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TERRITORIAL DISTRIBUTION OF POPULATION CHANGE IN POLAND IN THE YEARS 1991-2001

ABSTRACT. The paper aimed at presentation of spatial distribution of population growth in Polish districts (powiaty – administrative regions of the 2nd order) in the period 1991-2001 and its main components: natural increase and net migration. The Webb typology was used to determine which component of population change prevailed in particular years and its dynamics to present the tendencies of changes. The dynamic classification of population change according to Webb types was shown, which confirmed a continuing separate character of north-western and south-eastern parts of Poland and the development of suburban zones.

KEY WORDS: population growth, natural increase, net migration, Webb typology, population dynamics

During the period of socio-economic transition, profound changes in population growth have taken place in Poland. A rapid decline in fertility below replacement level and a decrease in migration, especially from rural areas to towns, has caused the depopulation of some areas. This was also connected with acceleration of population ageing process. In the 1970s and 1980s population decline occurred mostly in rural areas and small towns because of the entrance of industrialization and urbanization (Eberhardt, 1989). The significant fall in spatial mobility from rural areas in the 1990s caused by the housing shortage and the high unemployment rates has led to a decrease in the demographic dynamics in towns contributing to the development of suburban areas around the largest centres. The fall in demographic dynamics, influenced by different socio-economic factors including post-industrialization and technological improvements, the new pattern of family formation, changes in the values sys-

tem as well as a shift in norms toward progressiveness and individualism is described as a second demographic transition (Kotowska, 1999, Okólski, 2003, Van de Kaa, 1987, 2002).

The aim of this paper is to show the spatial distribution of population growth in Polish districts (*powiaty*) in the period 1991-2001 and its main components: natural increase and net migration. The Webb typology was used to determine which components of population change prevailed in particular years, and its dynamics, to present the trends in changes. This study covers 373 spatial units according to the administrative division of December 31, 2001.

In the years 1991-2001, the total population in Poland increased from 38,309.2 to 38,575.5 thousand (by 0.7%). Population in urban districts recorded a fall from 11,629.9 to 11,418.4 thousand (by 1.8%). In 250 among particular districts (about two third of the total) the population number rose and the highest increase occurred in tyski district (35.8%). High population growths occurred in the districts surrounding the biggest cities (Warsaw, Cracow, Poznań, Wrocław, Gdańsk): in namely piaseczyński and poznański 13.9%, kartuski 13.5%, wejherowski 11.6%, gdański 11.1% and warszawski zachodni 11.0%. As shown in Fig. 1, the highest spatial increase occurred in north-western and south-eastern Poland while there was a significant fall in the populations in unit areas located in south-western, central and eastern Poland. The highest decrease was recorded in urban districts in Upper Silesia and Lower Silesia, corresponding to decline of the coal-mining industry (Mysłowice -16.7%, Bytom -13.8%, Ruda Śląska -10.9%).

In Poland, after World War II, enormously high birth rates (over 30‰) and natural increase (almost 20‰) were observed as a result of the post-war compensative demographic phase. In the 1960s, when the less numerous populations born during the war reached reproductive age, a phase of low births and natural increase occurred. At the turn of the 1970s and 1980s an echo of the post-war demographic baby-boom was observed as the numerous women born in 1950s started to have children. The births values in rural areas were higher than in the towns. During the investigated period of socio-economic transition the childbirth decline, reflected by the sharp reduction in birth and natural increase rates was recorded (respectively from 14.3 to 9.5‰ and from 3.8 to 0.1‰). In 1991 inasmuch as 22 units recorded a negative natural increase but ten years later the number of districts in this category rose to 144 (39% of the total). The highest values in 1991 occurred in the małopolskie (districts: nowosądecki and limanowski 11.5‰), pomorskie (kartuski 12.8‰, bytowski 11.5‰) and warmińsko-mazurskie voivodeships (piski 12.1‰, olecko-gołdapski 11.9‰). Negative values of the coefficient were observed mainly in urban districts (Łódź, Sopot and Chorzów -5.2‰, Warsaw -3.7‰). In the period under study almost all units showed a decline in natural increase and in 2001 the highest level occurred in the pomorskie and małopolskie voivodeships (districts: limanowski 7.7‰, kartuski 7.4‰, nowosądecki 7.2‰, kościerski 6.3‰). The lowest values

were recorded in Łódź (-6.7‰), Sopot (-5.3‰) and hajnowski district (-5.2‰) in the podlaskie voivodeship. The spatial distribution of natural increase rates has not changed for years (Fig. 2 and 3). Historically and maintained today, the areas of high fertility are situated in northern, western and south-eastern Poland while the areas with low birth rate, comprise central, eastern and south-western part of the country. Despite the sharp reduction in birth and natural increase rates in the last decade, the regional disparities remained. It must be assumed that the relative demographical juvenility of those northern and western areas results from the resettlement of mainly young people after World War II. An echo of such processes is still visible through a higher natural increase rate. The only exception is the mountainous region of the Sudety where a process of depopulation was announced already as late as in 1960s (Eberhardt, 1989). In turn, the high childbirth rates in the małopolskie and podkarpackie voivodeships are related to the tradition of having large families, continued by the population inhabiting these mainly mountainous areas.

Population migrations in Poland have reflected the economic development of the country. High population movements occurred just after the World War II and again in the 1970s were connected with the construction of heavy industry plants. Until 1990s the internal net migration balance was positive in towns and negative in rural areas but in recent years the situation has reversed. Since the beginning of socio-economic transition in Poland significant changes of direction and transfer of migration has taken place. Among them the decrease in overall migrations, the decline of population flows into towns, and the increase in the number of population movements from urban to rural areas are the most important. In 1991 in Poland the total net migration balance was positive in 123 units (one third of the total). The highest values occurred in urban districts of medium size (Dąbrowa Górnicza 19.1‰, Leszno 17.2‰, Suwałki 16.7‰, Bielsko-Biała 16.0‰). The lowest level of net migration rate was recorded in districts located around those medium sized towns (suwalski -15.3‰, łomżyński -14.7‰, skierniewicki -12.9‰, przemyski and ostrołęcki -12.0‰). The only urban district experiencing a remarkable negative net migration balance was Sopot, the largest Polish sea-side spa on the Baltic sea (-10.3‰). Looking at the map of migration balance (Fig. 4) it should be noted that the areas with positive net migration rates were concentrated in the most urbanised and industrialised regions of Upper Silesia, Poznań, Gdańsk and Warsaw conurbations. On the other hand, the areas with profound negative migration balance occurred in districts around medium-sized towns located mainly in north-eastern, central and eastern Poland. During the period 1991-2001 net migration rates followed an opposite trend. Suburban districts of large and medium towns recorded a considerable increase in the net migration rate while urban districts underwent a substantial drop of the index. In 2001 111 units (30% of the total) indicated positive values of migration balance and the highest were noted in piaseczyński (20.7‰), po-

znański (14.9‰), warszawski zachodni (12.2‰), gdański (12.7‰), policki (11.3‰), bydgoski (10.4‰) and toruński (9.4‰) districts. Negative net migration rate occurred in small, peripheral districts (hajnowski -7.6‰, krośnieński -7.5‰, as well as some urban districts (Żory -7.5‰, Jastrzębie-Zdrój -6.5‰, Wałbrzych -4.2‰, Sopot -3.2‰, Słupsk -2.8‰) including also the largest towns (Bydgoszcz -1.7‰, Poznań -0.8‰, Toruń -0.6‰ or Gdańsk -0.3‰). Territories with a positive migration balance of population concentrated around Warsaw, Cracow, Gdańsk, Poznań, Wrocław, Łódź, Szczecin, Częstochowa, Rzeszów, Bielsko-Biała, in which areas where population outflow outnumbered immigration occurred in eastern and north-eastern Poland (Fig. 5). They are peripheral regions without well-developed industry, located far from larger centres.

Taking into account the main components of population growth, namely natural increase and migration, the Webb typology was used to show which component prevailed and to highlight changes in the years 1991-2001. As shown in Fig. 6, on the abscissa net migration is shown and on the ordinate natural increase. Theoretically 8 types are possible, as a combination of migration and natural increase according to their modulus and mutual prevalence. Types A, B, C and D are characterized by population growth, whilst types E, F, G and H – by population decline. Both in 1991 and 2001 all 8 types were represented in Polish districts, however, larger diversification in the latter year was observed. In the period under study the percentage of types with population growth (A,B,C and D) recorded a substantial fall from 81 to 47%, thus in 2001 types of population decrease prevailed (Table 1). In 1991 type A, where the natural increase dominates over the migration decrease was most common and occurred in almost half of the total units. Spatially the districts which indicated type A were concentrated mainly in northern, western and south-eastern Poland (Fig. 7). About 17% of districts represented type B, where a natural increase dominates over the migration surplus, and they were situated around some larger towns such as Cracow, Gdańsk, Szczecin, Toruń and Opole. The third most numerously represented type was depopulation type H characterised with a domination of migration decrease over the natural increase (16% of total units) and it concentrated in south-western, central and eastern Poland. The remaining types were less numerous and did not show spatial concentration. In 2001 the most numerous types were contrasting ones A and H. Districts characterized with type A were located in north-western and south-eastern Poland but the belt was not so dense as a decade earlier and comprised mainly pomorskie, wielkopolskie and podkarpackie voivodeships (Fig. 8). In turn, type H encompassed units in north-eastern and western Poland (the warmińsko-mazurskie, zachodniopomorskie and lubuskie voivodeships). The areas of eastern, central and south-western Poland were predominated type G (17% of all units), where natural losses prevail over the migration decrease. The highest increase noted type F by 20 fold (from 2 to 40 units), where migration losses dominate over natural decrease. It occurred in łódzkie, the northern part of the Silesian voivodeships and in the Sudety mountains.

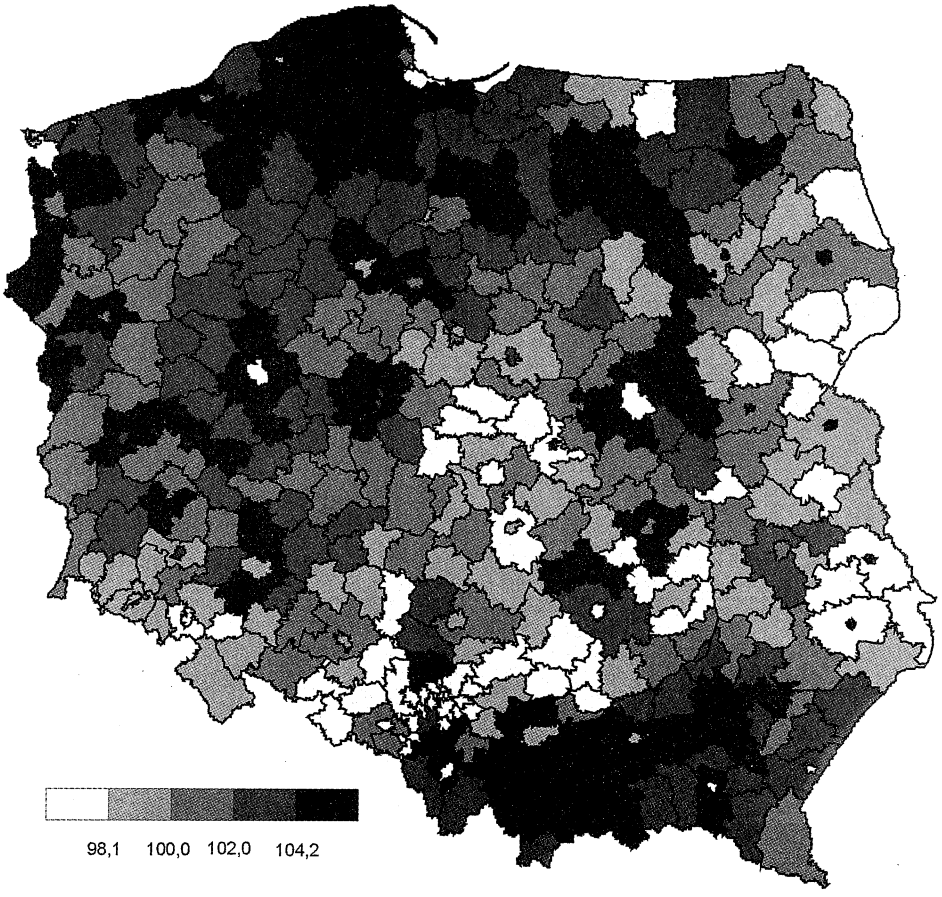

Fig. 1. Population growth in 1991–2001 (1991 = 100)
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

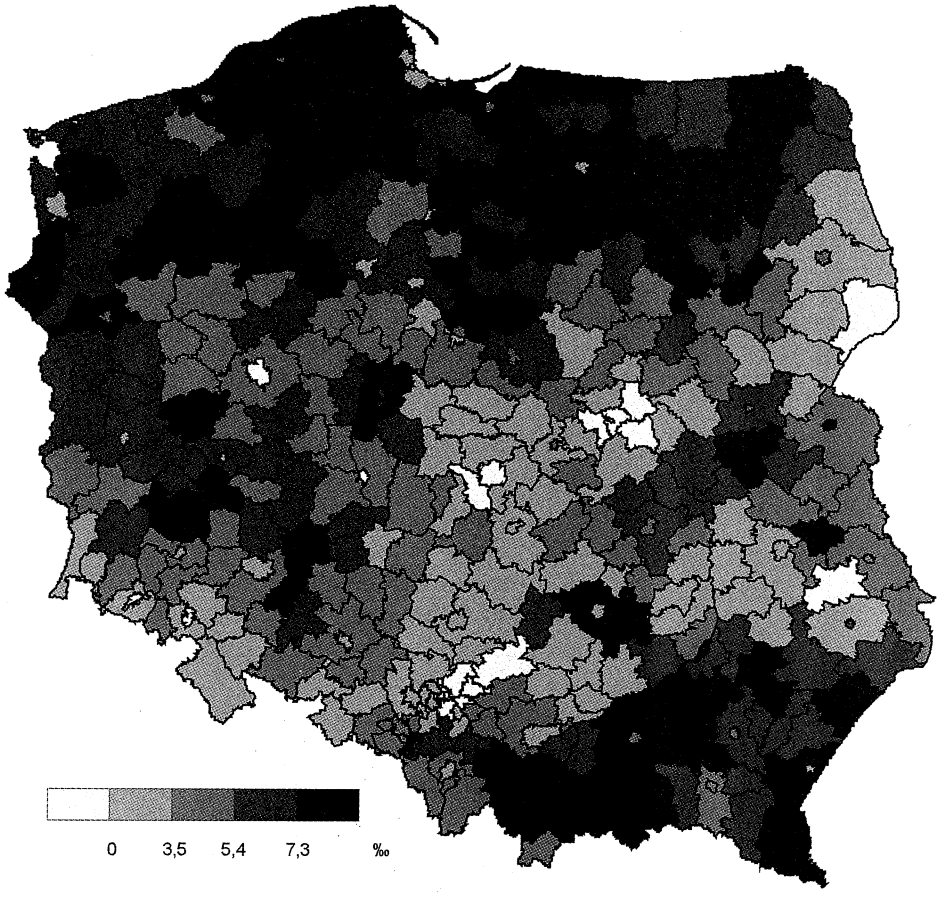

Fig. 2. Natural increase rate in 1991
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

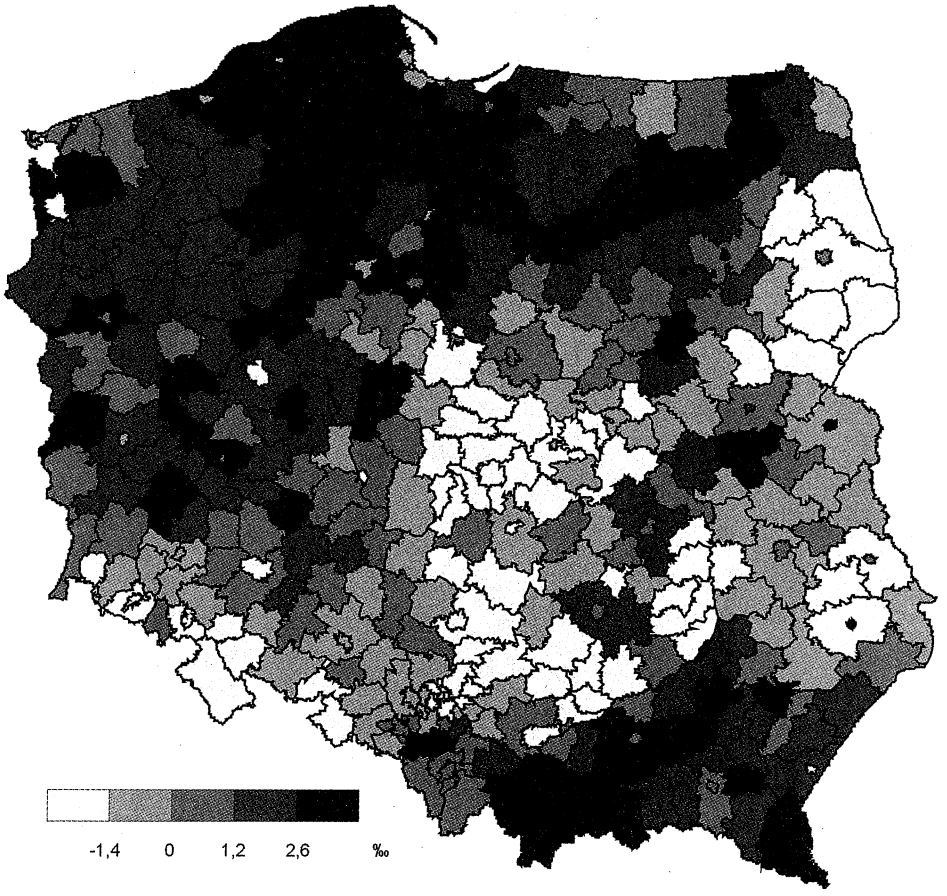

Fig. 3. Natural increase rate in 2001
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

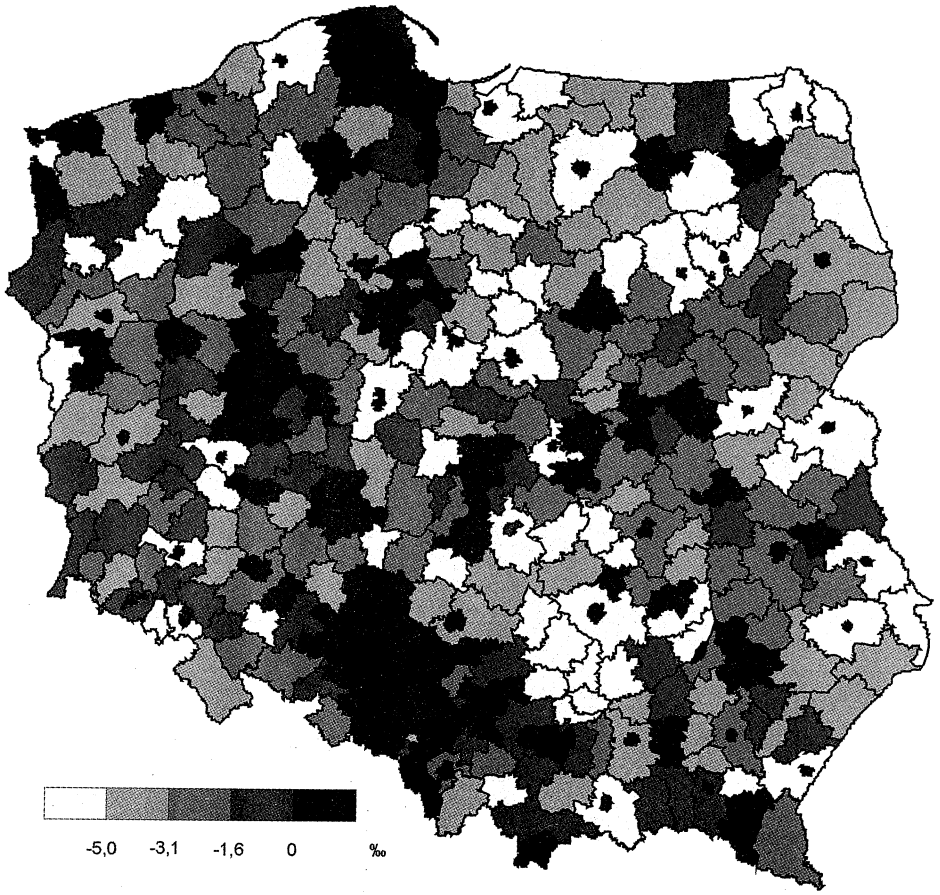

Fig. 4. Net migration rate in 1991
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

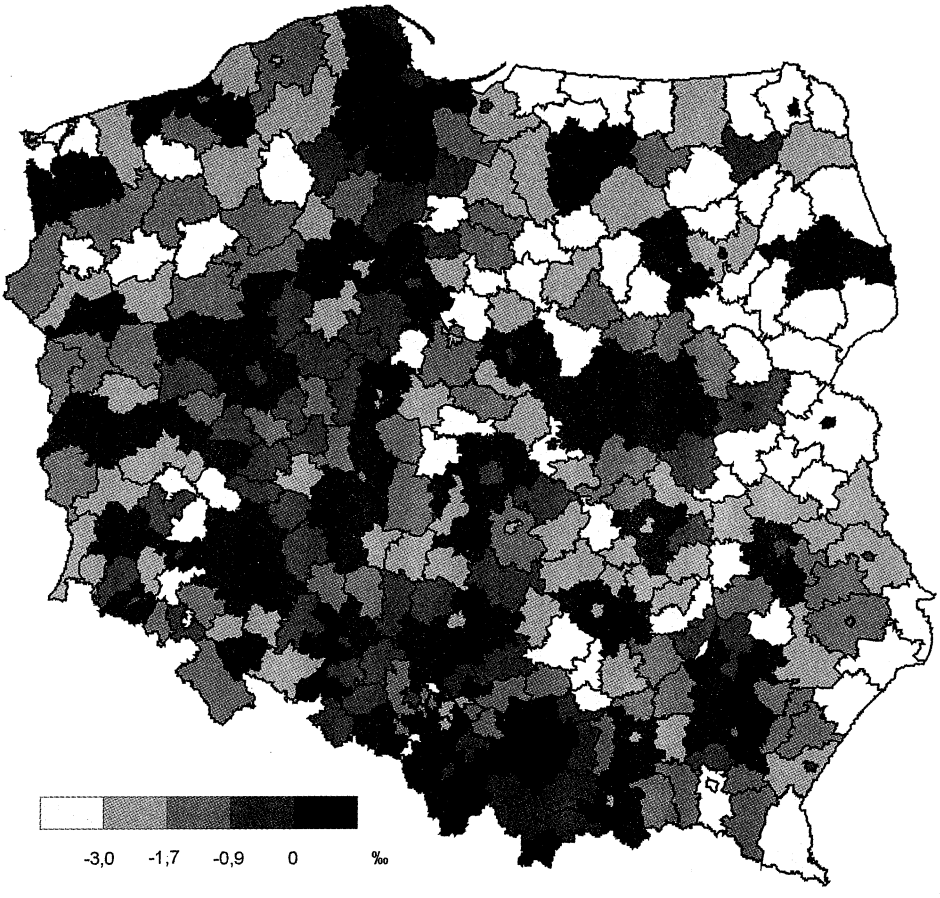

Fig. 5. Net migration rate in 2001
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

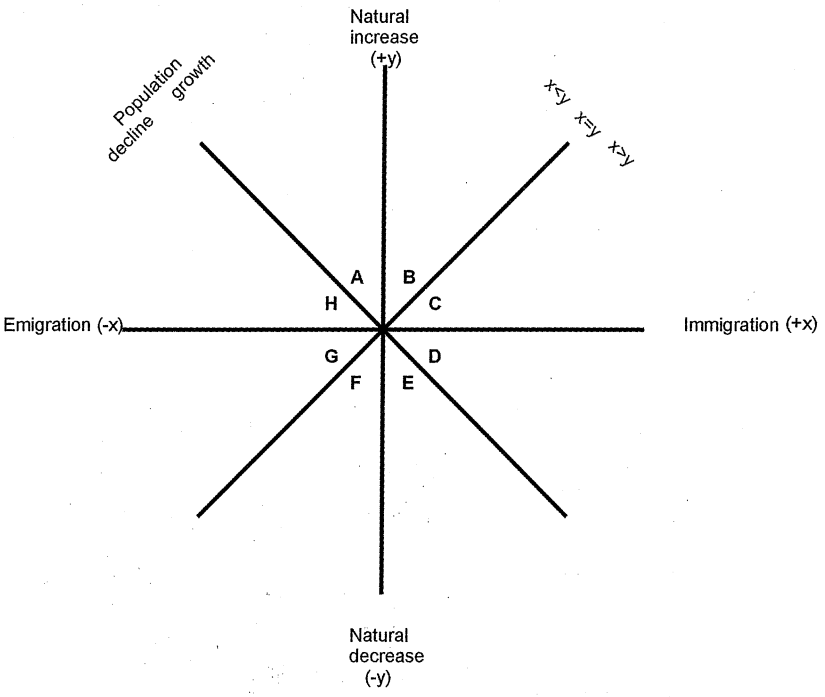

Fig. 6. Webb typology according to components of population growth
Source: Kosiński, 1976, *Geografia ludności*, p. 146

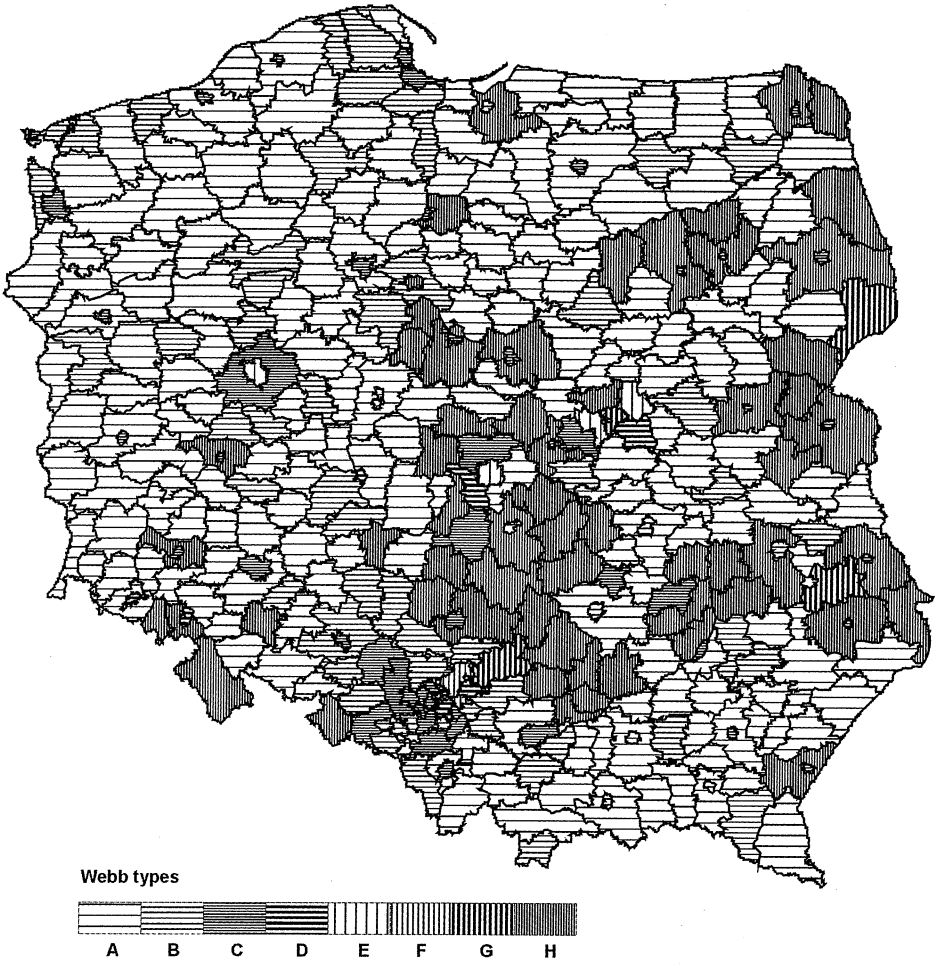

Fig. 7. Webb typology in 1991
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

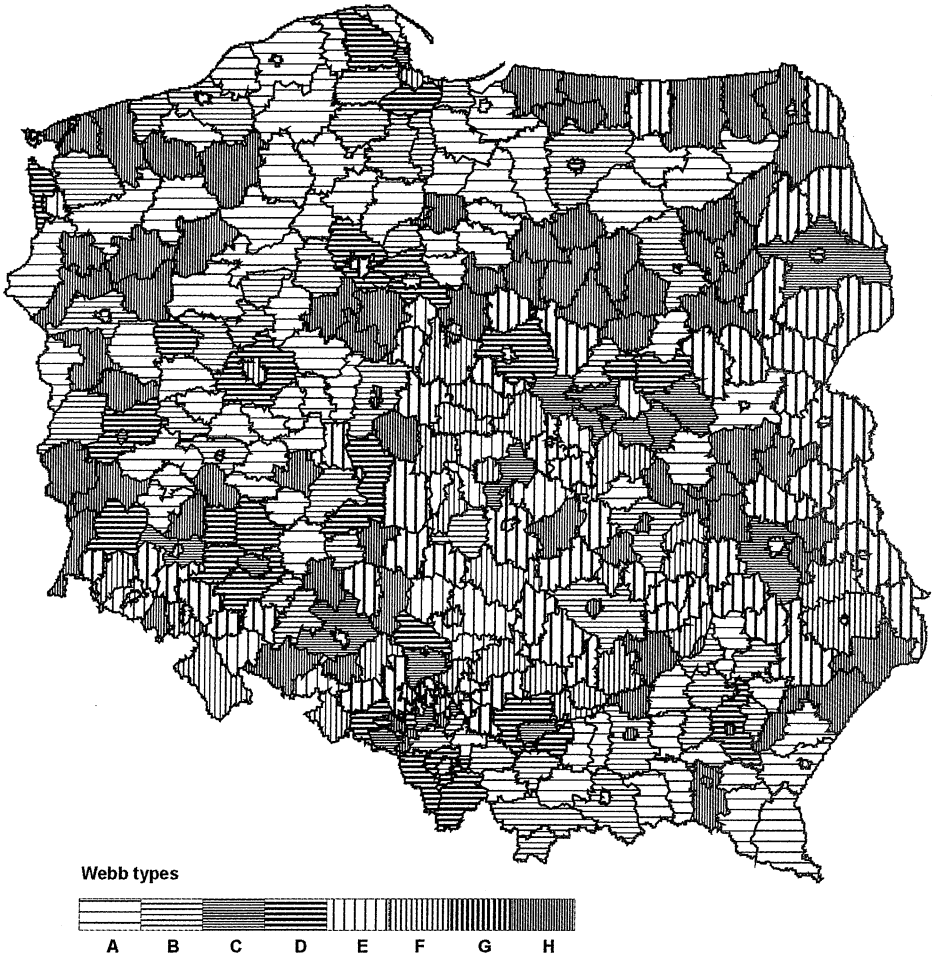

Fig. 8. Webb typology in 2001
Source: Author' elaboration based on the data from Central Statistical Office, Warsaw

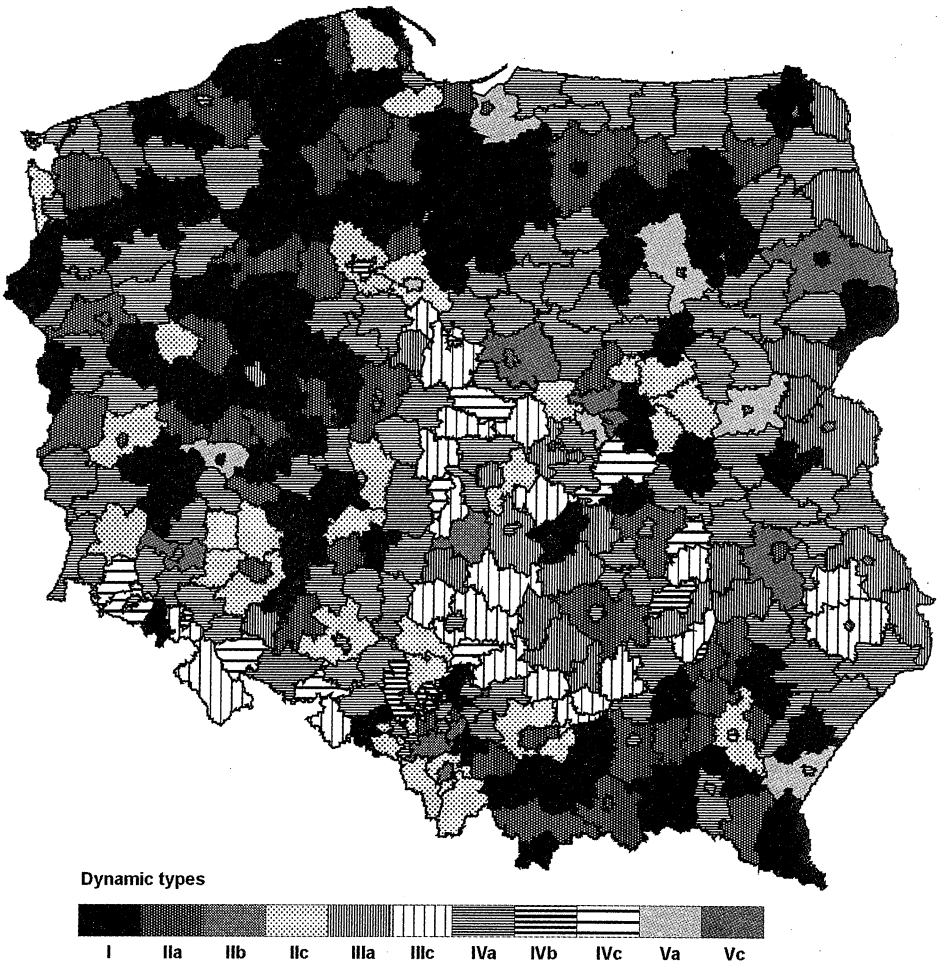

Fig. 9. Dynamics of Webb typology in 1991–2001
Source: Table 3 and Author's elaboration based on the data from Central Statistical Office, Warsaw

Table 1. The distribution of number and percentage of Webb types in districts

Type	1991		2001	
	Number	Percentage	Number	Percentage
A	181	48.5	78	20.9
B	62	16.6	47	12.6
C	48	12.9	30	8.0
D	10	2.7	21	5.6
E	5	1.3	18	4.8
F	2	0.5	40	10.7
G	5	1.3	62	16.6
H	60	16.1	77	20.6

Source: Author's elaboration based on the data from Central Statistical Office, Warsaw

Table 2. Matrix of changes between Webb types in 1991-2001

*	A	B	C	D	E	F	G	H
A	55	26	14	3	4	4	25	50
B	13	10	10	4	1	0	7	15
C	4	9	5	7	4	8	8	3
D	0	0	0	1	3	5	1	0
E	0	0	0	1	2	2	0	0
F	0	0	0	0	0	2	0	0
G	0	0	0	1	0	3	1	0
H	4	2	1	4	4	16	20	9

* according to Webb types
Source: Author's elaboration based on the data from Central Statistical Office, Warsaw

Table 3. Dynamics of Webb typology

TYPE	DESCRIPTION	SUBTYPE	DESCRIPTION
I	**Stagnation** when the relations between the constituents in the Webb's system remain unchanged	-	-
II	**Permanent population growth** when in both periods the population number increased (unit type A, B, C or D preserves the type marker)	a	**Stable** when the relations between the constituents in the Webb's system remain unchanged
		b	**natural growth surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of the natural growth
		c	**migration surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of migration balance
III	**Permanent population decline** when in both periods the population number decreased (unit type E, F, G or H preserves the type marker)	a	**Stable** when the relations between the constituents in the Webb's system remain unchanged
		b	**natural growth surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of the natural growth
		c	**migration surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of migration balance
IV	**Depopulation** when the increase in the population number was stopped in the first period, and in the other period the fall in the number was observed (unit type A, B, C or D becomes type E, F, G or H)	a	**Stable** when the relations between the constituents in the Webb's system remain unchanged
		b	**natural growth surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of the natural growth
		c	**migration surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of migration balance
V	**Population growth** when the fall in population number was stopped in the first period, while in the second period the number increased (unit type E, F, G or H becomes type A, B, C or D)	a	**Stable** when the relations between the constituents in the Webb's system remain unchanged
		b	**natural growth surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of the natural growth
		c	**migration surplus**, when the relations between the constituents in the Webb's system change due to the increasing role of migration balance

Source: Author's elaboration

Table 4. Dynamics of Webb typology – theoretical combinations

*	A	B	C	D	E	F	G	H
A	I	IIa	IIc	IIc	IVc	IVc	IVa	IVa
B	IIa	I	IIc	IIc	IVc	IVc	IVa	IVa
C	IIb	IIb	I	IIa	IVa	IVa	IVb	IVb
D	IIb	IIb	IIa	I	IVa	IVa	IVb	IVb
E	Vb	Vb	Va	Va	I	IIIa	IIIb	IIIb
F	Vb	Vb	Va	Va	IIIa	I	IIIb	IIIb
G	Va	Va	Vc	Vc	IIIc	IIIc	I	IIIa
H	Va	Va	Vc	Vc	IIIc	IIIc	IIIa	Ia

* according to Webb types
Source: Author's elaboration

Next stage of the analysis was to show the dynamics of units according to Webb types. Between 8 Webb types in two periods there 64 combinations were possible and actually 42 occurred (Table 2). To generalize them, five main types of changes were distinguished and within four of them additionally three subtypes were separated according to the relation between natural growth and migration balance (Table 3 and 4). In practice, type IIIb and Vb did not occur. In 1991-2001 85 units did not change their Webb type (23% of the total) and among them 55 units preserved its type A. In dynamic classification they represented type I and were located in north-western and south-eastern Poland (Fig. 9). The second most numerous combination was a change between types A and H, which occurred in 50 units and they did not show spatial concentration. The type with high degree of concentration was IIc which was represented by districts located in suburban areas of larger towns. The districts were characterised by positive population growth in both periods, but in 2001 the dominant component of population change was migration balance instead of natural increase in 2001. Similarly type Vc occurred around large towns such as Warsaw, Białystok or Lublin, where depopulation process gave way to an increase in the population size due to migration surpluses. The most common dynamic type, however, was IVa (117 units, about one third of all), which was characterised by change from positive to negative population growth and the main component of this growth did not change. The areas with this type were situated in peripheral areas of eastern, north-eastern, western or central Poland.

It must be concluded that spatial changes in the population size reflect the traditional division of Poland into demographically young north-western and south-eastern areas and demographically 'old' regions of central and eastern part of the country. The only new phenomenon is development of suburban areas which are now very influential in terms of population growth, especially net migration. The Webb typology showed that in the years 1991-2001 the num-

ber of units where natural increase was the main component of population change fell from 308 to 263, indicating the increasing role of migration, connected with high pace of childbirth decline. The dynamic classification of population change according to Webb types, although at the first sight complicated, manifested a continuing diversified character in the north-western and south-eastern parts of Poland and the development of suburban zones. Units located far from main centres along with some border areas also showed this typology. The above classification is an attempt to show the spatial distribution of the phenomenon of population balance and its main components.

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