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Socio-economic transformation of Poland's largest cities over the years 1998–2008: A multivariate approach

Abstract: This article seeks to show changes in the socio-economic structure of the thirty largest Polish cities, in topological relations, and in the type of socio-economic differences among them. The research was carried out at three analytical levels: of the unitary variables chosen, principal components, and in a synthetic approach (cluster analysis). To assess structural changes, use was made of comparative statics involving an analysis of the 1998 and 2008 situations. The period analysed was one of dynamic changes in the determinants of the socio-economic development of Polish cities, with four reforms of key significance being introduced, not all of them crowned with success, but also a period marking the start of a decline in demographic dynamics and of suburbanisation processes. It is also treated as a time of transition from a quantitative to a qualitative type of urban development, as indicated by improving services in the sphere of municipal infrastructure. Those processes are connected with the restructuring of the economy, in particular with its distinctly post-industrial orientation, which is especially readily visible in the case of the Upper Silesian Industrial District (a mining and heavy-industry region). The research corroborated the highly specific type of development of the towns of this region as well as the unique position of the Polish capital city. It also showed that the changes which determined the tendencies of transformation of the Polish cities were mainly those in demography, housing situation, level of health care, and level of entrepreneurship.

Key words: socio-economic changes, Polish cities, demographic changes, principal components analysis, cluster analysis

Introduction

Cities as central places perform a special role in the settlement structure of a country and region. Their importance in the contemporary world is much emphasised in the literature on the subject, where they are seen as growth 'engines', especially big cities. Also the Leipzig Charter puts stress on the European cities, considering them to be valuable economic, social and cultural assets. Cities are

taken to be centres of knowledge and sources of economic growth, social progress and innovation, but at the same time they suffer from demographic problems, social inequality, social exclusion of some population groups, and many environmental problems (Leipzig Charter 2007). Hence, cities need well-balanced development in which, however, an important role must be played by socio-economic development to ensure their inhabitants high standards of living and well-being.

The aim of this paper is to show how the socio-economic structure of the thirty largest Polish cities, topological relations, and types of socio-economic differences among them changed between 1998 and 2008. In the research use was made of multivariate analysis, since the many variables its methods employ give a fuller image of socio-economic processes than when an analysis is carried out on the basis of a single or a few selected variables.

Basic research assumptions

In the period after the Second World War, Polish towns developed in systemic conditions different from those obtaining in Western Europe, which certainly affected their rate of socio-economic development. In the postwar years under socialism, urbanisation in Poland was uncontrolled and quantitative in nature. Towns developed dynamically primarily owing to an inflow of the rural population seeking work there. The satisfaction of needs of the rapidly growing mass of inhabitants was very difficult, which showed in the underdevelopment of a suitable housing stock and fixed assets of physical and social infrastructure (Parysek 2006). Instead, what grew fast in towns was industry, offering jobs to new workers constantly flowing in. It is worth reminding at this point that an overwhelming proportion of the economic sphere, including housing management, was state-controlled. The situation in Poland started to change slowly only after 1989, i.e. after the change in the systemic conditions. The factors that have affected the course of urbanisation processes since then include: (1) removal of isolationist barriers, (2) restoration of private ownership, (3) development of private building enterprise, and (4) substantial rise in the standards of living of a part of society (Chojnicki et al. 1999, Parysek, Mierzejewska 2005). Those changes, however, set in motion processes that were favourable in terms of urban socio-economic development, such as privatisation or qualitative development, but also some that were not, like advancing suburbanisation.

The study period, i.e. the years 1998–2008, was the time of a readily visible socio-economic transformation of Polish towns, especially when seen in a multivariate approach. Its landmarks were the following facts (Parysek, Mierzejewska 2010):

1. The initial stage embraced the years of the systemic transformation, which was radical and hence harsh for society (cf. Chojnicki et al. 1995). Later, after 2000, it was less radical, but also less rigorous in its course and nature.
2. This was the time when the Polish government implemented four fundamental systemic reforms: of the education system, social security, health care, and

territorial division. Each of them must have affected the socio-economic development of towns in some way, even if less significantly than the systemic reforms of the initial transformation period (or the so-called Balcerowicz's reforms).

3. It covers the years from before and after Poland's inclusion into the European Union structures, which first meant the country's eligibility for EU pre-accession assistance and then for the Community funds for regional, cohesion and structural policies (Woś 2005, Pietrzyk 2007, Parysek 2008, Churski 2008).
4. The years 1998–2006 were a period of especially heavy foreign direct investment, which was located primarily in towns and certainly altered the conditions of their socio-economic development (Wdowicka 2004, 2005, 2006, Parysek 2006).

All this allows the decade in question to be regarded as particularly interesting for socio-economic spatial-structural research, the more so as socio-economic effects of the world crisis had not become that apparent yet.

Urban development can be studied using several categories of quantitative and qualitative assessment. Usually those are population criteria of the quantitative type based on the assumption that the growth in the number of a city's inhabitants decides about its development. This is justified by the fact that data of this kind are generally available, and besides citizen needs crucially determine urban development in other fields, like residential construction, shopping and service facilities, number of jobs, etc. However, equally important in an assessment of a city's development are qualitative criteria, which require referring changes in population number to other variables describing the city and its socio-economic situation.

Research methodology

In this study use was made of the following 11 qualitative variables describing the socio-economic situation of the biggest Polish cities in the years 1998 and 2008:

– population density as one of the indices of a city's development,
– population of non-working age per 100 persons of working age as a demographic dependency rate,
– natural increase per 1,000 population, showing the city's demographic situation,
– mean area of a flat in m^2, describing its housing conditions,
– flats per 1,000 population as an index of its saturation with housing,
– physicians per 10,000 population, to illustrate health service availability,
– hospital beds per 10,000 population as a measure of its level of medical care,
– sleeping facilities per 10,000 population as an index of the city's attractiveness (also tourist),
– budgetary revenues per head, to illustrate its economic situation,

– economic entities per 1,000 population as an index of the entrepreneurship of its inhabitants,
– employed persons per 1,000 population, to describe its inhabitants' occupational activity.

The analysis covered Poland's thirty biggest cities with populations exceeding 100,000, namely Warsaw, Cracow, Łódź, Wrocław, Poznań, Gdańsk, Szczecin, Bydgoszcz, Lublin, Katowice, Białystok, Gdynia, Częstochowa, Płock, Rzeszów, Radom, Sosnowiec, Toruń, Kielce, Gliwice, Dąbrowa Górnicza, Zabrze, Bytom, Olsztyn, Bielsko-Biała, Tychy, Ruda Śląska, Rybnik, Elbląg, and Opole.

The analysis of their socio-economic situation was carried out using a three-level model which embraced (Parysek, Mierzejewska 2009a, b, c, Parysek, Mierzejewska 2010):
– determining differences existing among the cities in terms of the original variables employed and assessing changes in this respect,
– determining differences in their socio-economic structures in terms of principal components and the changes that took place,
– determining differences in those structures in a synthetic approach.

At the first analytical level, for each time profile a simple statistical description of the variables was employed, emphasising their variance (standard deviation and coefficient of variation). At the second level, the principal components method was used to distinguish chief dimensions (levels) of structural differences among the cities, and at the third, a multivariate classification based on cluster analysis was performed.

Socio-economic situation of big Polish cities in 1998 and 2008: An elementary level of analysis (in terms of the 11 original variables)

In 1998 the variable that differentiated Polish cities most sharply was natural increase, for which the coefficient of variation *Wz* attained the highest value among the variables adopted for analysis – as much as 321.54%. The lowest natural-increase figures were recorded in Łódź (–7.1) and Warsaw (–4.2), i.e. the two largest cities of that time, as well as in Upper Silesia's Katowice and Dąbrowa Górnicza (–2.8 each). Negative rates were noted in 18 out of the 30 cities, i.e. in more than half of them. Natural increase was the biggest in Rzeszów (2.2), Płock (2.1), and Tychy (2.0), i.e. primarily those with under 200,000 inhabitants.

What also clearly differentiated the biggest Polish cities were the accommodation base (*Wz* = 100.01%) and population density (*Wz* = 30.54%). The least differentiating variables were the dependency rate (*Wz* = 4.39%) and those describing housing conditions, which can partly be explained as an effect of the housing policy pursued under socialist realism (cf. Table 1).

When analysing the level of socio-economic development of the studied cities in 2008, i.e. after ten years, one can generally conclude on the basis of the coeffi-

Table 1. Statistical characteristics of the variables describing the socio-economic development of the 30 biggest Polish cities in 1998

Variable	mean	standard deviation	coefficient of variation
population density	2,034.53	621.44	30.54
population of non-working age /100 persons of working age	57.67	2.53	4.39
natural increase/1,000 population	–0.64	2.06	–321.65
mean flat floorspace in m^2	54.30	3.74	6.88
flats /1,000 population	338.90	24.34	7.18
physicians /10,000 population	35.13	10.19	29.01
hospital beds /10,000 population	78.61	21.22	26.99
sleeping facilities /10,000 population	84.54	84.54	100.01
budgetary revenues per head	1433.85	288.92	20.15
economic entities /1,000 population	93.33	25.06	26.85
employment /1,000 population	351.67	65.41	18.60

Source: own compilation on the basis of data of the Local Data Bank

cients of variation that the differences among them had dwindled in this respect. There is only one variable that differentiates them significantly and even more sharply than in 1998, namely natural increase (Wz = 930.76%). This is due to the advancing depopulation of big Polish cities caused by a variety of factors, the chief among them being an outflow of younger people to suburban zones and their emigration. Still, natural decrease was now characteristic of only 11 out of the 30 cities, i.e. nearly one-third, which shows unfavourable demographic trends to have slowed down. Again, the lowest natural increase was recorded in Łódź (–5.6), but also in the major Upper Silesian towns of Katowice (–2.6) and Sosnowiec (–2.5), while the highest figures could be noted in Rzeszów (3.0) and Olsztyn (2.8), but also in Upper Silesia's Tychy (2.7).

Table 2. Statistical characteristics of the variables describing the socio-economic development of the 30 biggest Polish cities in 2008

Variable	mean	standard deviation	coefficient of variation
population density	1,909.77	557.81	29.21
population of non-working age /100 persons of working age	50.86	2.69	5.30
natural increase/1,000 population	0.20	1.83	930.76
mean flat floorspace in m^2	59.18	3.91	6.60
flats /1,000 population	391.29	28.96	7.40
physicians /10,000 population	36.76	11.58	31.50
hospital beds /10,000 population	75.27	21.04	27.96
sleeping facilities /10,000 population	90.87	72.54	79.86
budgetary revenues per head	3,653.27	608.51	16.66
economic entities /1,000 population	120.24	27.31	22.71
employment /1,000 population	349.19	80.10	22.94

Source: own compilation on the basis of data of the Local Data Bank

As previously, the accommodation base (*Wz* = 79.9%) and population density (*Wz* = 29.2%) played a decidedly lesser role in differentiating the cities in 2008. And as in 1998, the least differentiating variables were the dependency rate, although it grew slightly (*Wz* = 5.3%), as well as mean flat floorspace (*Wz* = 6.6%) and saturation with flats (*Wz* = 7.4%) (cf. Table 2).

The changes in the socio-economic situation that occurred over the years 1998–2008, as assessed in terms of the 11 variables, can be regarded as generally favourable for cities.

Level of socio-economic development of cities in terms of principal components in 1998

The transformation of the 11 original variables collected for Poland's 30 biggest cities in 1998 into principal components resulted in the first principal component (V_1) accounting for 30.62% of their total variance, the second (V_2), for 19.85%, and the third (V_3), for 14.19%. The remaining components accounted among them for 24.60% of the variance of the variables under analysis (cf. Table 3).

The nature of the individual components is determined by the variables correlated with them. Thus, the first principal component (V_1) is correlated fairly significantly with as many as six original variables: population density, natural increase, flats per 1,000 population, physicians per 10,000 population, hospital beds per 10,000 population, and economic entities per 1,000 population. Hence it can be called a component of demographic potential, housing conditions and medical services, and the economy. The second component (V_2), correlated with mean flat floorspace and flats per 1,000 population, can be called a component of the housing situation. Both components are correlated with the mentioned variables at a high level of significance ($\alpha<0.001$). The significance level is lower ($\alpha=0.01$) for the correlation between the third component (V_3) and the following variables: population density, natural increase, hospital beds per 10,000 population, and budgetary revenues per head. It can be called a component of demographic potential, hospital services, and budgetary revenues. The fourth principal component is correlated significantly with only one original variable,

Table 3. Variances of the variables describing the socio-economic development of big Polish cities accounted for by principal components

Component	1998		2008	
	%	cumulative %	%	cumulative %
V_1	30.62	30.62	30.70	30.70
V_2	19.85	50.47	22.34	53.04
V_3	14.19	64.66	13.50	55.50
V_4	10.74	75.40	8.60	75.14
other	24.60	100.00	24.86	100.00

Source: own compilation

Table 4. Variables correlated with the principal components of the level of socio-economic development of big Polish cities in 1998

Component	Variables
V_1 (of demographic potential, housing conditions and medical care, and economy)	population density (r^2=0.327, α<0.001) natural increase (r^2=0.375, α<0.001) flats /1,000 population (r^2=0.421, α<0.001) physicians /10,000 population (r^2=0.664, α<0.001) hospital beds /10,000 population (r^2=0.495, α<0.001) economic entities /1,000 population (r^2=0.372, α<0.001)
V_2 (of housing situation)	mean flat floorspace in m^2 (r^2=0.535, α<0.001) flats /1,000 population (r^2=0.332, α<0.001)
V_3 (of demographic potential, hospital services and budgetary revenues)	population density (r^2=0.254, α=0.01) natural increase (r^2=0.234, α=0.01) hospital beds /10,000 population (r^2=0.280. α=0.01) budgetary revenues per head (r^2=0.260. α=0.01)
V_4 (of dependency rate)	population of non-working age /100 persons of working age (r^2=0.786, α<0.001)

Source: own compilation

viz. population of non-working age per population of working age, which means that it is a component of the dependency rate (cf. Table 4).

By ordering the cities by the value of the first principal component and eliminating the four longest taxonomic distances between them, five classes were distinguished differing significantly in the character of this component (Table 5). Grouped at one end of the scale (Class I) were cities (Dąbrowa Górnicza and Rybnik) differing from the rest in their markedly lower population density and a low level of health care, while the other end (Class V) was taken by the capital city of Warsaw. This (V) is the class of the highest population density and citizen

Table 5. Classification of the analysed cities on the basis of values of the first principal component (V_1) in 1998

Class	Cities	Class characteristics
I	Dąbrowa Górnicza, Rybnik	low population density, low level of health care
II	Szczecin, Elbląg, Gliwice, Tychy, Częstochowa, Bielsko-Biała, Płock, Ruda Śląska, Gdynia, Radom, Opole, Kielce, Toruń, Gdańsk, Bydgoszcz, Olsztyn, Lublin, Kraków, Zabrze, Sosnowiec, Katowice, Poznań, Wrocław, Bytom, Łódź	average, though fairly varying population densities, saturation with flats and levels of health care
III	Białystok	high population density, average saturation with flats and medical care
IV	Rzeszów	high population density and natural increase (great demographic potential), high level of health care, low saturation with flats
V	Warsaw	highest population density, greatest citizen entrepreneurship, high saturation with flats, low natural increase

Source: own compilation

entrepreneurship in the studied set, high saturation with flats, and low natural increase.

Level of socio-economic development of cities in terms of principal components in 2008

The transformation of the original variables into principal components for the 2008 data was somewhat different. While the first principal component (V_1) accounted for a similar percentage of the total variance of the variables, 30.7%, the share of the second component (V_2) was slightly higher, 22.34%, of the third (V_3), 13.5%, and of the fourth (V_4), a mere 8.6% (cf. Table 3).

The first principal component, which is described by such variables as flats per 1,000 population, physicians per 10,000 population, budgetary revenues per head, economic entities per 1,000 population, and employment per 1,000 population, can be called a component of the level of economic development as well as consumer and social services. The second component is defined by natural increase, mean flat floorspace, and flats per 1,000 population, hence it can be called a component of housing conditions and demographic development. The third (V_3) is significantly correlated with the number of hospital beds per 10,000 population, hence it can be termed a hospital service component (cf. Table 6).

Also for the 2008 data a classification of the cities was made on the basis of their linear ordering by the values of the principal components. After eliminating the four longest taxonomic distances, five classes were obtained again. In the case of the first principal component (V_1), the extreme classes included Dąbrowa Górnicza (Class I), characterised by very low levels of medical care and economic development, and Warsaw (Class V), with very high levels of saturation with flats and economic development and average health care (Table 7). It is therefore hard to regard as balanced the development of the cities in those extreme classes (social development does not come hand in hand there with economic develop-

Table 6. Variables correlated with the principal components of the level of socio-economic development of big Polish cities in 2008

Component	Variables
V_1 (of economic development as well as consumer and social services)	flats /1,000 population (r^2=0.394, α<0.001) physicians /10,000 population (r^2=0.560. α<0.001) budgetary revenues per head (r^2=0.340. α<0.001) economic entities /1,000 population (r^2=0.639, α<0.001) employment /1,000 population (r^2=0.456, α<0.001)
V_2 (of housing conditions and demographic development)	natural increase (r^2=0.623, α<0.001) mean flat floorspace in m^2 (r^2=0.672, α<0.001) flats /1,000 population (r^2=0.393, α<0.001)
V_3 (of hospital services)	hospital beds /10,000 population (r^2=0.542, α<0.001)

Source: own compilation

Table 7. Classification of the analysed cities on the basis of the values of the first principal component (V_1) in 2008

Class	Cities	Class characteristics
I	Dąbrowa Górnicza	very low level of medical care and economic development (low citizen activity and entrepreneurship)
II	Częstochowa, Szczecin, Elbląg, Rybnik, Ruda Śląska	average and low saturation with flats, low level of medical care, low budgetary revenues per head and citizen activity
III	Sosnowiec, Bielsko-Biała, Gliwice, Toruń, Radom, Bydgoszcz, Zabrze, Lublin, Gdynia, Opole, Bytom, Kielce, Tychy, Gdańsk, Olsztyn, Łódź, Rzeszów, Katowice, Płock, Białystok	average, though fairly varying, values of variables making up this component
IV	Wrocław, Kraków, Poznań	high saturation with flats, good availability of health services, high level of economic development (citizen activity and entrepreneurship, and budgetary revenues per head)
V	Warsaw	very high saturation with flats and level of economic development (citizen activity and entrepreneurship, and budgetary revenues per head) with average health care

Source: own compilation

ment). A more balanced level of socio-economic development is displayed by the remaining classes.

As follows from the principal components analysis conducted, although some variables correlated with the components repeat for 1998 and 2008, their character generally changed significantly, especially in the case of the first component. Here in the initial year of analysis (1998) the cities differed in terms of the demographic variables (population density and natural increase), which were much less significant in the final year (2008). Those that gained in importance over the study period were the economic development variables (budgetary revenues and the employment rate). In the case of the second principal component, identified with the second level of differences among the studied cities, the situation in both years looked similar, though in 2008 the variables describing differences in the housing situation were augmented with that of natural increase. The demographic variables largely determined the character of the third component in 1998, but ten years later they stopped being that conspicuous.

Thus, in sum, in the period 1998–2008 the differences among the cities dwindled with respect to the demographic situation, and widened in the level of economic development. What still differentiated the set significantly, however, were housing conditions and the level of health care.

Level of socio-economic development of Poland's thirty biggest cities: A synthetic approach

Having analysed all the 11 variables employed to describe the level of socio-economic development of the studied cities, their synthetic classification was made into arbitrarily adopted five classes, the criterion being the four biggest differences in the cities' similarity matrix.

For the 1998 data, the cities were grouped into the following similarity classes (cf. Fig. 1):

1. Class I – Warsaw, the city with the highest population density in the set, one of the lowest indices of natural increase in the country, a high dependency rate, and one of the smallest values of mean flat floorspace, but with a high level of saturation with flats and economic development (the highest budgetary revenues and economic entities /inhabitants rate, and one of the higher employment rates);
2. Class II – Dąbrowa Górnicza, a city with the lowest population density in the set, a negative natural increase rate, and very poorly developed health care;
3. Class III – Rzeszów, a city with a high population density and the highest natural increase, very good health care and a high employment rate, but low availability of flats;
4. Class IV – Rybnik, a city with a low population density and poor health care, but offering the best housing conditions as measured by mean flat floorspace; and
5. Class V – the remaining cities, significantly differing from one another, but similar in terms of the variables analysed and the classification criterion adopted, viz.: Cracow, Łódź, Wrocław, Poznań, Gdańsk, Szczecin, Bydgoszcz, Lublin, Katowice, Białystok, Gdynia, Częstochowa, Radom, Sosnowiec, Toruń, Kielce, Gliwice, Zabrze, Bytom, Olsztyn, Bielsko-Biała, Ruda Śląska, Tychy, Płock, Elbląg, and Opole.

For 2008, in turn, the following similarity classes were distinguished in the analysed set of cities, three of them being one-element classes (cf. Fig. 2):

1. Class I – Warsaw, with the highest population density in the set again, one of the highest dependency rates, the best availability of flats (as measured by the flats/population ratio), the best situation in terms of budgetary revenues per head and citizen entrepreneurship (as measured by the number of economic entities per head), and a very good situation on the labour market (a very high employment rate);
2. Class II – Płock, a city with a balanced socio-economic structure, but very high budgetary revenues per head;
3. Class III – Białystok, its uniqueness lying in a very high population density and the highest percentage of employed persons in the country;
4. Class IV – Rybnik and Dąbrowa Górnicza, which formed separate classes in 1998, now ended with similar socio-economic structures, the similarity lying

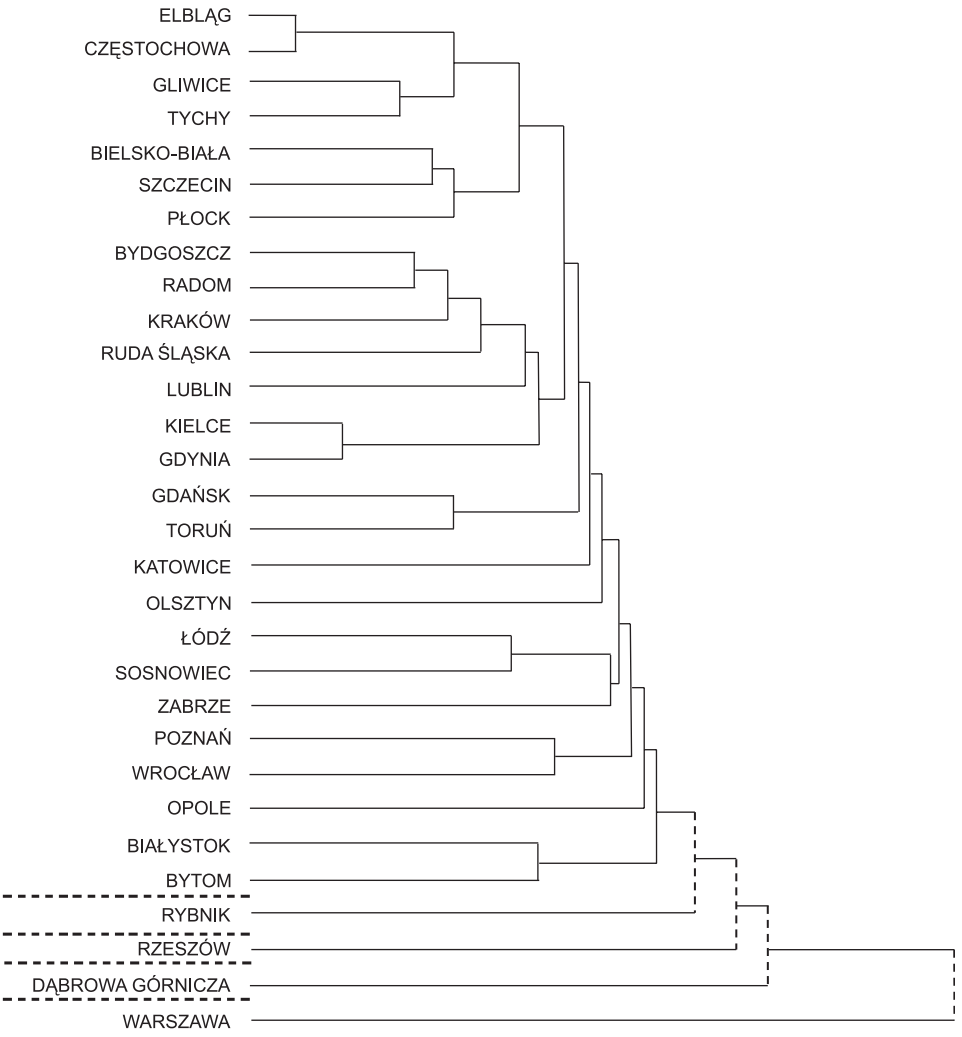

Fig. 1. Dendrogram of the similarity of Poland's biggest cities in terms of socio-economic development in 1998

primarily in low population density (the lowest values in the set), high natural increase (some of the highest figures), and poor health care; and

5. Class V – the remaining cities, similar in terms of the variables and criteria adopted in the analysis: Cracow, Łódź, Wrocław, Poznań, Gdańsk, Szczecin, Bydgoszcz, Lublin, Katowice, Gdynia, Częstochowa, Radom, Sosnowiec, Toruń, Kielce, Gliwice, Zabrze, Bytom, Rzeszów, Olsztyn, Bielsko-Biała, Ruda Śląska, Tychy, Elbląg, and Opole.

It follows from the analysis conducted that both in 1998 and 2008 the city that stood out in the set was Warsaw, the capital, which seems obvious because of the central functions it performs. Also the two Silesian cities of Rybnik and Dąbrowa

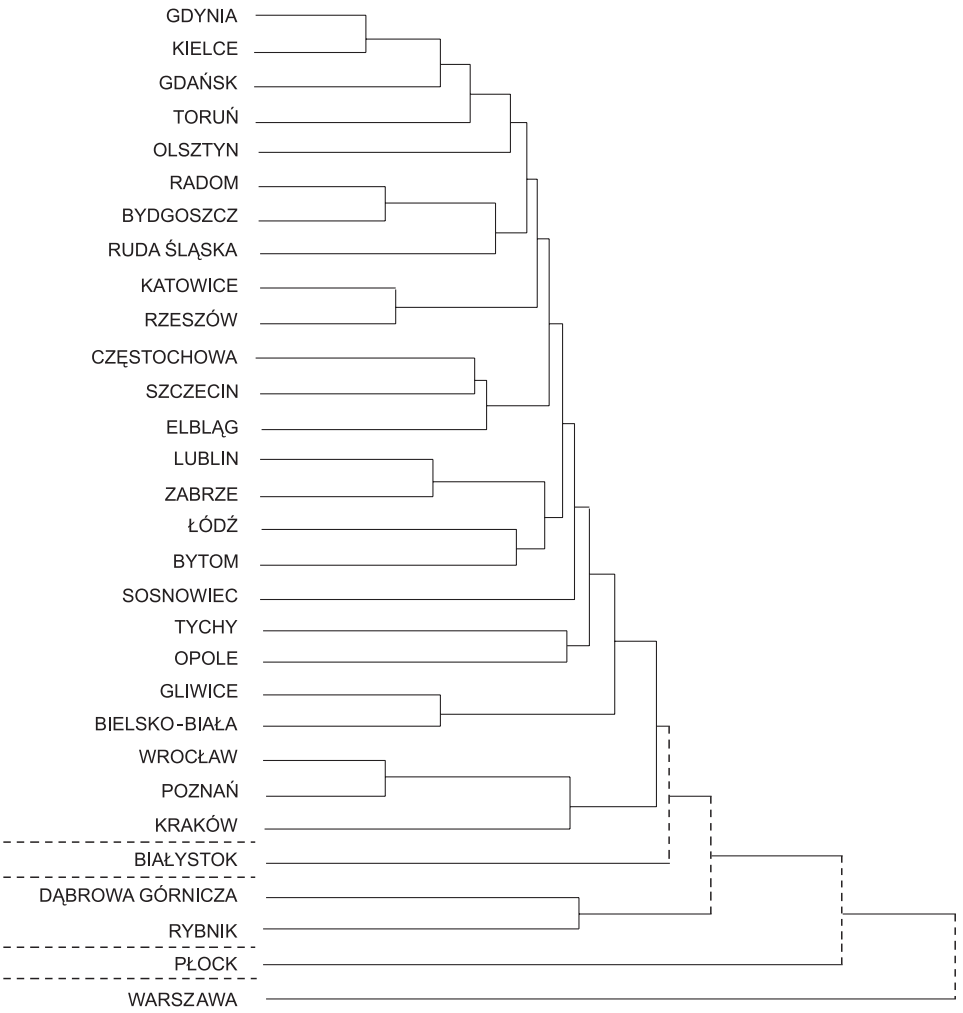

Fig. 2. Dendrogram of the similarity of Poland's biggest cities in terms of socio-economic development in 2008

Górnicza turned out to be distinctive, with their levels of socio-economic development different in 1998 but highly similar ten years later. This may have resulted from their location in the polycentric Upper Silesian agglomeration, where certain specialised functions (also in the field of health care) are perhaps offered by other towns of the agglomeration, readily accessible to Rybnik and Dąbrowa Górnicza residents. The similarity may also be due in some measure to the structural stabilisation of those cities gained in the transformation process and fixing their similarity. The city that lost its specificity over the decade was Rzeszów, in favour of Płock, which stood out among the studied cities in 2008 for only one variable: its budgetary revenues, which was certainly not unconnected with the location of the Petrochemia Płock concern there.

Thus, in 1998 and 2008 the socio-economic structures of many biggest Polish cities, such as Poznań, Wrocław, Cracow or Gdańsk, turned out to be hardly distinctive, although the growth in their levels of socio-economic development in terms of the individual variables analysed was unquestionably robust. It follows, therefore, that the high ranking of those cities as metropolitan centres and agglomeration cores at the national scale is still largely due to the effect of synergy. The effect is produced by interconnected socio-economic phenomena and processes taking place in the given city (cf. Domański 1998).

Conclusion

For decades Polish cities developed under socialist conditions, which certainly affected their development potential. Their current level of development has also been determined by the years of the systemic transformation, which proved favourable for some cities (especially the biggest ones where metropolitanisation processes can be observed), while in others the post-industrial changes of the initial stage of the transformation brought about stagnation, or even regression (mostly in the Upper Silesian cities).

At present, what mould the growth rate of the Polish cities, apart from the complicated past, are development trends characteristic of the contemporary world, such as globalisation or metropolitanisation. Their joint result has been wide differences in the rates and directions of their socio-economic development.

The conducted analysis has shown that the variable most crucial in differentiating the Polish cities, both in the past and now, has been natural increase, and in a general approach, demographic changes including natural increase and population density. It seems, however, that the most unfavourable trends in this field have been checked. What make the analysed cities most similar, in turn, are their demographic dependency rates and housing conditions offered.

However, as the principal components analysis shows, the variables responsible for differences among the Polish cities over the years 1998–2008 were somewhat different. In 1998 those were primarily the demographic changes mentioned above, while in the final year of analysis, 2008, it was the level of economic development that differentiated them in the first place. The Polish cities also differed significantly in their levels of health care and the entrepreneurship of their inhabitants, while in the case of housing, differences in the saturation with flats in the initial year of analysis were replaced in the final year by differences in the living conditions as expressed by mean flat floorspace.

The synthetic classification of the studied cities in terms of the variables adopted for analysis demonstrates that the one whose level of socio-economic development stood out most markedly among the others (and still does) is the state's capital, Warsaw. Also the Upper Silesian cities displayed some specificity; in the period of the systemic transformation and the technological changes in industry that it had brought, at first they had clearly lost their development potential, and their level of consumer and social services was very low. With time,

however, those unfavourable tendencies had been reversed, though in some of the cities the services, especially in health care, still leave much to be wished for.

Thus, the direction of socio-economic changes taking place in the Polish cities over the years 1998–2008 should be assessed very highly. It seems, however, that in the next stage the cities should focus on making their development more balanced, because in some of them a high rate of economic development does not go hand in hand with the rate of social development and the level of consumer and social services. Therefore, it is necessary to conduct further in-depth studies in terms of sustainable development in which emphasis is put on qualitative changes. This is especially important in the situation of the global crisis that started in 2008 and that has also hit Poland.

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