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## Polish rural municipalities: Can we say what do people do there on the basis of the official data?

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**Abstract:** *On the basis of data on all of the Polish rural municipalities – close to altogether 1,600 entities – a preliminary study was carried out, meant to identify certain key characteristics of the population studied in terms of economic activity and its reflection through the indicators, related, first of all, to: (i) the non-agricultural employment, (ii) the number of businesses, (iii) the registered unemployment, (iv) the share of agricultural tax in the local budgets, (v) the overall structure of the local budgets, and (vi) the equipment with basic technical infrastructure.*

*Given the limitations of the official statistics, characterised in the paper; and often leading to statistical artefacts, the analysis attempts to verify certain simple hypotheses, which can be forwarded on the basis of these statistics. Some simple models and relations are identified for the entire population of the rural municipalities in Poland and for its significant sub-populations. This analysis constitutes also a preliminary step towards identification of regional differentiation with respect to the phenomena considered.*

*The primary purpose of the analysis, whose initial stages are presented here, is to identify the development paths of rural municipalities in order to be able to assess the quality (degree of balance or sustainability) of their development with respect to the paths identified.*

**Keywords:** *Poland, rural municipalities, municipality types, employment, balanced development, migrations*

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### Introduction – the administrative structure

Poland has a three-level administration structure (see Figure 1), with the upper level (NUTS-2) being constituted by 16 provinces (“voivodships”), each of these divided into the intermediate-level (NUTS-4) units of counties (“poviats”), 379 in total, and, at the lowest level, the municipalities, or communes (“gminas”), NUTS-5. Fig. 1 shows the structure of the Polish

administrative divisions, with emphasis placed on the distinction between central governmental and self-governmental bodies, functioning on the particular levels.

Poland is divided into roughly 2,500 municipalities of self-governmental character. Of these, some 300 are the urban communes, among them big cities, including the capital, and some 600 are urban-rural communes, meaning that a small town is merged in terms of administration with the surrounding rural commune. There are, namely, in Poland approximately 900 locations with formal “urban rights”, but many of them are really very small (e.g. 3,000-4,000 inhabitants). We use here the expressions like “roughly”, “some” etc. with respect to the numbers of units at various levels, because there are year-to-year changes with this respect (e.g. as of January 1st, 2009, a couple of small localities gained the “urban rights” and the respective municipalities moved from the “rural” to “urban-rural” category).

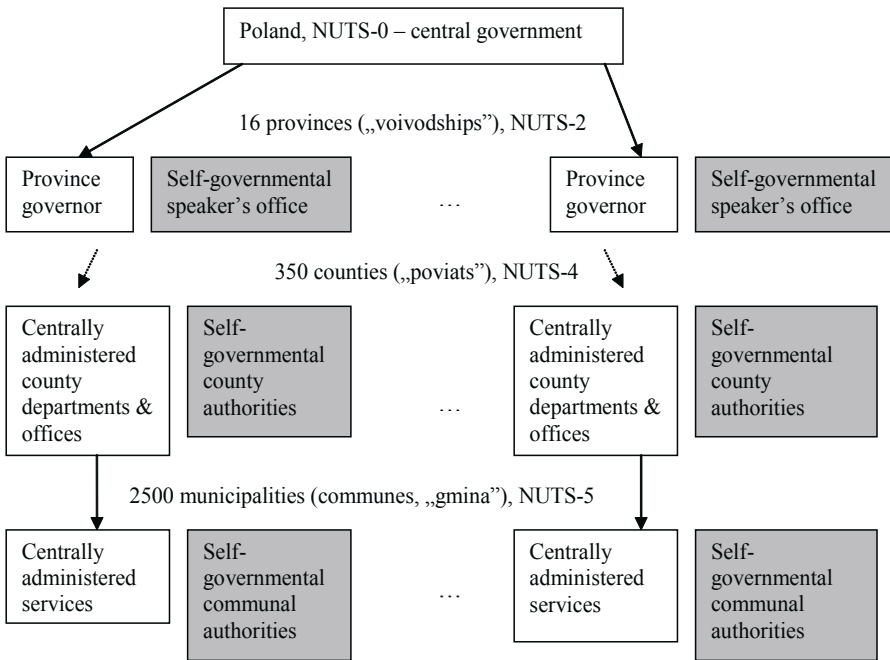
Below the communal level there are, in rural areas, village marshals, elected also through direct voting of the inhabitants, whose primary duties consist in tax and fee collection, and communication with the communal authorities.

Note that we speak of rural communes or even areas, we refer here to these formally rural entities on the NUTS-5 level, and not to any of the otherwise popular, but not unambiguous, definitions of “rurality” in terms of population densities and proportions of units with definite population densities. Later on we shall yet return for a while to this subject.

Communes have their own budget, made up of own revenues and means from the central administration, usually addressed to definite needs or projects. Under Polish conditions most of the revenue at the municipal level comes from the estate tax and the part of the personal income tax, which remains with the commune. Of course, in big city communes and in those, where highly earning companies are located, the share from corporate tax also makes up an important portion of the budget.

In principle, counties, which consist of just a couple up to a dozen or so communes, should provide, in a local urban centre (see the very similar numbers of counties and urban communes), the complete set of services (health care with a local hospital, secondary or tertiary education, court, etc.).

Naturally, rural communes are highly differentiated, their population usually in the thousands, but, actually, population densities ranging from about 20 to well above 200 (while the average for the whole of Poland, i.e. including urban areas, is at 130). The differentiation is, both in view of the intrinsic “statistical” properties (much larger group of objects) and the diversity of the actual situations in the municipalities, much bigger than in the other two types of communes (urban and urban-rural). This gives rise to the conviction that, indeed, there are different kinds of rural communes, not just in terms of their (proportion-wise) functionality, but over a much broader socio-economic domain.



**Figure 1.** Overall structure of Polish territorial administration. NUTS-1 and NUTS-3 levels in Poland are only statistical entities

## The goal of the study and the data problem

On the basis of data on all of the Polish rural municipalities a preliminary study was carried out, meant to identify some key characteristics of the population studied in terms of economic activity and its reflection through the indicators, related, first of all, to: (i) the non-agricultural employment, (ii) the number of businesses, (iii) the registered unemployment, (iv) the share of agricultural tax in the local budgets, (v) the overall structure of the local budgets, and (vi) the equiptment with basic technical infrastructure.

This attempt was meant to provide an initial insight into the existing *types* or *paths of development* of the communes, meaning both the magnitudes of definite variables and indicators, and relations between them. The objective, in turn, of such an exercise would be to gain the capacity of relating the actual developments to the *type- or path-dependent indicators of balanced or sustainable development*. It is, namely, assumed that for clearly differing trajectories of socio-economic variables the quantitative and qualitative criteria of the balanced or sustainable growth must also differ.

Thus, while the differentiation of rural communes in Poland is, in terms of almost all characteristics, much bigger than in the case of the two other categories of communes, it is interesting to try to quantitatively characterise the

potential types of communes with respect to their socio-economic features, emphasis being placed on the economic activity of the inhabitants.

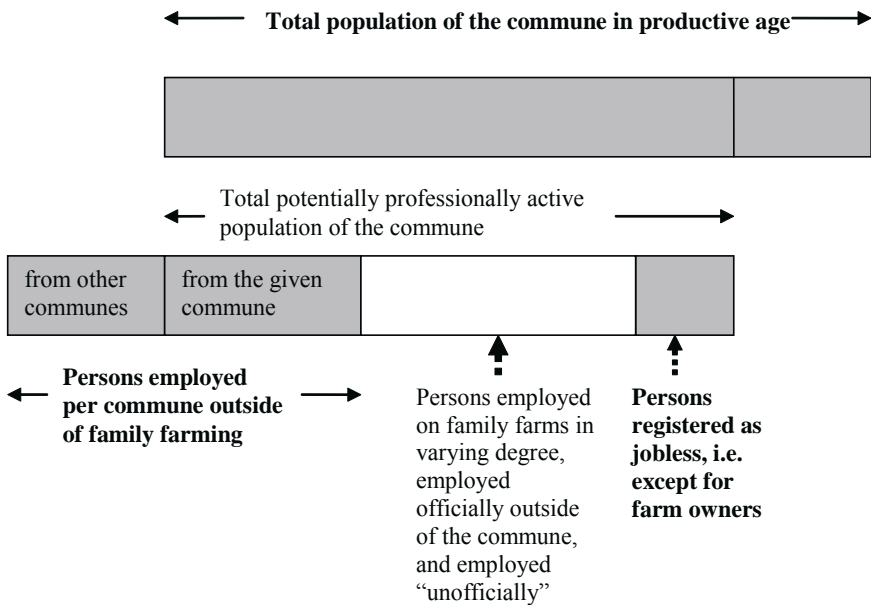
Such an attempt encounters in Polish conditions three major obstacles: **(1)** the acute shortage of data on employment in farming, due to lack of data on family farm employment, since there is no “official” and systematic registering of employment within the family farms (such data are available for the true-to-life farming enterprises, though even in this case one can hardly distinguish farming from industrial employment), this is amplified by the fact that farm owners cannot register as unemployed, **(2)** the data on (non-agricultural) employment are provided according to the seats of the companies, and not according to the place of residence of the employed<sup>16</sup>, and **(3)** farmers are not obliged to register their petty businesses, so that very often small repair and craft shops exist on the farms, agriculture being frequently only subsistence or even hobby activity in such cases. Figure 2 shows schematically the potential relations concerning the data in question, indicating the ambiguities and traps. Hence, the conclusions from the data available must be drawn with utmost care, and additional information must be used in order to formulate more in-depth analytical results. That is also why the modest study reported relies on several indicators and tries to look at a number of diagnostic features.

The data we refer to are the data from the so-called Regional Data Bank (BDR) of the Central Statistical Office (GUS) of Poland. This is, indeed, a very rich database, with hundreds of data items on each commune, annual data, in principle, for the period, more or less of the last decade (i.e. after the administrative system in Poland had been reshuffled). We refer to this database for two essential, interrelated reasons: (1) it is generally the most reliable of the official data sources in Poland in view of the repetitiveness, methodological homogeneity, interrelations with other data (migrations, natural movement, etc.), and degree of use; (2) it, specifically, avoids, to a larger extent than other sources, the biases associated with the regional and local differentiation in the intensity of various data-twisting phenomena.

While, therefore, it is possible and justified, for various purposes, to use other and additional data, like in determination of the “functions” of definite areas, and of municipalities in particular, it is obvious that these are (also) just approximations of a certain reality, and that uncovering of relations within the BDR data is of primary importance in view of the fundamental significance of these data.

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<sup>16</sup> This applies to the regularly collected statistical data, contained in the Regional Data Bank (BDR) of the Central Statistical Office (GUS). There exist other sources of information, including data on on-farm employment, like the National Census, the Agricultural Census, the farmers’ social security registration or the special studies, made by the Central Statistical Office (BAEL), but the reliability and the verifiability of these other data is much more doubtful (e.g. there are regions in Poland where it is suspected that up to 25% of persons registered for farmers’ security system do in fact live off non-agricultural jobs elsewhere).



**Figure 2.** Schematic view of the data on employment in communes used in the study

The data we refer to are the data from the so-called Regional Data Bank (BDR) of the Central Statistical Office (GUS) of Poland. This is, indeed, a very rich database, with hundreds of data items on each commune, annual data, in principle, for the period, more or less of the last decade (i.e. after the administrative system in Poland had been reshuffled). We refer to this database for two essential, interrelated reasons: (1) it is generally the most reliable of the official data sources in Poland in view of the repetitiveness, methodological homogeneity, interrelations with other data (migrations, natural movement, etc.), and degree of use; (2) it, specifically, avoids, to a larger extent than other sources, the biases associated with the regional and local differentiation in the intensity of various data-twisting phenomena.

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## The doubts and the hypotheses

We shall now present some of the consequences of the situation depicted above, first in the form of a couple of observations, emphasising the shortcomings of the statistics, and then in the form of some hypotheses, linking the variables and the phenomena here considered.

Table 1 presents the overall relative statistics from the domain for the years 2003-2006. One is definitely surprised by the maximum for the relative number of persons employed in a rural commune: around 4,500 per 1,000 inhabitants! Even though such data are in terms of the definition adopted “true”, and, indeed, informative (employment provided in a given commune), they – as shown in Fig. 2 – leave completely unknown the numbers of persons having a job, but who come to work there from other communes (where they actually live and pay taxes). In the particular maximum case shown in Table 1 we deal with a formally rural municipality hosting a large-scale opencast lignite mining and power generation complex. Another clear consequence of the previously mentioned character of the data is the joint share of the employed and jobless, on the average at around 17% of the total population! Thus, a vast proportion of farming employment is concealed away from these data.

On the other hand, though, it should be noted that the minima of the relative numbers of registered businesses are consistently higher than those of the registered employed persons! This is, definitely, not an error in data (in principle, a person might own more than business, although it would certainly be strange to have the average number of businesses per one professionally active person higher than one), but calls for a deeper insight as to where these minima are attained and under what other conditions.

**Table 1.** Registered employed, jobless and businesses per 1,000 inhabitants in rural communes in Poland in 2003-2006 (approximated to the nearest integer)

Category	Years	Minimum	Mean	Maximum
Registered employed per 1,000 inhabitants	2003	18	82	4580
	2004	19	83	4439
	2005	18	85	4352
	2006	22	87	4108
Registered unemployed per 1,000 inhabitants	2003	18	91	306
	2004	17	87	215
	2005	16	82	211
	2006	12	70	270
Registered businesses per 1,000 inhabitants	2003	22	57	316
	2004	21	55	324
	2005	23	56	329
	2006	23	57	349

Source, here and further on: own calculations on the basis of data from BDR GUS

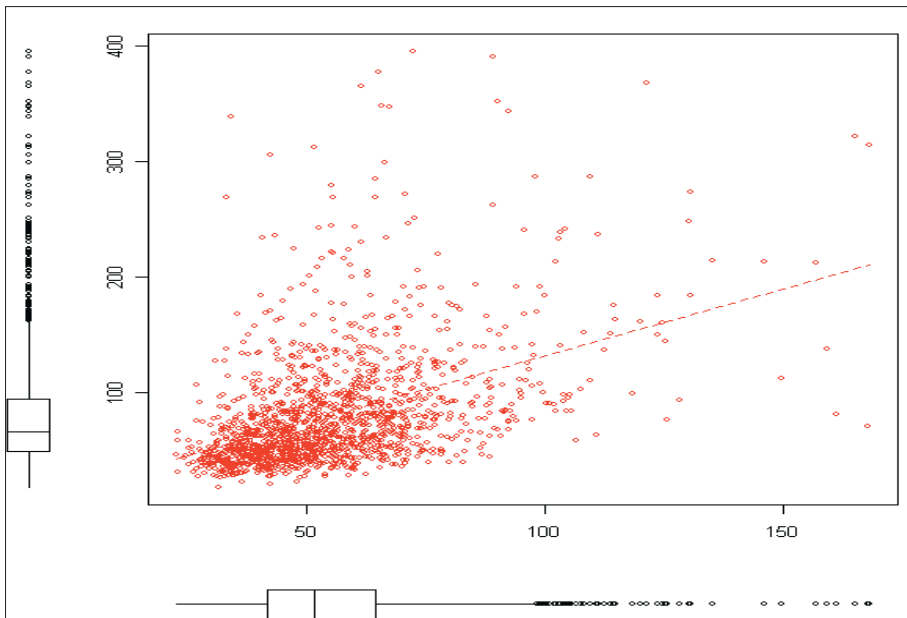
The character of these data is also very clearly confirmed by Figure 3: a cone is visible, with a very dense part close to the “hard bottom” in terms, especially, of the number of employed. One can suspect that in some cases just the municipal staff makes up for the statistics, and in fact, in some communes *virtual zero registered employment* is recorded!

It is exactly in view of this wide gap that several other sources of data are being used in Poland, as mentioned in footnote 16, having a different status and being less reliable. Thus, in particular, it is pointed out that declarations related to the farmers' social security system are especially suspect in some regions with supposed rural-agricultural overpopulation (South-East of Poland), where many alleged farm owners and farmhands, making up this overpopulation, actually work unofficially, on place, in other parts of Poland or abroad.

On the other hand, an unquestionably positive phenomenon is constituted by the observed neat improvement trend of the employed-unemployed ratio, both in terms of minima (from 1 to 1.83) and the means (from 0.90 to 1.24).

Finally, Table 1 shows the extraordinary differentiation, characterising the population of rural communes in Poland – even for the quite limited, as to their values, variables of registered employment and joblessness the range is more than one order of magnitude.

This latter statement suggests that some reasonable hypotheses might be formulated and then checked referring to the internal diversity of the population of rural communes. Although Figure 3 does not provide any clear hint as to an effective breakdown of this population, it is felt that even an artificial division of the population might bring some reasonable relations between respective variables.



**Figure 3.** Number of businesses per 1,000 inhabitants (horizontal axis) against the number of registered employed per 1,000 inhabitants (vertical axis) in rural communes in Poland in 2005 (upward extremes removed)



So, the basic proposition is that:

- when both employment and joblessness figures are low, then we deal with the truly farming and/or peripheral areas, whose characteristics qualitatively differ from those with higher figures on these dimensions,
- the numbers of businesses should, roughly, also follow this image, but if they are, “surprisingly”, high, this may mean that the area offers little other chances, even within farming itself,
- it may also occur that employment and joblessness are positively correlated over some segments along the “rural-to-urban” dimension,
- it can therefore be hypothesised that a connection with population density exists, and also, of course, with location (e.g. peri-urban, tourist, peripheral, etc.).
- it is interesting to see whether, and if so – what is the connection with the financial standing of the communes (the capacity of implementing own plans, but also the indication of the economic standing of the inhabitants).

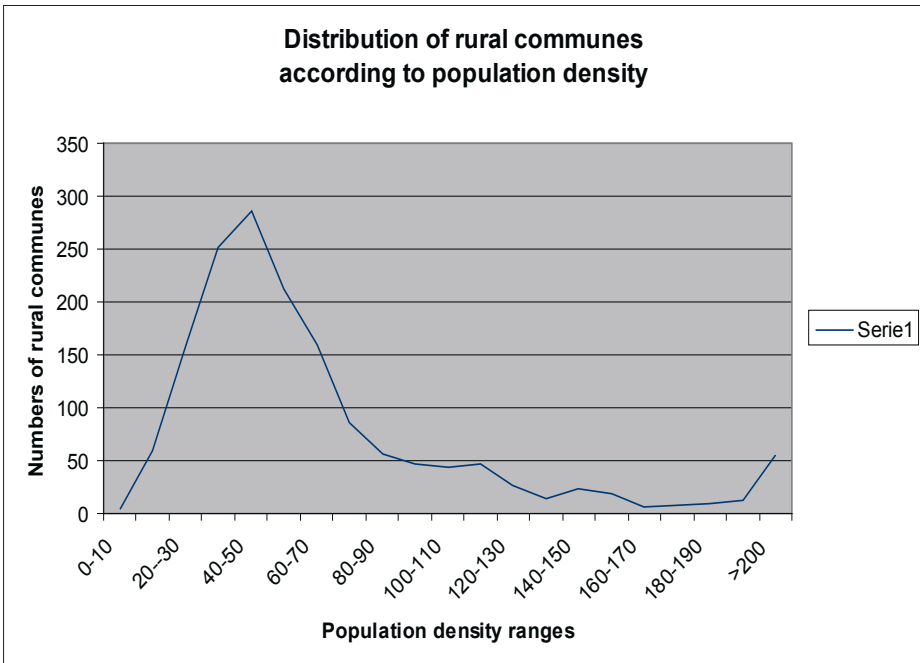
We shall follow here some of these lines of reasoning or questioning, leaving other ones for further study.

### **To what extent is population density a telling dimension?**

The general hypothesis behind asking the question is that in municipalities with higher population density other economic activities must have developed to the extent showing in the official statistics through employment and business registration data. (It is, in this context, of secondary importance, what is the location of a particular commune, the location aspect being relegated to a separate study, associated mainly with the reach, character and dynamics of urban influence.) If, however, we do not find traces of the tendency mentioned above in a definite group of communes, some (more) specific factor(s) must be at work, related primarily to either hidden existence or lack of multifunctionality.

Figure 4, showing the numbers of communes in successive intervals of population density values, largely confirms the image from Figure 3. The nature of this distribution is emphasised by the average (over the population of rural communes) population density equal 68.4 persons per sq. km, as compared to the median – 51.3, and the average population density on the area of all the rural communes in Poland – 54.0. This total area, namely, of 199,475 sq. km altogether, is inhabited by close to 11 million people.

Given that the average population density in Poland is at slightly more than 120 persons per sq. km, and the distribution from Figure 4, the threshold of roughly 90-100 might be considered appropriate as the first approximation for analysing the sub-populations of rural communes. Table 2, below, provides a complementary information to that of Figure 4.



**Figure 4.** Distribution of numbers of rural communes in Poland along population density value (2006)

**Table 2.** Population numbers in rural communes with definite population density levels (2006)

Population in rural communes with population density exceeding:							
0 (all communes)	80	100	120	140	160	180	200
10 760 000	3 736 000	2 827 000	1 948 000	1 569 000	1 093 000	913 000	689 000

Let us add that there are 54 rural communes with densities above 200 persons per sq. km, and 9 with densities exceeding 400! The maximum is close to 550! Altogether, we are not dealing with a marginal population at all.

In order to gain an additional insight into the processes, driving the changes in the distribution of Figure 4, let us cast a look at simple linear regression models of migration balances, identified for rural communes in Poland, as a function of seven selected variables.

**Table 3.** Linear regression models of net migration in rural communes in the years 2003-2006

Model element / variable	Scale of magnitude	2003	2004	2005	2006
Constant	-	-11.4	-10.9	-8.5	-8.9
Population density	100	2.8	1.6	1.8	1.7
Own revenues of commune per capita	102	-0.001	-0.002	-0.001	-0.0001
Employed per 1000 inhabitants	101-102	0.013	0.012	0.011	0.006
Jobless per 1000 inhabitants	101	-0.013	-0.015	-0.030	-0.004
Businesses per 1000 inhabitants	101-102	0.097	0.118	0.104	0.079
% of population with sewage	101	-0.01	-0.01	0.002	-0.02
Financial independence	10-1	16.42	18.38	12.74	20.22
R2	-	0.34	0.33	0.32	0.36

Thus, given that the most important (and statistically significant) role in the models is played by *population density*, *financial independence* of the municipality, and the *number of businesses per 1000 inhabitants*, it is obvious that migrations tend towards the places “where life (already) is”, amplifying, naturally, the existing differentiation. Yet, is this fact (and the associated process) sufficient to warrant the (trivial) use of population (density) as the discriminating / classifying variable?

At the end of this section let us, therefore, look yet at the correlation coefficients between some variables, characterising rural communes. The few places with higher correlation values in Table 4 have been indicated in boldface. The observations from Table 3 are, indeed, confirmed, but the implied strength of interdependences is not overwhelming.

There are clearly two variables in this selection that play the “negative” role. One is, of course, the ratio of the jobless, but the other one is the farming tax per capita, an element of the municipal budget. Definitely, it is a telling indicator of the rural / agricultural / peripheral character of the communes.

Two other features of the interrelations ought to be emphasised, as well. First is the curiously indicative role of “financial independence” of the communes, which seems to collect, or represent, several other characteristics. Then, the “detached” character of the variable expressing the number of graduates of secondary and higher educational establishments, which is due to the fact that only few rural communes actually run such establishments (usually one or more of primary schools and a gymnasium, a lower secondary school).

**Table 4.** Correlation coefficients for selected variables characterising rural communes (2006)

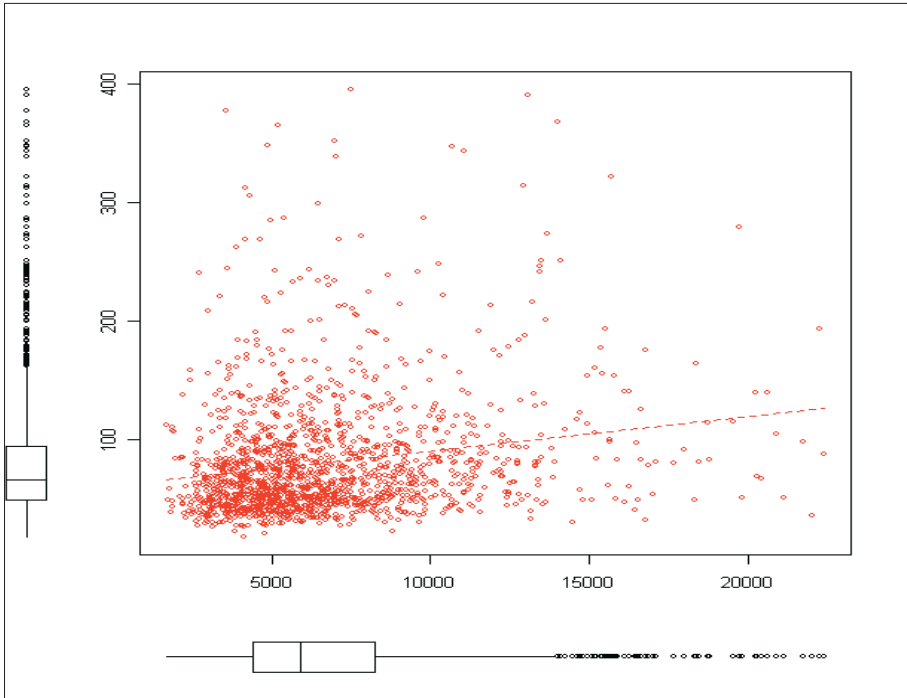
Variables	1	2	3	4	5	6	7	8	9
1. Population density	1	0.094	-0.326	0.302	0.318	0.024	0.057	0.283	-0.339
2. Employed per 1000	0.094	1	-0.085	0.224	0.268	0.045	0.702	0.392	-0.120
3. Jobless per 1000	-0.326	-0.085	1	-0.107	-0.271	-0.043	-0.080	-0.189	0.192
4. Businesses per 1000	0.302	0.224	-0.107	1	0.460	0.010	0.253	0.613	-0.252
5. Net migration	0.318	0.268	-0.271	0.460	1	-0.001	0.242	0.526	-0.263
6. Secondary graduates per 1000*	0.024	0.045	-0.043	0.010	-0.001	1	-0.016	0.005	-0.047
7. Investment outlays per capita**	0.057	0.702	-0.080	0.253	0.242	-0.016	1	0.235	-0.124
8. Financial independence***	0.283	0.392	-0.189	0.613	0.526	0.005	0.235	1	-0.101
9. Farming tax per capita	-0.339	-0.120	0.192	-0.252	-0.263	-0.047	-0.124	-0.101	1

\* Graduates from secondary and higher educational establishments, located in the commune

\*\* Investment outlays from municipal budget per capita

\*\*\* Ratio of own revenues of the municipality to total budget

In particular, the role of population density does not seem to be “decisively” telling, even though it certainly plays some role, especially when compared to most of other variables. The apparent nexus is constituted by the **(i) number of businesses per 1000 inhabitants**; **(ii) net migration**, and **(iii) financial independence of the communes**. The strong link between the number of employed per 1000 inhabitants and municipal investment outlays per capita seems to result straight from the financial capacity of the communes, indirectly due to the share of the employed, influencing the municipal budget.



**Figure 5.** Population numbers (horizontal axis) against the number of registered employed pr 1,000 inhabitants (vertical axis) in rural communes in Poland in 2005 (extremes removed)

Especially striking is the lack of connection between population density and employment, while there appear to exist connections between population density on the one hand, and joblessness, business registrations and net migration. Indeed, Figure 5 confirms that it is hard to associate a distinct statistical (to say nothing of causal) relation to the population dimension, through a pattern that is almost identical with that of Figure 3.

In the attempt to verify the hypothesis of different characteristics of municipalities along some of the dimensions analysed, therefore, another way of proceeding was selected.

Namely, the population of rural communes was divided into pairs of *overlapping sub-populations*, one division pertaining to the number of businesses per 1000 inhabitants, and the other – to the number of registered employed per 1000 inhabitants. The two divisions and the numbers of communes in the respective sub-populations are shown in Table 5.

**Table 5.** Divisions into two sub-populations – limits and numbers of communes

Division according to:	Definitions	Numbers of communes in consecutive years			
		2003	2004	2005	2006
Number of registered employed per 1000 inhabitants	> 90	410	416	450	458
	< 100	1281	1261	1240	1214
Number of registered businesses per 1000 inhabitants	> 70	286	255	274	310
	< 75	1398	1407	1395	1360

The data from Table 5 confirm the ones from Table 1, of course, along with the improved situation in terms of employment. For each of the sub-populations the correlation coefficients were calculated for selected variables, similar as in Table 4. Thus, Table 6 compares the correlation coefficients of the registered employed per 1000 inhabitants for the two pairs of sub-populations.

**Table 6.** Correlation coefficients of the registered employed per 1000 inhabitants for the two pairs of sub-populations of rural communes, defined in Table 5 (ranges of values for 2003-6)

Variables, with which correlation was calculated	Division according to the employed per 1000 inhabitants		Division according to registered businesses per 1000 inhabitants	
	> 90	< 100	> 70	< 75
Population density	0.03 - 0.04	0.09-0.15	0.18 - 0.23	0.02
Agricultural tax per capita	-0.10	-0.05 - -0.07	-0.10 - -0.15	-0.07 - -0.09
Investment outlays per capita**	0.72 - 0.88	0.00 - 0.07	0.25 - 0.27	0.62 - 0.77
Employed per 1000 inhabitants	1	1	1	1
Jobless per 1000 inhabitants*	-0.11 - -0.12	0.08 - 0.12	-0.22 - -0.28	-0.02 - -0.04
Businesses per 1000 inhabitants*	0.08 - 0.09	0.35 - 0.39	0.33 - 0.34	0.14 - 0.15
Graduates per 1000 inhabitants	0.00 - -0.01	0.12 - 0.15	0.14 - 0.18	0.02 - 0.03
Net migration	0.13 - 0.23	0.19 - 0.30	0.28 - 0.31	0.17 - 0.23
Financial independence	0.26 - 0.44	0.30 - 0.40	0.49 - 0.53	0.36 - 0.42
Revenue from personal income tax per capita*	0.13 - 0.15	0.33 - 0.37	0.44 - 0.48	0.20 - 0.23
Revenue from corporate tax per capita**	0.76 - 0.93	0.23 - 0.25	0.54 - 0.60	0.81 - 0.93

It can be concluded, on the basis of Table 6 that we indeed deal with two different sub-populations, although this initial choice of the division limits was only superficially guided by the descriptive statistics.

First, let us notice high stability of the coefficient values over the period studied. In addition, some of the coefficient values are persistently high, while not reflecting the “arithmetically” derived variables. This confirms the supposition that we can treat these (or similarly derived) sub-populations as proper objects of study.

Then, there are very distinct differences between the two sub-populations, in terms of relations to some other variables, indicated in the table by bold and italic figures. We shall return to them when formulating the initial conclusions, but now the tables, analogous to Table 6, shall be presented, for the variables of the number of registered jobless per 1000 inhabitants (Table 7) and the number of registered businesses per 1000 inhabitants (Table 8).

**Table 7.** Correlation coefficients of the registered jobless per 1000 inhabitants for the two pairs of sub-populations of rural communes, defined in Table 5 (ranges of values for 2003-6)

Variables, with which correlation was calculated	Division according to the employed per 1000 inhabitants		Division according to registered businesses per 1000 inhabitants	
	> 90	< 100	> 70	< 75
Population density*	-0.41 - -0.46	-0.27 - -0.29	-0.45 - -0.50	-0.28
Agricultural tax per capita	0.19 - 0.24	0.15 - 0.17	0.31 - 0.39	0.13 - 0.16
Investment outlays per capita	-0.06 - -0.11	-0.02 - -0.05	0.02 - -0.09	-0.03 - -0.06
Employed per 1000 inhabitants*	-0.11 - -0.12	0.08 - 0.12	-0.22 - -0.28	-0.02 - -0.04
Jobless per 1000 inhabitants	1	1	1	1
Businesses per 1000 inhabitants	-0.14 - -0.19	-0.02 - 0.01	-0.04 - -0.09	0.00 - 0.01
Graduates per 1000 inhabitants	-0.05 - -0.07	-0.03 - -0.08	-0.07 - -0.10	-0.04 - -0.07
Net migration*	-0.29 - -0.32	-0.08 - -0.23	-0.33 - -0.41	-0.09 - -0.19
Financial independence	-0.18 - -0.26	-0.10 - 0.03	-0.07 - -0.28	0.00 - -0.10

**Table 8:** Correlation coefficients of the registered businesses per 1000 inhabitants for the two pairs of sub-populations of rural communes, defined in Table 5 (ranges of values for 2003-6)

Variables, with which correlation was calculated	Division according to the employed per 1000 inhabitants		Division according to registered businesses per 1000 inhabitants	
	> 90	< 100	> 70	< 75
Population density	0.29 - 0.32	0.19 - 0.29	0.17 - 0.21	0.16 - 0.18
Agricultural tax per capita	-0.24 - -0.26	-0.18 - -0.21	-0.17 - -0.18	-0.15 - -0.17
Investment outlays per capita**	0.22 - 0.26	0.01 - 0.11	0.42 - 0.47	0.04 - 0.07
Employed per 1000 inhabitants*	0.08 - 0.09	0.35 - 0.39	0.33 - 0.34	0.14 - 0.16

Variables, with which correlation was calculated	Division according to the employed per 1000 inhabitants		Division according to registered businesses per 1000 inhabitants	
Jobless per 1000 inhabitants	-0.14 - -0.19	-0.02 - 0.01	-0.04 - -0.09	0.00 - 0.01
Businesses per 1000 inhabitants	1	1	1	1
Graduates per 1000 inhabitants	-0.02 - -0.07	0.01 - 0.02	-0.06 - 0.01	0.02 - 0.03
Net migration	0.45 - 0.46	0.35 - 0.43	0.29 - 0.31	0.27 - 0.31
Financial independence	0.49 - 0.58	0.43 - 0.50	0.39 - 0.53	0.37 - 0.41

## Some conclusions

The conclusions we formulate here are primarily related to the further course of the study, as the results reported constitute just the starting point for a broader analysis, involving also the geographical, or regional, aspect of the phenomena considered.

Thus, definitely, the variable of registered employment is telling for the division of the population of rural communes in Poland into the respective sub-populations. Based on Tables 6, 7 and 8 we can state that the other two variables here considered cannot be treated as thus telling (especially not the joblessness). Thereby, a foundation is provided for a more detailed insight into the employment and professional activity issues, designed, in terms of classes of communes and variables looked at, following the here presented results and conclusions.

Even though population density was not found to determine (decisively) the shape of the relations studied, it was found to be closely associated with some of the key variables. Quite in line with the models of Table 3, this variable displays stronger “influence” in the “upper” sub-populations. On the top of this, such variables as, in particular, capital outlays per inhabitant have been found as closely related to the division sought.

Although of feeble strength, the previously suggested positive correlation of employment and joblessness data was also found (Tables 6 and 7) for the lower employment-wise sub-population.

The primary outcome of the consideration of the results here quoted consists in the possibility of asking reasoned questions, oriented at causal relations, such as:

- wherefrom the striking difference between the correlations of employment and capital outlays in the two employment-wise subpopulations? is it just due to the very low such outlays in the lower sub-population? and, even if so, why are these (per capita!) outlays so low there?
- a similar question can be asked with respect to the municipal budget revenue from the corporate tax: are the differences, shown in Table 6, due to the



fact that, in particular, employment and associated revenues, personal and municipal, are not so much associated with the total number of registered businesses, as with the existence of larger businesses, both employing more people and paying altogether higher payrolls; yet, the probability of appearance of such businesses increases, of course, with the total number of businesses within an area;

- the above question naturally extends to the number of employed, as also seen in Table 8;
- further, why the revenues from personal income tax display (even though quite modest) reverse shift in correlation? (we should keep in mind that all these are relative, not absolute values).

These are just examples of the research issues to be undertaken in the next stage of research, also, as mentioned, in the spatial dimension, both regional and in terms of the “urban-rural” and/or “central-peripheral” axis.

Even though the study, as of this instance, does not take up explicitly the aspect of dynamics, i.e., the data on the past and the consideration of potential future changes in the characteristics analysed, the hypotheses considered are also related to the supposed dynamics and its future course. A kind of “ergodic” assumption could, namely, be made, meaning that the fate of some types of communes shall – or at least can – constitute the future pattern for some other ones. (This applies, in a particular manner to the “extreme” types, like the municipalities in the suburban zones of larger agglomerations and their actual and potential transformations, as well as the peripheral municipalities, with low level of economic activity and threatening or actual depopulation.)

On the other hand, the hypotheses forwarded concern also the limits to the thus conceived “ergodicity”, that is: is this particular kind of evolution sustainable? what are the limits to the repetition of this kind of evolution? and: what are the alternative paths?

## And an illustration

To illustrate the aspect of spatial dimension we shall quote at the end two tables. The first of these, Table 8, shows the “top 20” communes in the ranking, based on the decreasing values of the difference between two indicators, one called “*economic*”, summing up the following here considered relative variables: (i) registered employment per 1000 inhabitants, (ii) number of businesses registered per 1000 inhabitants, (iii) jobless per 1000 inhabitants (entered as negative), (iv) net migration, (v) investment-project-related expenditures from the municipal budget per capita, and (vi) expenditures from the municipal budget on communication and transport per capita, and the other one called “*civilisational*”, summing up (i) the number of graduates of secondary and higher schools, (ii) number of computers in schools located in the municipality per 1000 inhabitants, (iii) water supply system availability in % of inhabitants, (iv) and (v) sewage and wastewater treatment facility availability, in % of inhabi-

tants served. Thus, the “top 20” communes here listed in Table 8 feature the biggest (absolute) differences between the values of the two indicators.

**Table 8.** Top 20 communes with the biggest differences of the economic and civilisational indicators

Commune (area in Poland)	Type	Economic	Civilisational	Absolute difference
Józefów (near Warsaw)	1	537.22	62.73	474.49
Łomianki (near Warsaw)	3	547.05	83.49	463.56
Raszyn (near Warsaw)	2	588.08	158.83	429.25
Michałowice (near Warsaw)	2	563.22	179.85	383.37
Stryków (near Cracow)	2	361.44	13.38	348.06
Siewierz (Silesia)	3	432.91	102.71	330.20
Radziejowice (not far from Warsaw)	2	338.54	33.19	305.35
Jabłonna (near Warsaw)	2	311.01	39.81	271.20
Marki (near Warsaw)	1	373.17	105.78	267.39
Pelczyce (Western Pomerania)	3	-3.76	261.22	264.98
Puszczkowo (near Poznań)	1	428.25	168.29	259.96
Bełzec (region of Lublin)	2	272.60	20.19	252.41
Karnice (Western Pomerania)	2	-57.98	192.54	250.52
Podkowa Leśna (near Warsaw)	1	397.35	147.04	250.31
Grzmiąca (Western Pomerania)	2	-36.72	208.12	244.84
Ślemień (Beskid Mts., near Silesia)	2	254.03	11.67	242.36
Dobra (Western Pomerania)	3	-18.56	215.55	234.11
Trzciana (not far from Cracow)	2	242.67	12.81	229.86
Radzymin (near Warsaw)	3	301.89	75.77	226.12
Dębe Wielkie (region of Warsaw)	2	238.43	16.39	222.04

Type: 1 – urban; 2 – rural; 3 – urban-rural

It is, indeed, highly striking that this table gathers almost exclusively, within two extremes (i.e. of municipalities with the economic indicator overwhelmingly higher than the civilisational one, and vice versa), two kinds of communes: **(i)** the suburban, peri-urban or “satellite” municipalities of large agglomerations (where the economic aspect is, as a rule, far in excess of the civilisational one), and **(ii)** the well-equipped, in terms of basic infrastructure, peripheral communes of the post-state-farm areas, within the territories formerly belonging to Germany, where there is virtually no economic activity and outmigration takes place nowadays (it ought to be emphasised that many of those municipalities are located close to very attractive areas from the point of view of tourism; thus, there are often, within one county, deeply depressed and dynamically developing communes, side by side). Definitely, for the sake of further study these two groups should be kept apart as “special cases” of the (nominally) rural areas.

Let us return here to the issue of proper definitional “rurality”. As indicated, we deal in the study with formally rural municipalities in terms of the Polish territorial administration. This is not only for the sake of simplicity (the definitions are “given”), but also in view of the policy perspective, which has to account for the definite competence of local authorities of different levels, and of different types. It is highly probable that most of the communes from group (i) above would end up as parts of “urban” areas, were the definitions of OECD, EU etc., followed – this, however, for quite specific a priori defined areas, encompassing these communes. For other ones, they may still be perceived as rural. The quasi-infinite regression problem arises, which we do not want to take up here, and thus stick to the formal designation of the respective territories. In further course of the study an attempt might be undertaken to improve the definitions of rural areas, alluded to here.

Then, Table 9 shows the top 40 rural communes with respect to population density. There is a definite overlapping of the two subsets of communes, associated with the correlation of population density and the variables forming the economic indicator. It can, of course, be argued that most, if not all, of the “rural” communes with high population densities could have been transferred to the category of urban units. This, however, is not so simple. Decisions of this sort – like everywhere in the world – are not being made overnight based on just one criterion. Tradition, cultural and historical aspects play decisive role. This applies equally to municipalities that could have been “absorbed” by their respective urban agglomerations, as representing their quasi continuation, and to that can hardly be (directly) associated with any urban agglomeration. Yet, even if some of those were thus transferred, the phenomenon would still be there, though of somewhat smaller proportions.

Actually, we can see that a vast majority of the communes listed in Table 9 make, in fact, the elements of (broader) agglomeration or direct influence zones of just a couple of Polish large urban agglomerations: (Upper) Silesia (3-5 million inhabitants) – 24 out of the 40 above, Warsaw (2.5 million) – 4 out of 40, Cracow (up to 1million) – 5 out of 40, Lodz (close to 1 million) – 2, Poznań (half a million) – 1, as well as a couple of smaller centres, virtually uniquely in the quickly developing South-East of the country (Rzeszów, Krosno, Tarnów). Most presumably, with the consideration of less densely populated municipalities, other agglomerations and their influence zones would appear, as well, but it is worth emphasising that yet in the next dozen or so communes in the same ranking the very same spatial organisms appear almost uniquely. This also calls for a special analytic, as well as administrative treatment of these units, so as to, generally, discern the “proper rural” from what can be called “suburban” or “urbanising” or “post-agricultural”, but also to differentiate the urban agglomerations (in Poland) with respect to the characteristics of their surrounding zones.

In further course of the study these issues shall be taken up, first having in mind the separation of the types of communes, mainly from the point of view of the occupations of their inhabitants.

**Table 9.** Polish (formally) rural communes with the highest population density (2006)

Name of commune, corresponding county	Population density (persons per sq. km)	Nearest urban agglomeration and relation to it
Buczkowice, Bielsko-Biała	548	Silesia, southern border, tourism-oriented
Ksawerów, Pabianice	527	Lodz, adjacent to the South
Andrespol, Łódź	503	Lodz, East
Jejkowice, Rybnik	487	Silesia, western edge
Świerklany, Rybnik	466	Silesia, western edge
Michałowice, Pruszków	452	Warsaw, adjacent to the South-West
Raszyn, Pruszków	452	Warsaw, adjacent to the South
Gaszowice, Rybnik	440	Silesia, western edge
Kozy, Bielsko-Biała	435	Silesia, southern border
Markłowice, Wodzisław	373	Silesia, western edge
Łodygowice, Żywiec	370	Silesia, southern border
Ornontowice, Mikołów	360	Silesia, centre-South
Wilkowice, Bielsko-Biała	360	Silesia, southern border
Godów, Wodzisław	328	Silesia, western edge
Zielonki, Cracow	326	Cracow
Krościenko Wyżne, Krosno	318	Local urban centre of Krosno
Jaworze, Bielsko-Biała	313	Silesia, southern border
Miedzna, Pszczyna	308	Silesia, South
Gorzyce, Wodzisław	304	Silesia, western edge
Zebrzydowice, Cieszyn	304	Silesia, southern border
Czerwona, Poznań	290	Poznań
Chybie, Cieszyn	287	Silesia, South-West
Gierałtowice, Gliwice	281	Silesia, West
Tarnów, Tarnów*	280	Local urban centre of Tarnów
Bestwina, Bielsko-Biała	277	Silesia, southern border
Miejsce Piastowe, Krosno	262	Local urban centre of Krosno
Stare Babice, Warsaw West	260	Warsaw, adjacent to the West
Mogilany, Cracow	260	Cracow, adjacent to the South
Świerklaniec, Tarnowskie Góry	246	Silesia, North
Siepraw, Myślenice	246	Cracow, southern extension
Krasne, Rzeszów	245	Rzeszów
Chełm Śląski, Bieruń-Lędziny	245	Silesia, centre-South-East
Psary, Będzin	244	Silesia, centre
Lesznowola, Piaseczno	239	Warsaw, adjacent to the South
Rędziny, Częstochowa	235	Częstochowa (Silesian influence)
Pawłowice, Pszczyna	232	Silesia, South

Name of commune, corresponding county	Population density (persons per sq. km)	Nearest urban agglomeration and relation to it
Porąbka, Bielsko-Biała	230	Silesia, southern border
Zabierzów, Cracow	227	Cracow, East
Mszana, Wodzisław	225	Silesia, western edge
Oświęcim, Oświęcim*	224	Silesia – Cracow

\* rural communes surrounding the urban communes with county seats;

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