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POLAND AND RELATED QUESTIONS

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Piotr Korcelli

I. BASIC AREAL UNITS

The definition of basic territorial units is a standard, although a rather important step in any spatial analysis of social and economic change. It becomes usually a problem when a comparative approach is taken. Therefore, in this paper I shall start with a brief presentation of: (a) the administrative structure of Poland and its evolution over recent decades; (b) the nature of administrative units and their relation to the structure of social and economic space; and (c) the availability of statistical data, including time series of such data, for each type of units.

Two major revisions in the administrative structure of Poland have been carried out since 1950. The first change occurred in 1954-55, and the second quite recently in 1973-75 [see: 6]. The basic, three-level hierarchical division into voivodships¹, poviats², and townships³ was introduced in 1949. Subsequently, in 1954 the townships were replaced by smaller communes⁴, and the number of voivodships was increased from 17 to 22. However, the original communes turned out to be not large enough for the establishment of efficient local administration, and their number was gradually reduced from 8800 to about 4300. A more radical step was taken in 1973 when 2365 townships were created. On June 1st, 1975 the transition from a three-level to a two-level structure was completed; namely the number of voivodships was increased to 49 and poviats ceased to exist.

Urban places are defined according to their legal status, rather than a population threshold, the latter being true in

the case of some other countries. Before June 1, 1975 the five largest cities: Warsaw, Łódź, Cracow, Wrocław and Poznań constituted the so-called city-voivodships in addition to performing functions of administrative capitals for larger units surrounding them. Seventy-four other large and medium size cities held the rank of separate poviats; again a majority of those cities were at the same time administrative centers for larger, surrounding poviats. The remaining towns were situated within poviat boundaries along with respective communes or townships. Since 1975 the voivodships have been divided into cities (towns) and townships, although in the case of smaller urban places the local town and township administration have been combined to form, in fact, one unit.

Despite their alterations, administrative units have proved to be, in the absence of statistical grid coordinate systems, and except for small-scale investigations, the most widely used for presentation and analysis of data in geographical, sociological, economic, and, of course, planning studies. The availability of data in administrative breakdowns, however, does not solely account for this fact. Of equal importance is a relatively high correlation between administrative regions and other kinds of economic regions, especially what N. Hansen [10] calls polarized regions. The existence of such interdependence in Poland has been emphasized by S. Leszczycki. In fact, one of the basic objectives in delimiting the administrative units and setting-up administrative hierarchies is that such systems should be suitable from the point of view of economic activities and policies and the planning process. For example, an explicit policy in establishing townships since 1973 has been that these units should be of a proper size and of population and economic potential large enough to stimulate the transmission of agricultural innovations and the organization of modern community services, particularly educational systems. A large segment of economic and social activity of

the State is spatially organized, and investments allocated, on the basis of administrative divisions. This mainly applies to the tertiary sector, including wholesale and retail trade, as well as a substantial part of medical, educational, and recreational services. At the same time, administrative units constitute physical planning regions.

Generally, administrative boundaries of cities and towns embrace all the built-up area plus some area for future expansion. Still, there are some exceptions to this rule, such as the city of Bielsko-Biała, whose boundaries fail to include some of its major outlying residential districts. A polycentric pattern of urban agglomerations tends also to be reflected in the administrative structure; thus the contiguous Upper Silesian cities are separate one from the other in terms of administrative status, so as are the cities of Gdańsk, Gdynia, and Sopot on the Baltic coast. In the new administrative structure three voivodships, i.e. Warsaw, Łódź and Cracow can be approximately identified with urban agglomerations. The same is also in fact true in the case of the Katowice voivodship whose population is now 85.7% urban (comparing to 87.5 percent in Warsaw city-voivodship, 67.7 percent in Cracow city-voivodship and 90.6 percent in the city-voivodship of Łódź) and living at the average density of 517 persons per square km (the respective figures for the three city-voivodships are: 558, 339, and 701).

Turning up to the question of data availability, it should be pointed out that in the pre-1975 system most of the statistics were aggregated for voivodships and poviats. Despite some boundary changes, those units were relatively stable from 1950 to 1970, i.e. over three decennial censuses. The data reported for communes pertained mostly to demographic characteristics and to agriculture. On the other hand, a special survey of commuting patterns [see: 7] took communes as basic units.

In the new division there is some statistical information available for the 49 voivodships, and the Central Statistical Office [see: 6] has undertaken a cumbersome task of recalculating the data from the previous censuses (since 1946) and to reconstruct time series of population, housing and economic statistics for voivodships and townships. Those data will be published progressively.

At present, poviats seem still to be most suitable basic units in the study of functional urban regions, since the new voivodships provide too coarse a grain, and the data for townships are not available. Furthermore, the commuting survey for 1968 was carried out for communes--the units fully nested within poviats boundaries. A study using poviats as basic units suffers, of course, from a lack of continuity, but a retrospective approach seems still to be of a certain interest. It may be contemplated that when data for townships are made fully available, the analysis could be repeated for the now established functional regions adjusted according to township boundaries.

II. DELINEATING THE FUNCTIONAL URBAN REGIONS

There have been many studies dealing with economic regionalization, the delineation of urban agglomerations, and the commuting patterns in Poland. It is beyond the scope of this short paper to review that voluminous work. Nevertheless, such a retrospective glance over the spatial patterns proposed, as well as the underlying definitions and concepts seems needed, and it will be attempted as a separate task.

It has been recently assumed [see: 9, p. 4] that data on commuting to work, when available, are preferred in the delimitation of functional urban regions over other kinds of data. In Poland the commuting survey of 1968 was carried out by the Central Statistical Office (Główny Urząd Statystyczny) with respect to all cities with the population figure of 50,000

and over. At that time there were 49 cities of the size specified above. In addition, the survey was extended to cover four cities with little less than 50,000 inhabitants, as well as the twin cities of Bielawa-Dzierżoniów with the combined population of 64,100. According to the 1970 census there were at that latter date 50 urban places within the fifty thousand or over category, and they had been all covered by the 1968 survey. Thus in terms of the initial set of cities the survey returns can be regarded as a suitable data base to deal with.

The first step in a delineation procedure is to define core areas. Although the simple general principle followed is that such areas should constitute cities of 50,000 inhabitants and over, in their administrative boundaries, the question of polycentric agglomerations remains to be settled. In the Central Statistical Office study the following working rules were established:

(1) Territorially contiguous cities were considered as one core area, even if some of them had less than 50,000 inhabitants.

(2) Two or more territorially non-contiguous cities were considered to form one core area if those cities were situated close one to the other and shared a common commuting shed.

As a result, the 55 cities initially selected were aggregated to form 41 core areas, which in addition were expanded to cover 18 smaller urban places, making for the total of seventy-three cities and towns. The list of core areas of the commuting regions is given in Table 1.

The second of the two criteria used has provoked some criticism. One author [16] pointed out that, although the commuting sheds may overlap, it is not usually the case that the sheds of smaller urban centers are fully nested within those of nearby metropolitan centers. Thus, for example,

Table 1. Core areas of the commuting regions.
Source: [7].

<u>No.</u>	<u>Monocentric</u>	<u>1970 Population</u> ('000)	<u>No.</u>	<u>Polycentric</u>	<u>1970 Population</u> ('000)
1.	Białystok	168.5	36.	Bielawa	31.1
2.	Bielsko-Biała	106.2		Dzierżoniów	33.0
3.	Bydgoszcz	282.2		Total	64.1
4.	Częstochowa	188.2			
5.	Elbląg	90.1	37.	Gdańsk	365.6
6.	Gniezno	50.9		Gdynia	191.5
7.	Gorzów Wlk.	74.8		Sopot	47.7
8.	Grudziądz	75.7		Total	604.8
9.	Inowrocław	54.9			
10.	Jelenia Góra	55.9	38.	Ostrowiec Św.	50.1
11.	Kalisz	81.5		Skarżysko Kam.	39.4
12.	Kielce	127.0		Starachowice	43.1
13.	Koszalin	65.2		Total	132.6
14.	Kraków	589.5			
15.	Legnica	76.0	39.	Łódź	787.0
16.	Lublin	238.5		Pabianice	64.2
17.	Olsztyn	94.8		Zgierz	43.0
18.	Opole	86.9		Total	894.2
19.	Ostrów Wlk.	49.7			
20.	Piotrków Tryb.	59.8	40.	Katowice	305.0
21.	Płock	72.3		Zabrze	197.0
22.	Poznań	471.9		Bytom	187.5
23.	Przemyśl	53.5		Gliwice	172.0
24.	Radom	159.5		Chorzów	151.9
25.	Rzeszów	82.1		Sosnowiec	145.0
26.	Słupsk	68.9		Ruda Śl.	143.0
27.	Szczecin	338.0		Siemianowice	64.7
28.	Świdnica	47.7		Tychy	71.5
29.	Tamów	85.9		Świętochłowice	57.8
30.	Tomaszów Maz.	55.0		Dąbrowa Górń.	61.7
31.	Toruń	129.9		Jaworzno	63.4
32.	Wałbrzych	125.2		and 8 smaller	
33.	Włocławek	77.6		urban places	
34.	Wrocław	526.0		Total	1937.0
35.	Zielona Góra	73.5			
			41.	Warszawa	1315.6
				and 6 smaller	
				urban places	
				Total	1511.3

commuting to Zyrardów, which is an industrial town situated about 45 kms from Warsaw, should not be identified with commuting to Warsaw, i.e. it is not certain whether people commuting to Zyrardów live within the daily urban system of Warsaw. Such criticism is conceptually valid and should be given consideration in the studies of spatial interaction patterns, however, it can be disregarded for the time being given a broad, national scale of the present regionalization. In fact, B.J.L. Berry [1, pp. 11-15] and (to a lesser extent) P. Hall [8, pp. 117-137] made certain simplifying assumptions which allowed them to treat two or more neighboring cities as single core areas. In the present delineation, such an approach allows use of a uniform data base as provided by the Central Statistical Office study.

Another question concerns the boundaries of commuting regions. The CSO study used as a commuting ratio the percentage of commuters among economically active, non-agricultural population. The threshold value representing the extent of commuting regions was selected to be 20 percent. Such an index presents certain comparability problems, since it cannot be easily compared with a more conventional measure, i.e. the ratio of commuters to all employed population. Logically, the former index is valid since full-time farmers are not generally expected to commute to central-city jobs, but it would be more useful if that index were used along with the non-agricultural employment index.

It is understood that an accurate commuting ratio threshold as a basis for delineating functional urban regions is not obligatory for the present study. Of greater importance seems to be an identification of the outer commuting range which, when interpreted as a regional boundary, assures a high degree of closure of employment and residence within individual regions. This can be done adjusting the CSO data to the powiat scale. The results are presented in Figure 1. The working

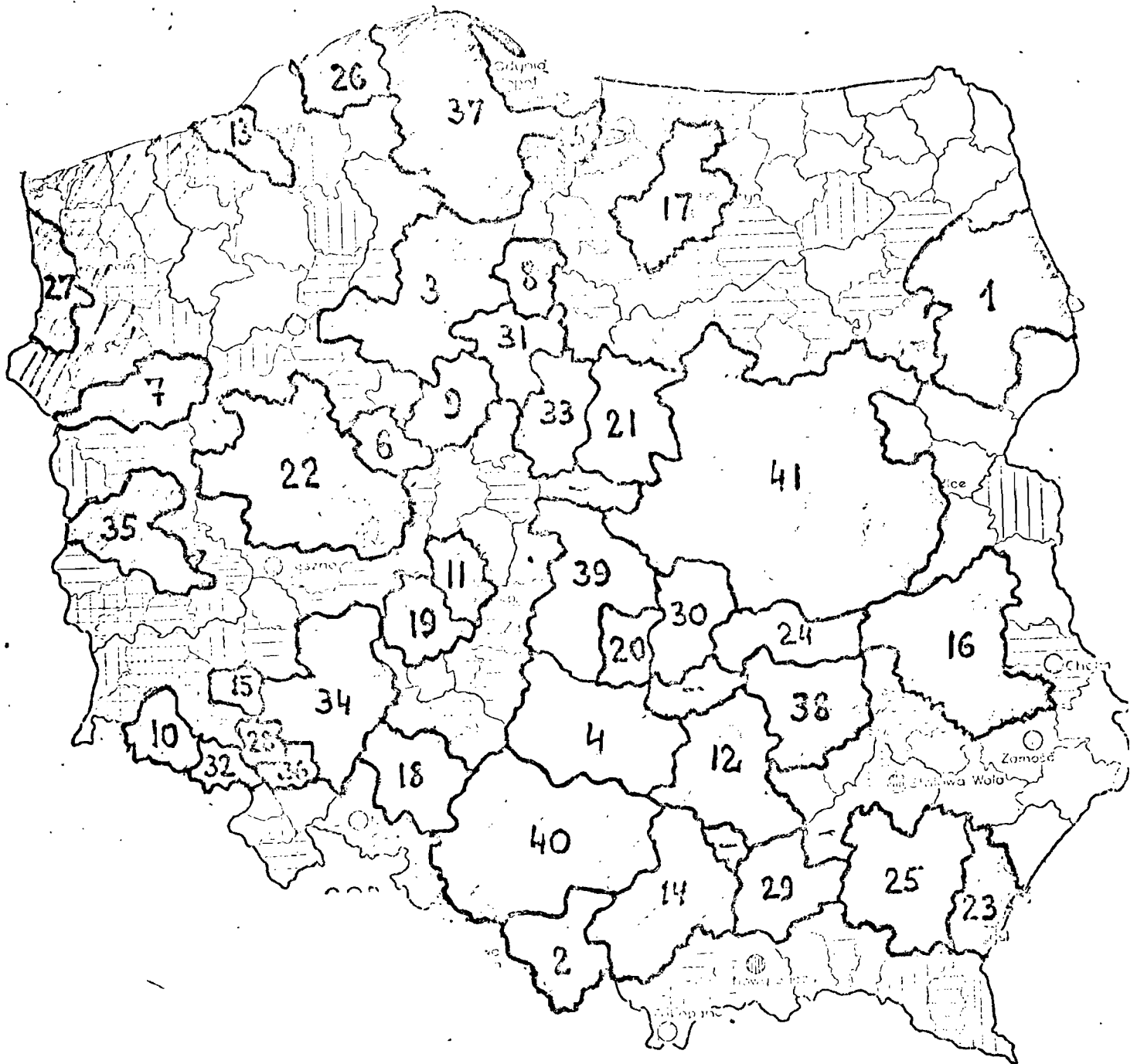


Figure 1. The Expanded Commuting Regions, 1968-70.
See Table 1.

criteria applied in assigning poviats to individual core areas were as follows: At least one commune should have the rate of commuters to non-agricultural workers of 30 percent or more; or from at least five communes at least one percent of workers should commute to a particular core. (On the average there were about ten communes in each poviat in 1968/70, although this rate varied considerably over space).

As a result, the commuting regions as presented in Figure 1 cover about fifty percent of the national territory and account for over 70 percent of the total population. The pattern is rather close to that of the commuting regions as established by the Central Statistical Office study (see Figure 2). A larger size of the former regions is a consequence of bigger basic units and more liberal threshold values used in the present delineation. In at least several cases individual poviats turned out to be split in terms of their commuting patterns between two or even three competing employment centers. Examples are: the poviat of Szydłowiec, whose northern part was oriented towards the city of Radom, while its southern communes were sending most of their non-agricultural labour force to the cities of skarżysko-Kamienna and Starachowice; or the poviat of Sławno, split in half into the commuting sheds of Koszalin and Słupsk. In such cases, additional, often non-quantitative, assignment criteria had to be used.

From Figure 1, it is concluded that rigorous application of the 50,000 population threshold criterion leads to the omission of several important regions of intense commuting oriented towards newly developed industrial centers. Those regions now appear as "holes" on the map. They include the sulphur-mining and sulphur-processing district of Tarnobrzeg [see: 3], the Konin - Koło district [see: 4] specialized in soft-coal mining and power generation, the copper mining and smelting district of Lubin - Głogów [18], extending north

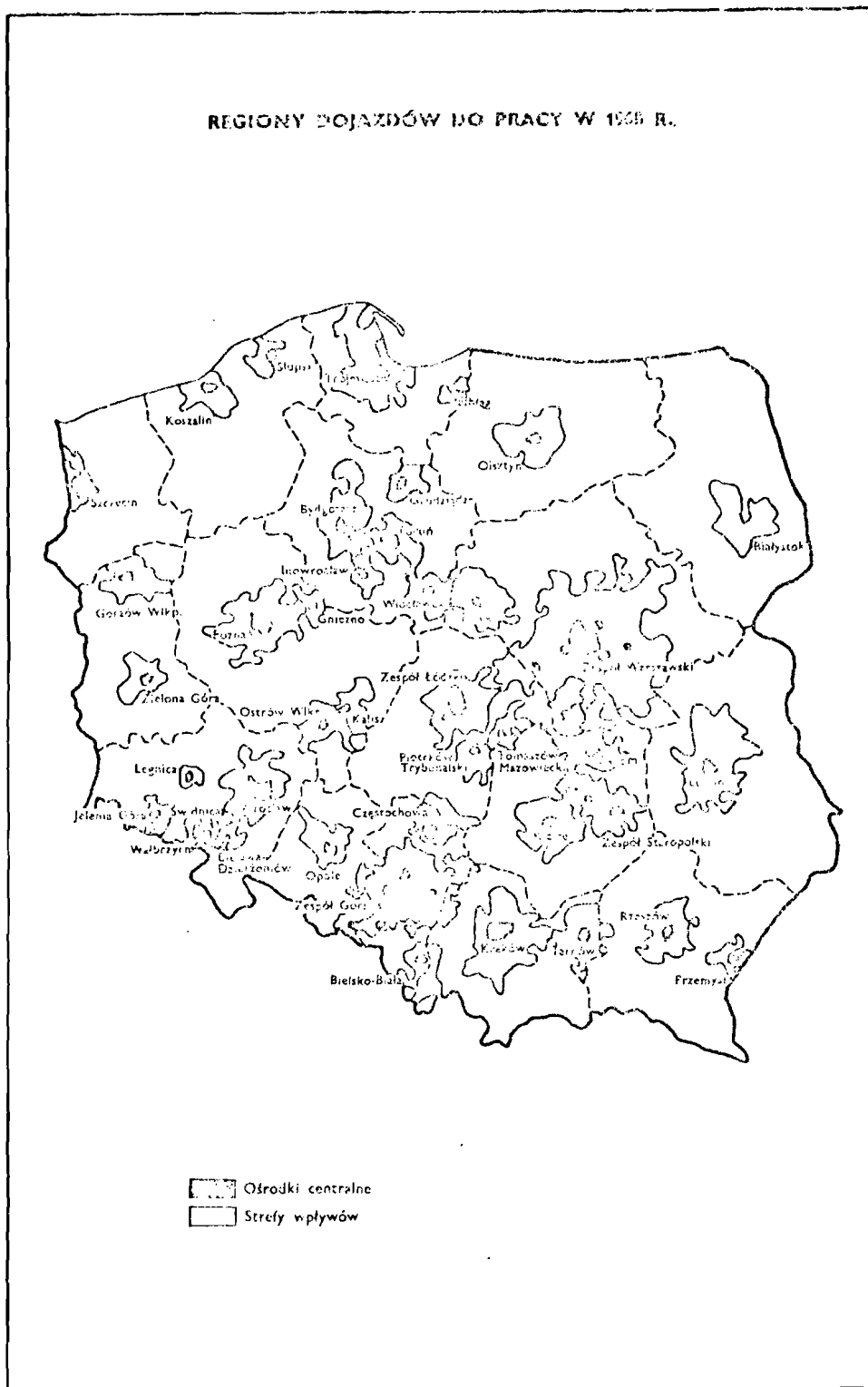


Figure 2. The Commuting Regions According to the Central Statistical Office Study [7].

of the city of Legnica; as well as industrial towns of Krosno - Jasło and Piła.

These additions bring some new areas within the reach of what are often called the daily urban systems. However, they do not assure the extension of functional urban regions over the whole national territory. To accomplish this, one has to resort to two additional criteria, namely:

- (a) a further relaxation of the commuting ratio threshold;
- (b) the inclusion of central-place considerations.

As to the second point, when applying the central place criteria, it is possible to expand the boundaries of the previously identified regions, as well as to introduce a limited number of well-established central places with the population of generally more than 40,000 (see Table 2). In several cases two closely situated towns are treated as one core area. According to the same rule some smaller areas in the south-western and central part of Poland, with a considerable amount of cross-commuting and an apparent division of functions, have been merged. Figure 3 shows the resulting functional urban regions exhausting the whole national territory.

Two brief comments are necessary. First, Figure 1 shows areas of commuting to work based on the identification of its outer range rather than of contiguous territory with a heavy concentration of work trips to the core areas. It should be kept in mind that many smaller urban and non-urban places attract relatively large numbers of commuters. These flows, if plotted on the map, could substantially modify the overall pattern. An attempt was made to partly alleviate this problem by including nine additional core areas. On the other hand, because the aim was to subdivide the whole territory into functional urban regions, it turned out to be rather difficult, if not impossible, to use rigorous and uniform criteria throughout the delimitation procedure.

Table 2. Smaller core areas, added in the second version of the delineation of functional urban regions.

<u>No.</u>	<u>Urban Place</u>	<u>Population ('000)</u>	
		1970	1974
1.	Tarnobrzeg Stalowa Wola (total)	49.1	64.2
2.	Ełk Suwałki (total)	53.0	60.0
3.	Łomża Ostrołęka (total)	48.0	54.2
4.	Krosno Jasło (total)	43.9	53.8
5.	Konin	40.8	48.4
6.	Piła	44.0	47.5
7.	Nowy Sącz	41.3	46.6
8.	Siedlce	39.3	42.5
9.	Zamość	35.1	37.9



Figure 3. The Functional Urban Regions.

Second, the pattern of 45 functional urban regions, as shown in Figure 3 (cf. Table 3), is relatively close to the new administrative division into 49 voivodships (cf. Figure 4). This finding, however, is hardly surprising. It was a basic rationale in the recent administrative reform to create regions with a high degree of internal coherence and closure with respect to the economy and the patterns of daily human migrations. I should admit that in several debatable cases the assignment of individual units to functional regions was based on the administrative status. Divergencies between the two patterns would be still less if territorial units smaller than poviats could have been used in the present delineation, as had been the case in the restructuring of administrative divisions, when townships formed basic reference units. Major differences can be found in the vicinities of the largest urban centers. Here, the voivodships of Warsaw, Łódź, and Cracow were tailored so as to encompass the respective urban agglomerations rather than their much larger hinterlands.

It may be assumed that the new administrative structure, which follows the development of space economy will in turn have a significant impact upon the formation of daily urban systems. Indeed, in future studies this division may provide a very convenient frame of reference.

III. SOME RESEARCH NEEDS

It is possible to use the existing poviat statistics to analyze both interregional and intraregional patterns and their change over the recent decades (see Table 4). Both approaches seem viable, since it is important to get a knowledge of spatial trends in economic and social development at the national level, as well as to dissect individual functional urban regions to see interrelations between cores and hinterlands. In some cases, the core - hinterland relations may still reflect the urban-rural differentiation, while in the

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Figure 4. The New Administrative Division of Poland into 49 Voivodships.

Table 3. Functional Urban Regions, 1970.
(See Figure 3.)

1. Białystok	24. Olsztyn
2. Bielsko-Biała	25. Opole
3. Bydgoszcz	26. Ostrowiec Św. - Skarżysko Kam. - Starachowice
4. Częstochowa	27. Piła
5. Elbląg	28. Piotrków Tryb. - Tomaszów Maz.
6. Ełk - Suwałki	29. Płock
7. Gdańsk	30. Poznań
8. Gorzów Wlk.	31. Przemyśl
9. Grudziądz	32. Radom
10. Inowrocław	33. Rzeszów
11. Jelenia Góra	34. Siedlce
12. Kalisz - Ostrów Wlk.	35. Słupsk
13. Katowice	36. Szczecin
14. Kielce	37. Tarnobrzeg - Stalowa Wola
15. Konin	38. Tarnów
16. Koszalin	39. Toruń
17. Kraków	40. Wałbrzych
18. Krosno - Jasło	41. Warszawa
19. Legnica	42. Włocławek
20. Lublin	43. Wrocław
21. Łomża - Ostrołęka	44. Zamość
22. Łódź	45. Zielona Góra
23. Nowy Sącz	

Table 4. Data for inter- and intraregional analysis.

<u>Major areas</u> (according to: 9, Chart 2)	<u>Poviat Statistics (see: 15)</u>
DEMOGRAPHY	<ol style="list-style-type: none">1. Population size (urban and rural)2. Population density3. Marriages, births, deaths, natural increase, infant mortality4. Migrations: in-migration, out-migration, net migrations (by urban and rural places)
EMPLOYMENT	<ol style="list-style-type: none">1. Population by main source of income: agricultural, non-agricultural, rural non-agricultural2. Employment by six major sectors
CONSUMPTION	<ol style="list-style-type: none">1. Retail trade - number of establishments, sales2. Use of water, electrical energy, gas3. Bank savings
SOCIAL INFRASTRUCTURE	<ol style="list-style-type: none">1. Housing statistics: number of dwelling units, rooms, rooms per person; dwelling units constructed (all by urban and rural places)2. Education: number of students in primary, secondary (both general and vocational) schools3. Movie theatres. RTV sets, public libraries (number of volumes)4. Medical services: number of doctors, dentists, nurses, hospitals (beds)
PRODUCTION	<ol style="list-style-type: none">1. Capital investments by nine sectors2. Value of manufacturing production3. Agricultural statistics: land use, area under major crops, number of cattle; agricultural production by major crops, animal production

highly industrialized areas urbanization phenomena (such as the so-called "occupational urbanization" and the related change in cultural patterns) may be more uniformly spread out throughout the whole region.

One can see at least three areas of study related to the concept of functional urban regions, with a certain theoretical appeal and numerous planning implications as well, pertaining to both the national and the regional planning level. One area is the study of structural interdependencies within national settlement systems, especially between core areas and other urban places.

Table 5 sheds some light on such interdependencies. The first impression is a rather high degree of stability. Over the 1960-1970 period urban places of several categories have retained their ranks both in terms of population size and selected indices pertaining to the tertiary sector. A remarkable similarity of median ranks for the first and the second category is, of course, a consequence of a very high overlap of the two sets of cities. More interesting may be a comparison of the three remaining categories, which, if taken together, exhaust the set of 79 cities for which data have been assembled. It can be seen that within urban agglomerations a disproportionate share of retail activity is accounted for by the main centers (i.e. central zones) which have also much higher retail sales per person than smaller regional centers have. The dependence of outlying parts of urban agglomerations upon core areas is less pronounced, although still evident, in the case of medical and educational facilities. On the other hand, the category of "smaller regional centers," i.e. self-contained middle-size cities, is much more specialized in general secondary education than urban agglomerations are.

Table 5. Selected central place characteristics:
median ranks for 5 categories of urban places*

No.	<u>Categories of urban places</u>	<u>Population size</u>				<u>Retail sales per 1000 population</u>			<u>Doctors per 1000 population</u>			<u>Secondary school students per 1000 population</u>		
		1960	1965	1970	1974	1960	1965	1970	1960	1965	1970	1960	1965	1970
1.	Administrative centers of new voivodships (39 units)	27	27	27	27	31	27	28	34	32	32	38	38	37
2.	Core cities** of functional urban regions (45 units)	30	30	30	30	34	33	29	36	32	32	36	35	36
3.	Administrative centers of former voivodships (17 units)	9	9	9	9	16	15	16	12	13	13	47	40	42
4.	Cities within major urban agglomerations (non-central cities) (22 units)	41	39	42/3	42/3	65/6	64/5	61/2	45	47	54	65	66	67
5.	Smaller regional centers (40 units)	50/1	49/50	49/50	50/1	44/5	42/3	41/2	48	49	47	26/7	28/9	26/7

* Within the universe of 79 cities of the administrative status of poviat. Note that median rank for the universe is 40. Categories: 3, 4 and 5 are additive, while others are not.

** Only one, dominant centre for each functional urban regions, except for 3 regions with no clearly dominant center (nos. 12, 26, 28 in Table 3).

Data sources: [15, 17].

The second area of study relates to spatial interaction patterns within cities and regions. Models of such patterns and their theoretical underpinnings have rapidly developed over the past decade or so, in response to an increasing demand for new planning tools. Yet those models seem to lack massive empirical evidence on the spatial structure of urban regions and their change. Here a systematic analysis of functional urban regions can be expected to provide the required inputs.

Finally, interrelations between urban and regional systems need to be more closely investigated, and the existing theoretical concepts pertaining to such systems reevaluated, along the lines indicated by the work of J. Parr [13], L. Bourne [2] and others. The prevailing hypothesis, according to which national settlement systems can be disaggregated into regional subsystems which in turn consist of intra-urban and local (rural-small town) subsystems, should be empirically tested. Needless to say, research along this line can also carry major planning and policy implications.

Footnotes

¹The term "province" has also been used in some publications in English. The original spelling is: wojewòdztwo, pl. wojewòdztwa.

²These intermediate-level units have sometimes been referred to as "counties." However, the term "powiat" has been introduced by British geographers and is listed in some English-speaking geographical dictionaries. The original Polish spelling is: powiat, p. powiaty.

³In Polish: gmina, pl. gminy.

⁴The respective Polish term is: gromada, pl. gromady.

References

- [1] Berry, B.J.L. Growth Centers in the American Urban System. Vols. I, II. Cambridge, Ballinger, 1973.
- [2] Bourne, L.S. "Conceptual Issues in Designing and Evaluating Strategies for National Urban Settlement Systems." In H. Swain, Ed., National Settlement Strategies: East and West. IIASA CP-75-3. Laxenburg, Austria, International Institute for Applied Systems Analysis, 1975.
- [3] Dobrowolska, M. "The Growth Pole Concept and the Socio-Economic Development of Regions Undergoing Industrialization." Geographia Polonica, 33 (in print), 1976.
- [4] Domański, R. Syntetyczna charakterystyka obszaru, (A Synthetic Characterization of a Region). PWN, Warszawa, 1970.
- [5] Dziewoński, K. "Major Spatial Trends in the Urbanization of Poland." Geographia Polonica, 4 (1964) Warszawa.
- [6] Graczyk, B. "Przeliczanie danych statystycznych na dwustopniowy podział administracyjny kraju," (Recalculating the Statistical Data into the Two-level Administrative Division of Poland). Wiadomości Statystyczne, 10 (1975) GUS, Warszawa.
- [7] Główny Urząd Statystyczny. Strefy wpływów dużych miast w świetle dojazdów do pracy, (Zones of Influence of Large Cities in Terms of the Commuting to Work). Statystyka Regionalna, 35 (1973) Warszawa.
- [8] Hall, P. The Containment of Urban England. Vols. I, II. London, George Allen and Unwin, 1973.
- [9] Hall, P., Hansen, N., Swain, H. Status and Future Directions of the Comparative Urban Regions Study: A Summary of Workshop Conclusions. IIASA WP-75-135. Laxenburg, Austria, International Institute for Applied Systems Analysis, 1975.
- [10] Hansen, N.M. A Critique of Economic Regionalizations of the United States. IIASA RR-75-32. Laxenburg, Austria, International Institute for Applied Systems Analysis, 1975.

- [11] Korcelli, P. "Problematyka regionów metropolitalnych w Stanach Zjednoczonych i w Wielkiej Brytanii," (Metropolitan Regions in the United States and Great Britain: Formation, Definitions and Study). Przegląd Geograficzny, 39 (1967) Warszawa.
- [12] Lijewski, T. Dojazdy do pracy w Polsce, (Commuting to Work in Poland). Studia KPZK PAN, 15 (1967) Warszawa.
- [13] Parr, J.B. "Growth Poles, Regional Development, and Central Place Theory." Regional Science Association Papers, 30 (1973).
- [14] Rocznik Statystyczny 1975. (Statistical Yearbook of Poland, 1975), GUS, Warszawa.
- [15] Rocznik Statystyczny Powiatów, 1971. (Statistical Yearbook for Poviats). Statystyka Regionalna, 27, GUS, Warszawa.
- [16] Rykiel, Z. "A Review of: 'Strefy wpływów dużych miast w świetle dojazdów do pracy'." Przegląd Geograficzny, 47, 2 (1975).
- [17] Statystyka miast i Osiedli, 1945-1965. (Town and Settlement Statistics). Statystyka Regionalna, 6, GUS, Warszawa.
- [18] Zagożdżon, A. "Problems of Development of a Settlement Network in a Region under Industrialization." Geographia Polonica, 27 (1973).