: Solina in Subcarpathia – an area with well developed tourist functions, Połaniec in Świętokrzyska Land, Puchaczów in Lublin, Bogatynia in Lower Silesia with industrial functions, and Tuszyn in Łódź, where a trade function has developed. Thus, one can expect that progress in the education of the local society and the analysed features may affect each other synergically in the future. The communes representing type six are located mostly in the western part of Poland: Wielkopolska (31), Lower Silesia (22) and West Pomerania (21).

Type eight includes communes where high education goes with an average level of economic development. Those units are concentrated in south-eastern voivodeships: Lublin (21), Mazovia (21 – the eastern and southern parts), Subcarpathia (19), Małopolska (15), and Opole (13). The favourable structure of the population's education results from its access to higher education (location in the vicinity of big university centres). Factors that impede an adequate level of economic development here are external and internal labour-related migrations (Heffner, Rauziński 2013), lack of local leaders as well as passivity of some of the best educated people. Moreover, fragmented agriculture dominates in these areas, where young people escape unemployment by extending the period of education. Unfortunately, despite acquiring at least secondary education, they enlarge so-called disguised unemployment. In my view, a good structure of education may stimulate the economic development of these areas in the future.

Type seven includes areas where a low level of education and an average level of economic development were observed. These communes are concentrated mostly in central Poland (Mazovia – 64, Wielkopolska – 38, Kujavia-Pomerania – 30, Łódź – 35) and western Poland (West Pomerania – 26, Lower Silesia – 21). The situation of agriculture is good there. One should also note that even a good situation of agriculture translates at most into an average level of socio-economic development.

Units characterised by an average level of education and a low level of economic development were classified into type nine. There are 262 communes (21.1% of their total number) of this type, located mostly in four voivodeships: Lublin (80), Subcarpathia (56), Małopolska (37) and Świętokrzyska Land (26). The units concentrated in those four voivodeships accounted for three-fourths of communes representing type nine. The population that dominates in these areas is rural and agricultural, usually characterised by a lower level of educational attainment than the inhabitants of cities (Frenkel 2012). However, in the case of fragmented and semi-subsistence agriculture, even the secondary level of education does not translate into a favourable (at least average) level of economic development.

7. Summing up

The above analysis allows one to state that there are vast regional disproportions, both in the educational attainment of the population and the level of economic development in the Polish rural areas.

The spatial diversification of the level of education can be analysed in terms of the core-periphery theory. The best educated citizens live in areas located in the influence zones of the biggest urban centres. The size of this zone depends on the size of a city and may include communes located in the first and second ring, but the influence of the city is not equal in all directions. For example, in the case of Warsaw, the communes neighbouring on the capital from the west are characterised by a higher level of education than the inhabitants of units stretching to the east of the capital. With the growing distance from the national urban centres, the level of education of

the rural population decreases. The most unfavourable structure of the population's education occurs in areas located peripherally in the voivodeships.

Clearly visible is the division of Poland, in terms of the level of economic development, into the western part characterised by superior values of the synthetic measure of development and the eastern part in a definitely worse economic condition, which results from historical factors (the partition of Poland). At the same time, the influence of urban centres on the development of areas included in their zone of influence becomes uncontested, which results in the division of the urban areas into integrated rural areas (located in the suburban zones of large cities) as well as indirect and peripheral rural areas (Wilkin 2007). Rosner and Stanny (2007) achieved similar results during a research on differences in the socio-economic development of rural areas, and so did Bański (2008) while identifying fields of economic success.

The research has shown a significant linear relation between the educational attainment of the population and the level of economic development of rural areas. The correlation coefficient amounts to 0.565, and the coefficient of determination $r^2 = 0.319$. However, it is hard to state unequivocally whether it is the level of education that stimulates economic growth or vice versa. I think that, so far, the rural population's qualifications are a secondary factor in the Polish circumstances. It results from the finding (Bański 2008, Kamińska 2010) that the primary factors of economic development are historical determinants (being part of the given partition), natural determinants (raw-material resources, conditions for the development of agriculture), location rent (a favourable location with respect to cities, areas attractive for tourists) as well as the presence of an economic entity (an industrial works, service providers) of at least regional significance (e.g. a voivodeship hospital in Morawica commune or a power plant in Połaniec commune – both examples from Świętokrzyska Land). The development of non-agricultural functions has caused an influx of highly qualified staff and the necessity to improve the education of the local society.

Suburban areas are especially privileged, with their high level of education going with a superi-

or level of economic development. Thanks to the synergic effect of both features, those are the areas of economic success with good prospects for the future.

In the case of a peripheral location, even a superior level of education is not a factor leading to economic development even at an average level.

Communes may reach a high level of economic development in some specific cases even with an unfavourable education structure. This is possible only if an economic entity of supra-regional importance operates in the given area. It diversifies the economic structure of the commune, creates non-agricultural workplaces, and results in an increase in local government's own revenues.

The economic situation is unsatisfactory in areas where the agricultural function dominates. It concerns both, communes with intensive, large-area farming, as well as those with the family-operated type – neither intensive, nor commodity-oriented. The difference between these communes is such that in the first case the level of economic development is average (in relation to Poland) and farming enables adequate living conditions for a farmer and his family, whereas in the second case, the level of economic development is lower than the average and farmers are forced to look for additional sources of income (often unearned sources: pensions, other social benefits). This is because agriculture does not create additional workplaces and does not increase the communes' revenues. It would be worthwhile to discuss a reform of the farmers' social security system (KRUS).

Spatial regularities were determined in the location of communes of various types:

1. communes with a high level of both analysed features are located around the biggest agglomerations,
2. communes included in types eight and nine are located mostly in south-eastern Poland, with the predominance of units performing agricultural and mixed functions characterised by fragmented family farming,
3. most units of type six are in north-western Poland, which is characterised by a significant share of non-agricultural functions, where communes with mixed and forest functions dominate,
4. units of type three are located mostly in north-eastern Poland where a whole range of

functions dominate in each commune and all the functions occur,

5. communes included in type two are located mostly in south-western Poland characterised by well developed non-agricultural functions,
6. in central Poland where functional diversification is observed, the type of commune depends on its location with respect to a city. Communes of types one and two concentrate in the vicinity of urban centres. Communes of type two (in the case of a significant share of non-agricultural functions) or types six and seven (in the case of dominating agricultural functions) dominate farther from cities.

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