EQUALISING OR POLARISING: THE CENTRE–PERIPHERY MODEL AND THE ABSORPTION OF EU FUNDS UNDER REGIONAL OPERATIONAL PROGRAMMES IN POLAND

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This article seeks to assess how the absorption of European the Union funds by the Polish voivodeships reflects two basic types of strategy in their allocation, i.e. the polarising and the equalising model. The analysis embraced 16 regional operational programmes (ROPs) between 2007–2013. The frame of reference adopted in the research was the centre-periphery model. Classes of peripherality were distinguished for each voivodeship, and absorption profiles of EU funds were determined for areas differing in their levels of peripherality. The goal of the article was achieved in a multi-stage research procedure ending in the construction of a synthetic index of the spatial orientation of support within the ROPs. The analysis demonstrated that the features of the polarising model tended to predominate in intra-regional policy. In most cases, however, the distribution of EU support represented a mixed model, with a shift towards the polarising one.

Keywords: core-periphery concept, regional operational programmes, EU funds, intra-regional policy, Poland

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INTRODUCTION

The European Union's regional policy is one of its two most important fields of operation in terms of financial involvement (besides the Common Agricultural Policy). The implementation of its fundamental goal as defined by the Treaty, *viz.* attaining economic, social, and territorial cohesion, consumes about one-third of the EU budget.

One of the basic causes of the low evaluation of the effectiveness of cohesion policy intervention at the Community level presented in the literature on the subject (e.g. Boldrin – Canova 2001; Dall'erba – Le Gallo 2008 is thought to be the lack of precisely defined goals (Martin 2009). The provisions of the Treaty do not state clearly at what rung of territorial organisation the differences in the level of socio-economic development should be reduced: the national or the inter-regional (or even the intra-regional). This imprecision seems to be highly significant because, as studies belonging to the stream of new economic geography show, an increase in the development dynamics of a spatial system is usually connected with a widening of internal differences among its component parts (e.g. Puga 1999; Martin – Ottaviano 2001). In the light of these works, a regional policy can only be effective if the institutions in charge of its instruments, both at the national and regional levels, define their funding strategy as oriented towards an improvement in *efficiency* or a *reduction of differences*.

The choice of the spatial orientation of the intervention strategy is an expression of the fundamental dilemma as to the chief goal of regional policy when only limited funds are available, namely the alternatives of equality or efficiency in socio-economic development. The equalising model assumes a reduction of excessive socio-economic differences by concentrating support in areas in the worst economic situation or marginalised ones. A practical example of this type of policy is the support given to the poorest developed regions and preferences for peripheral areas when allocating funds. In the efficiency-oriented variant (or the so-called polarising model) which, by assumption, seeks to maximise the economic growth rate at a macroeconomic scale, especially important support recipients should be areas with a high development potential and dynamics that also show great skills in adapting to the changing market conditions. In works on regional policy, such areas are often termed "centres" or "growth poles", and are usually taken to include the largest urban agglomerations.

This article seeks to assess how the structure of absorption of EU funds by Poland's voivodeships (highest-level administrative units) reflects these two basic types of allocation strategy, i.e. the polarising or the equalising model. It was assumed that this relationship could be verified by an analysis of differences in the EU funds obtained by communes carried out in a centre-periphery system.

The analysis focused on intra-regional policy, hence the research concentrated on the European funds available under the Regional Operational Programmes (ROPs) for the years 2007–2013.

The assessment rests on the spatial patterns of the actual absorption of funds (the implementation stage), not on the assumptions of individual regional operational programmes (the programming stage). However, it should be kept in mind that what significantly affected the spatial structure of use of EU funds in the Polish voivodeships was a "high-level" planning of their allocation, hence when interpreting the results obtained, references were made to the provisions of the operational programmes.

The issues discussed include the theoretical aspects of the equalising and polarising models; regional operational programmes as instruments of a policy conducted by regional government authorities; peripheries and problems with their delimitation; the potential model as a measure of peripherality; and a research procedure proposed to analyse regularities in the allocation of EU funds in the individual voivodeships in terms of the centre-periphery system, including a synthetic index of the spatial orientation of EU support.

1. THEORETICAL ASPECTS OF THE EQUALISING
AND POLARISING MODELS

One of the basic dilemmas in the implementation of a regional policy and other measures carried out by public authorities that lead to spatial changes in (a reconstruction of) a country's socio-economic structure is whether to aim at levelling out differences among its various areas (equality) or to secure, possibly fast, a high rate of return of the capital invested, i.e. to achieve maximum efficiency.[1] In the literature, the model of activities intended to achieve directly the first goal is called an equalising model, while the other goal is sought using a very popular polarising-diffusion model (e.g. Hausner 2001; Gorzelak 2010; Churski 2014).

Both the equalising and the polarising-diffusion model rest on a group of economic (and spatial-economic) theories assuming that the imperfection of the market mechanism leads to differences in economic growth in space, which manifests itself in the polarisation of the development level of individual areas. However, while in the equalising model differences in development among the various areas are regarded as a serious obstacle in attaining a higher rate of the socio-economic development of the territorial system as a whole (e.g. a state or region), in the polarising-diffusion model spatial inequalities (if not of unacceptable pro-

[1]   National Strategy of Regional Development 2010–2020: Regions, Cities, Rural Areas.

portions) are treated as one of the forces driving the development dynamics of a state or region.

In their argumentation, proponents of the polarising-diffusion model usually refer to a group of theoretical concepts termed polarisation theories (which includes those of the so-called unbalanced development), which can be traced to Perroux (1955), who introduced the growth poles model (*pôles de croissance*), that was later developed by many other scholars such as Hirschman (1958 – the concept of geographical growth centres), Boudeville (1966 – the theory of a polarised region), and the so-called French-Belgian school.

In the polarising-diffusion model, the advantageous effect of public intervention implemented to stimulate the socio-economic development of a state (or region) as a whole consists of (1) support given to areas of a significant concentration of economic activity (usually to large urban centres), and (2) the diffusion of the good effects of growth impulses to the marginalised areas that surround them, and in consequence an improvement in their socio-economic situation.

In turn, proponents of the equalising model emphasise several adverse effects of the polarisation and similar theories, usually referring to Myrdal's cumulative causation theory (1957) and Friedmann's (1967) centre-periphery model. Although Myrdal's concept includes positive effects of the diffusion of growth impulses, ultimately adverse effects, called backwash effects, greatly predominate. According to Myrdal, in less developed areas negative tendencies intensify in a specified time horizon and take the form of negative feedback (differences in development widen). He believed that the only way to overcome the "vicious-circle" mechanism of widening differences is direct intervention by public authorities in such areas in order to stimulate growth and check degradation processes taking place there.

Friedmann reached similar conclusions in his centre-periphery model. He also analysed the negative social and psychological aspects of widening regional (or intra-regional) differences. In his opinion, by creating an investment climate, centres stimulate the development of modern innovation systems and R&D centres, and this makes possible an increase in incomes despite the growing population density. Thus, they are places where one can observe a cumulated process of growth and development with which peripheral regions are unable to keep up.

The above theoretical concepts on which public intervention models are based present an abstract and non-concretised understanding of spatial conditions. Hence the mechanisms underlying the socio-economic systems that they deal with as well as their postulates and recommendations concerning potential measures to be taken by public authorities can refer to a variety of spatial scales: (1) the national level in a regional pattern, (2) the regional level in the pattern of lower-level administrative units (poviats, communes), or even (3) parts of cities

(districts). In each case, however, the interpretation has to be adjusted to the spatial, social, and economic context of the units under study.

In the practice of public intervention (also in projects co-financed from the European funds), it is not possible to achieve an ideal mapping of either of the models of intervention orientation: the equalising or the polarising-diffusion model. In the case of the distribution of the European funds, one of the causes of this state of affairs is that the intervention is not exclusively intended to boost economic efficiency, but also to accomplish some social or political goals (Grosse 2010).

2. REGIONAL OPERATIONAL PROGRAMMES

The most important document defining the basic goals of cohesion policy in Poland and the main fields of support offered using its instruments (the European Regional Development Fund, the European Social Fund, and the Cohesion Fund) in the financial years 2007–2013 was the National Strategic Reference Framework (NSRF). Its assumptions were put into practice *via* operational programmes, or documents of an executive nature making the provisions of the strategy more concrete and detailed.

The set of operational programmes designed to implement the NSRF assumptions consisted of:
- four national operative programmes (NOP) managed centrally by the Ministry of Regional Development (today the Ministry of Development): the Infrastructure and Environment NOP, the Human Resources NOP, the Innovate Economy NOP, and the Technical Assistance NOP.
- one intervention programme oriented territorially, but managed centrally by the Ministry of Regional Development: the Development of Eastern Poland NOP, and
- 16 regional operational programmes (ROPs).

Scholars have drawn attention to the spatial polarisation of development in Poland along two basic lines: (1) the richer west – the poorer east, which reflects long-term historical processes, and (2) metropolitan areas – non-metropolitan (peripheral) areas, which is a new version of the traditional urban-rural division (Gorzelak – Kozak 2008; Stryjakiewicz 2009). While in the first situation, the disproportions in the development level can be tackled by public authorities taking measures under their inter-regional policy (e.g. by working out a separate programme for the less developed regions of eastern Poland, or by giving preference to disadvantaged regions in the distribution of means for the particular ROPs described in the subsequent part of this paper), in the second case, the proper type

of intervention for reducing the scale of differences and preserving cohesion is carried out within the framework of an intra-regional policy.

Therefore, a significant new solution introduced in the perspective under study was the partial decentralisation of the management of cohesion policy instruments involving *the creation of 16 ROPs, one for each voivodeship,* in which the local authorities of these units were assigned the function of managing institutions (responsible for preparing the programme and its proper implementation). The implementation of the 16 ROPs was assessed to cost EUR 17.3 billion, or more than 25% of the total Community support earmarked for *all* operational programmes. In the opinion of Swianiewicz et al. (2008), the scale of financial decentralisation in Poland was the highest among all the New Member States which joined the European Union in 2004, although lower than in large Western European countries (e.g. Germany and Italy).

The regional character of intervention under ROPs made it necessary to work out a way of dividing EU funds among individual voivodeships. The solution adopted was that employed in the 2004–2006 programming period with reference to the Integrated Operational Programme of Regional Development (IOPRD): (1) 80% of the money was divided proportionally to the number of voivodeship residents; (2) 10% were divided proportionally to the number of residents of those voivodeships in which per capita Gross Regional Product was lower than 80% of per capita GDP for Poland; and (3) the remaining 10% was allocated to voivodeships with unemployment levels exceeding 150% of the national average in some of their poviats. In the relative approach (money allocated per resident), the division algorithm adopted clearly favoured voivodeships with a low level of socio-economic development. The highest payments were received by regions of eastern Poland (the Warmian-Masurian, Podlaskie and Świętokrzyskie voivodeships), and the lowest by voivodeships in a good economic situation (e.g. the Masovian and Greater Poland voivodeships).

When preparing a ROP of their own, regions could choose targets for the allocation of Community means in a way independent of, although complementary to, other operational programmes, and adjusted to the broader framework of the national policy. In practice, the differences among ROPs involved a different distribution of means among measures serving to attain standard goals rather than the formulation of development goals specific to each voivodeship. Through ROP provisions, voivodeship managements could control the spatial aspect of intervention in their region, making it accommodate differences in the level of its socio-economic development.

3. PERIPHERY AND PROBLEMS WITH ITS DELIMITATION

The centre(core)-periphery model is a basic and, it seems, the most popular concept of expressing spatial differences in the level of socio-economic development. It is connected with a group of theoretical concept developed in economy by, among others, North (1955), Perroux (1955), Myrdal (1957), Hirschman (1958), Boudeville (1966), and Friedmann (1967). What those concepts have in common is a simplified approach to space, which is usually divided in a dichotomous way into a central area (one where specified activities are concentrated) and a periphery (one devoid of the properties of a centre).

Predominating the literature on the subject is the opinion about the multidimensionality of peripherality. The most frequently listed dimensions include spatial, economic, and social (socio-cultural) ones, ecological, religious, or political dimensions are less popular (Zagożdżon 1980; Schmidt 1998; Scott 1998; Leimgruber 2004; Gurung – Kollmair 2005; Havlíček et al. 2005, 2008).

The multi-dimensionality of the notion of periphery necessitates a comprehensive approach to it. Hence attempts at a holistic identification of a periphery usually involve an "overlap" of peripheries identified in the various dimensions (Gurung – Kollmair 2005; Halás – Hurbánek 2008). This procedure seems justified, especially if individual dimensions of peripherality characterise various areas. However, a study by Halás – Hurbánek (2008) concerning Slovakia revealed spatial co-occurrence of the chief dimensions of peripherality. This means that an area regarded as peripheral in spatial terms is usually also peripheral from an economic and social perspective. One can therefore put forward the thesis that what determines socio-economic peripherality is largely the role the given area performs in a country's or region's socio-economic system. In this approach, peripherality – to use the definition proposed by Schmidt (1998) – means insufficient integration with the socio-economic system dominating the given place and time. The problem of the integration of an element (in this case, areas defined as peripheral) with the system is at the core of research on general systems theory. To quote Bunge (1979), the integration of an element with its system is a derivative of two kinds of relations making up the structure of real systems: nonbinding and binding. An example of the former can be spatial relations, and of the latter, functional relations (Chojnicki 1989).

In spatial terms, peripherality means a location on the margins of a system, at a considerable distance from places that constitute its chief nodes (Zagożdżon 1980). In functional terms, peripherality is understood as insufficient integration with the system and involves poor links of an area with units that are its cores. Both aspects of peripherality (spatial and functional) are closely related: a loca-

tion on the margin of a system in the spatial sense is correlated statistically with less frequent and weaker contacts and links with a core.[2]

With the spatial and the functional aspect of peripherality combined in a systems approach, a periphery can be seen as an area having the weakest spatial-functional relations with the centre of a socio-economic system. This is the way peripheries were seen by Jančák et al. (2003) and Havlíček et al. (2005), who even termed them specific areas defective in spatial-functional relations.[3] The effect of this handicap is the appearance of unfavourable social and economic processes (e.g. low wages, high unemployment, population outflow, or demographic ageing[4]).

In the light of the above, the identification of a periphery calls for the identification of an area that has the weakest spatial-functional links with the centre of a socio-economic system. Such research, if detailed, is usually highly labour-intensive. This follows, on the one hand, from difficulties in handling distance in the delimitation of a periphery (e.g. how to count a distance, from which centre), and on the other, from problems involved in an analysis of functional relations. In a research where the periphery is not its object, but only a frame of reference (as in this article), methods allowing an indirect analysis of spatial-functional relations such as those based on the potential model seem to be particularly useful.

4. POTENTIAL MODEL AS A MEASURE OF PERIPHERALITY

The concept of potential employed in spatial-economic studies rests on the theorems of Newtonian physics, concentrating on the assumption that there are interactions among individual elements, objects, or phenomena distributed in space (by analogy to masses considered in physics). The interaction strengthens with the mass of objects (with an increase in the values of the phenomena examined) and declines with the growing distance between them. Initially, potential models

[2]   The notion partly coinciding with that of a periphery, though without such strong spatial connotations, is that of so-called problem areas. In the context of Central and Eastern Europe, they are usually defined as "underdeveloped areas with poor growth dynamics and plagued by the adverse social effects of the transformation process" (Churski 2010: 23). Thus understood, problem areas have for years been an object of concern for public authorities conducting an economic policy intended primarily to level out socio-economic inequalities. More recently, one can often observe a change in the terminology used to refer to such areas; especially in strategic documents, the phrase employed is "strategic intervention areas".

[3]   Jančák et al. (2003) add to this also defective socio-spatial relations.

[4]   These characteristics are usually interconnected due to the selectivity of migration as expressed, e.g., by migration being more frequent among young and better educated people (De Jong – Fawcett 1981).

were applied as part of so-called social physics to describe population distributions independent of the boundaries of administrative units (e.g. Stewart 1948; Stewart – Warntz 1958). Using the assumptions of population potential, the models formulated next were those of income potential (Isard – Freutel 1954), market potential (Harris 1954), and supply and demand potential (Warntz 1956). With time, the concept of potential acquired great popularity among economic geographers studying spatial aspects of differences in socio-economic phenomena.

Despite the relatively long tradition of using the concept of potential in human geography research, a broader application of its models in economic sciences came only with the development of so-called new economic geography initiated by Krugman (1991, 1995).

A common feature of the many modifications of potential models is that they accommodate not only masses characterising individual parts of the studied whole in socio-economic terms, but also the effect of the location of each mass in the whole. Thus, potential is a systemic measure of the intensity of spatial interactions in which each spatial unit is characterised by reference to the remaining ones and to itself.

A potential model can have the following general form:

$$_iV_j = \frac{P_j}{d_{ij}} \text{ and } V_i = \sum_{j=1}^{n} \frac{P_j}{d_{ij}} \ (i = 1, 2, \ldots, n), (j = 1, 2, \ldots, n),$$

where:

$_iV_j$ is the potential induced at the ith point (spatial unit) by mass P_j,
V_i is the potential induced at the ith point (spatial unit) by all masses P_j,
P_j is the mass of the jth object (spatial unit), and
d_{ij} is the distance between the ith and jth objects (spatial units).

The first formula ($_iV_j$) can be used to examine the force of impact of one object upon another. The second (V_i) allows determining the force of impact of all objects on one. The total potential of the ith spatial unit (V_i) is the sum of the partial potentials of the remaining units and the ith unit's self-potential. Thus, even when the self-potential of a given unit is small, by an advantageous location it can find itself in the zone of intensive interactions and thus greatly enhance the value of its total potential.

The concept of potential makes it possible for a single mathematical model to accommodate both socio-economic differences among the units studied and spatial relations resulting from the places those units occupy in the spatial system under analysis as determined by the measure of distance. Because of those properties, potential can be regarded as a measure of peripherality. The highest potential is usually that of the largest cities, lower values characterise their sur-

roundings and towns at a lower hierarchical level, still lower values can be found in the surroundings of those towns and towns at the next hierarchical level, and so on.

The usefulness of potential models in examining centre-periphery relations was noted already during the first efforts at its conceptualisation (Stewart 1948: 35). Next, several empirical studies sought to identify central and peripheral areas at a variety of spatial scales (e.g. Keeble et al. 1982; Vickermann 1995; Copus 1999; Schürmann – Talaat 2000; Czyż 2002).

5. RESEARCH PROCEDURE

The research procedure adopted to analyse and explain regularities in the allocation of EU funds in terms of the centre-periphery system in individual voivodeships in Poland consisted of three basic parts (*Figure 1*). Stage 1 involved determining the level (class) of peripherality of individual communes in each voivodeship. At stage 2, use was made of this classification in order to determine the type of the spatial allocation of the funds in the Polish regions. Stage 3 embraced the con-
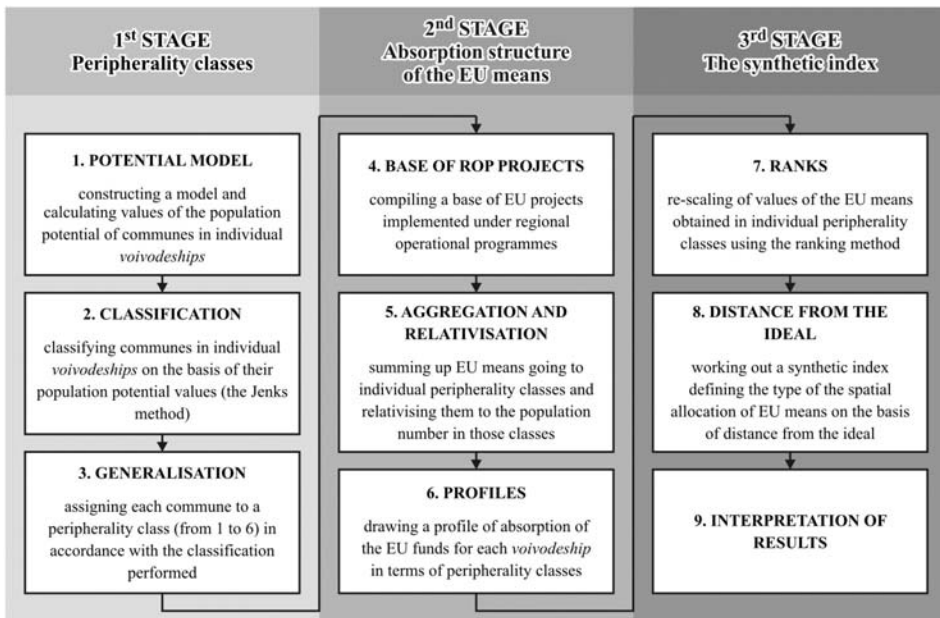

Figure 1. Diagram of the research procedure

struction of an index reducing regional structures (absorption profiles) to a single variable of a synthetic nature.

The proposed procedure was intended to check if the regional pattern followed the logic of equalisation (support given mainly to peripheral units) or polarisation (the funds going mainly to the most competitive units).

5.1. Peripherality classes (Stage 1)

In order to determine the classes of peripherality of individual communes in Poland, use was made of the potential model. In the analyses of spatial differences in the level of socio-economic development available in the literature on the subject, one can usually find models of income potential and population potential. Given the goal of the present research, population potential was decided upon as an optimum measure of the level of peripherality. Its choice was determined by an empirically proved high correlation of its variation with the spatial variation of many indices characterising the level of socio-economic development (e.g. Stewart – Warntz 1958; Pooler 1987; Czyż 2002). Of some significance was also the fact that areas (units) with a small population number and located far from centres of administrative power often have less influence on political decisions concerning the spatial allocation of EU funds,[5] while more difficult access to skilled personnel or firms specialising in obtaining them can limit their activity and effectiveness in this field. Hence in a research on the spatial aspects of the absorption of Community funds, population potential seems to be an adequate measure of peripherality. The use of population potential also has an additional basic advantage: it enables the type of research presented here to be carried out in every EU country. This would not be possible when using socio-economic variables because the public statistics of each country employ different sets of economic indices for the LAU1 (formerly NUTS 4) and LAU2 (formerly NUTS 5) levels.

When defining the degree of peripherality of communes, the demographic potential was calculated separately for each voivodeship. This was justified by (1) the way in which the European funds available under regional operational programmes are distributed in Poland (when preparing directives for the use of those means, self-government authorities of voivodeships could not take into consideration the favourable location of a unit in relation to other voivodeships because even the most favourable location did not ensure access to European means available under the regional programme of the neighbouring voivodeships), (2) recent

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[5]   The concept of participation potential referring to the spatial organisation of decisions was formulated as early as the 1960s by Isard – Tung (1963).

observations that areas that are peripheral, e.g. in economic terms, can be found
in Poland primarily near voivodeship borders (Czapiewski – Janc 2009), (3) the
problematic role of the state boundaries when calculating the demographic po-
tential for a whole country.

Taking the above into consideration, population potential was calculated using
the model:

$$V_i = \frac{P_i}{d_{ii}} + \sum_{j \neq i}^{n} \frac{P_j}{d_{ij}}, \ (i = 1, 2, \ldots, n), \ (j = 1, 2, \ldots, n),$$

where:

P_i is the population number in commune i,

P_j is the population number in commune j,

d_{ij} is the distance between communes i and j,

d_{ii} is the coefficient of reduction of a commune's self-potential, and

n is the number of communes in a voivodeship.

The first part of the equation (model) served to establish self-potential, or the
potential created by the population of a given commune in relation "to itself".
It was assumed that self-potential was identical with the number of the popula-
tion living in the commune, which in practice meant that the reduction coeffi-
cient d_{ii} was equal to 1 (Pooler 1987; Czyż 2002). The distances d_{ij} from the next
part of the equation were determined between points representing communes or,
more precisely, their centroids (geometric centres of gravity).[6] To this end, use
was made of a GIS technique (the distance matrix, using the so-called Euclidean
metric).

Starting from the assumption that each voivodeship had central (core) and pe-
ripheral areas among which spatial allocation of intervention under individual
ROPs was made, potential values were calculated from models worked out sepa-
rately for each region.

On the basis of the values of population potential calculated for each voivode-
ship, six peripherality classes were distinguished. Class intervals were established
using the Jenks optimisation method (Jenks 1963). It allows obtaining the great-
est possible internal uniformity of the classes while preserving the widest pos-

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[6]   The use of centroids to determine distances among communes was prompted by two reasons.
On the one hand, in Poland many rural communes have seats outside their areas, i.e. in another
commune (e.g. rural communes adjacent to towns). In such situations, it was very hard to
determine distances among the units examined. On the other hand, it was only in single cases
that those points significantly departed from the actual centres of gravity of communes when
the population of all localities had been accommodated, and the procedure of their calculation
itself was by far easier and faster.

sible inter-class differences. The first class of peripherality embraced units with the highest values of population potential, namely voivodeship capitals (treated as regional core areas). As the potential values declined, the class of peripherality to which the communes were assigned grew.

5.2. Absorption structure (Stage 2)

This stage began by collecting information about the amount of Community funds absorbed under the regional operational programmes in each commune in Poland. For this purpose, use was made of the National Information System SIMIK 07-13 base of projects, run by the Ministry of Infrastructure and Development (until November 2013, the Ministry of Regional Development). Selected from the base (accessed June 30, 2015) were projects implemented under regional operational programmes in individual voivodeships, and the value of EU funding per commune was calculated (in accordance with the place of project implementation).

In the next step, the values of the EU means obtained were aggregated in terms of the peripherality classes distinguished, and the totals were relativised to the number of the population living in the communes assigned to a class. The absorption structure of funds by peripherality classes allowed conclusions about the type of the spatial allocation of EU support in individual voivodeships. A decline in the use of funds with an increase in peripherality was interpreted as indicative of a polarising model. The opposite situation – an increase in the EU means acquired growing with the class of peripherality – suggested an equalising model.

5.3. The synthetic index (Stage 3)

In the last stage of the research procedure, a synthetic index was constructed to allow the ordering of voivodeships in a one-dimensional space describing the position of each unit on a scale being a continuum between the two extreme allocation types – the ideal polarising type and the ideal equalising one.

A fundamental problem in this part of the research was the choice of such a way of data transformation that would allow eliminating measurement units and making the order of magnitude of individual values characterising peripherality classes comparable. To obtain similarities in allocation profiles, the key issue was finding a method that would allow comparing voivodeships in terms of the significance of the successive peripherality classes in the (per capita) allocation

structure of funds under individual ROPs. In other words, it was necessary to re-scale values characterising individual voivodeships in such a way as to reflect the structure of support in terms of the successive peripherality classes, irrespective of its per capita value (because this largely depended on the centrally imposed division of means among voivodeships; cf. Section 2 on Regional Operational Programmes). Hence it was decided to employ ranks. With the six peripherality classes distinguished, the highest rank (6) in each voivodeship was assigned to the class with the highest absorption of per capita EU means under ROPs, and the lowest rank (1), to the class with their lowest absorption. The remaining classes were assigned ranks that reflected their positions in the ranking of per capita ROP means in individual voivodeships. In this way, an allocation profile in terms of peripherality classes was obtained for each voivodeship that could depict, in extreme cases, a polarising type (ranks of fund absorption in the successive peripherality classes: 6, 5, 4, 3, 2, 1) or an equalising one (ranks: 1, 2, 3, 4, 5, 6).

The ranking structure of the peripherality classes in terms of per capita allocation of EU funds in individual voivodeships allowed arranging them on a scale limited by the extreme categories corresponding, on the one hand, to the ideal equalising type, and on the other, to the polarising one.

The method employed here was a comparison against a standard, including a construction of a synthetic index of the spatial orientation of EU support, utilising the so-called Manhattan distance. Each voivodeship was compared against the two ideal types by calculating the sum of the absolute values of differences between the values of ranks in the individual peripherality classes for the given voivodeship and the theoretical system representing the given ideal type. Next, the values obtained were normalised in the interval [0;1], assuming that 0 corresponded to the ideal equalising type, and 1 to the ideal polarising one. The formula on the basis of which a synthetic index of the spatial orientation of support (*SISOS*) was calculated looked as follows:

$$SISOS_i = \frac{\sum_{j=1}^{n}\left|z_{ij} - z_{Ej}\right|}{\sum_{j=1}^{n}\left|z_{ij} - z_{Ej}\right| + \sum_{j=1}^{n}\left|z_{ij} - z_{Pj}\right|},$$

where:

SISOS$_i$ is the synthetic index of the spatial orientation of EU support of the *i*th voivodeship,

z_{ij} is the rank assigned to the *j*th class of peripherality in the *i*th voivodeship,

z_{Ej} is the rank assigned to the *j*th class of peripherality in a theoretical system representing the ideal equalising type,

z_{Pj} is the rank assigned to the *j*th class of peripherality in a theoretical system representing the ideal polarising type,

$j = 1, 2, ... n$ is the number of ranks (n = 6), and

$i = 1, 2, ..., N$ is the number of objects ($N = 16$).

6. SPATIAL ALLOCATION OF EU FUNDS IN VOIVODESHIPS AND THE SYNTHETIC INDEX OF THE SPATIAL ORIENTATION OF SUPPORT

The absorption structure of the EU funds by classes of peripherality is presented graphically, with each voivodeship having its own absorption profile (*Figure 2*). There are many factors controlling those profiles, the most important being the "top-down" planning of the allotment of the EU funds on the one hand, and the activity and effectiveness of individual communes in acquiring them on the other.

The planning of the allotment of means under individual ROPs was possible through spatial, administrative, demographic, or economic preferences stated in competitions for the part-financing of projects, and through the so-called "indicative" lists on which voivodeship managements put projects of strategic importance for ROP implementation, financing them in an extra-competition course of action. In this way, local authorities had some control over the spatial orientation of intra-regional intervention by using the support to eliminate differences in the development level or to subsidise mainly the most competitive units (Krukowska 2013). Of some importance for the spatial structure of ROP support was also the choice of the preferred categories of intervention, e.g. basic transport infrastructure as well as water-supply and sewage systems, or investment intended to stimulate innovativeness. In the first case, one might expect an equalising model of the distribution of funds; in the other, the part-financed projects would mostly be those run in big and medium-sized cities.

Apart from the strategy of the spatial orientation of intervention adopted by a voivodeship, the ultimate profile also depended on the activity and effectiveness of applicants from its communes in the acquisition of the EU funds. As recent research demonstrates (e.g. Dziemianowicz – Swianiewicz 2007; Swianiewicz et al. 2008), a significant role in this respect was played by factors specific to each commune such as its financial situation, quality of the staff employed, role of the leader (his experience, knowledge and skills) who initiated and supervised the application process (and then project implementation), and the "adjustment" of the line of intervention to the commune's current development needs.

Even a simple visual analysis of the absorption profiles of ROP means reveals great differences among voivodeships. On the one hand, there were voivodeships (especially the West Pomeranian and Lublin, but also the Opole voivode-

Figure 2. Profiles of the absorption of EU funds available under the 2007–2013 regional
operational programmes in Poland depending on the peripherality classes in the voivodeships

Source: Own compilation.

ships) where per capita support was the highest in the central areas and gener-
ally declined as the peripherality class grew. On the other hand, there were also
voivodeships in which the per capita means obtained grew with the peripherality
class (e.g. Masovian and Pomeranian voivodeships). In most voivodeships, how-
ever, the picture was more complicated, placing them between the two theoretical
models of support – the polarising and the equalising one.

An analysis of the similarity of the absorption profiles of ROP funds allows
only an indirect assessment of how far areas differing in peripherality were sup-
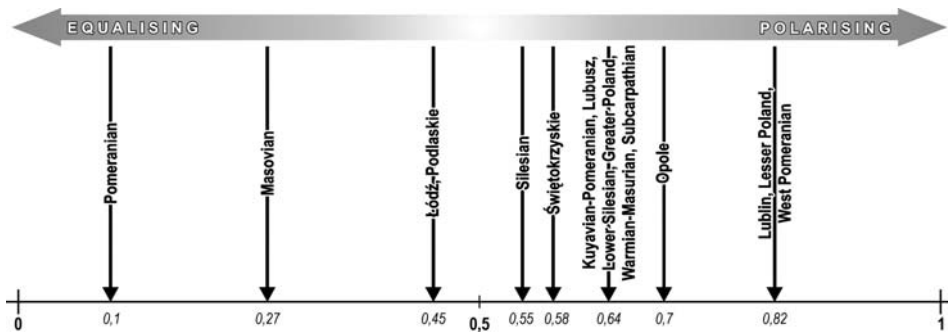ported from the European support. For a more detailed analysis, a spatial index

Figure 3. Values of the synthetic index of the spatial orientation of support under the 2007–2013 regional operational programmes in the voivodeships

Source: Own compilation.

of support orientation was constructed on the basis of similarity to the theoretical distribution of allocation in the equalising and the polarising model. It assumed values from 0 to 1, where 0 corresponded to the equalising model and 1 to the polarising one (a detailed description of the procedure was presented above, in Section 5).

The conducted analysis confirmed that there were substantial differences in the spatial orientation of support under ROPs in individual voivodeships. Values of the synthetic index ranged from 0.10 for the Pomeranian voivodeship to 0.82 for the Lublin, Lesser Poland and West Pomeranian voivodeships (*Figure 3*). Only in four regions (Pomeranian, Masovian, Łódź and Podlaskie voivodeships) did the index drop below 0.5, which meant that the equalising policy had an advantage here. In the remaining 12 voivodeships it exceeded 0.5, i.e. the polarising model prevailed. This shows the polarising policy of development to dominate at the level of voivodeships, which is additionally corroborated by the mean value of the synthetic index for all the 16 voivodeships, at 0.59.

The conclusion about the predominance of the polarising approach in the regional operational programmes in Poland needs to be made more precise. As can be noted in *Figure 3,* in a few voivodeships the use of the European funds was really close to the ideal models: equalising or polarising. Merely two evidently pursued the equalising policy of development (Pomeranian and Masovian voivodeships), and only three the polarising policy (Lublin, Lesser Poland and West Pomeranian voivodeships). In the remaining 11 voivodeships (nearly 70% of the total), the absorption of means in terms of peripherality classes departed from both those models, representing a mixed one. Thus, while in most cases

regional operational programmes tended to reinforce socio-economic polarisation in the centre-periphery system, clear symptoms of the ideal polarising model were found in very few cases only.

Considering the wide inter-voivodeship differences in the values of the spatial index of orientation of ROP-funded support (from 0.10 to 0.82), one may wonder whether those differences can be explained by the provisions of individual ROPs creating the institutional framework that defined the formal accessibility of funds to various categories of areas and beneficiaries. Without an in-depth, detailed study of the construction of the regional operational programmes, only a partial answer to this question is possible. At a very high level of generality, one can note sharp differences in the allocation structure of means between, e.g., the Pomeranian voivodeship, representing an allocation structure closest to the equalising model ($SISOS_i$= 0.10), and the Lublin voivodeship, close to the polarising model ($SISOS_{ii}$= 0.82). Such differences can be found, for example, in the case of projects financed from the indicative list. In the Lublin voivodeship, this list was assigned about 40% of all means, most of which went to beneficiaries located in the biggest towns and the suburban zone of Lublin city (mostly peripherality classes 1 and 2). In turn, in the Pomeranian voivodeship, the proportion of projects from the indicative list in the total value of funds available under ROPs did not exceed 30%, with a decided majority going to transport infrastructure projects implemented in areas belonging to peripherality classes 3–6. However, it must be kept in mind that the above factor was only one of the many that affected the ultimate structure of means allocated under the regional operational programmes, and the understanding of inter-regional differences in their construction requires a separate, in-depth research (Krukowska 2013).

7. CONCLUSIONS AND DISCUSSION

The goal of this article was to assess how the structure of absorption of EU funds in Poland's voivodeships reflected the two basic types of allocation strategy, the polarising and the equalising models. The reference system was the centre-periphery model and six classes of peripherality were distinguished in each voivodeship. This was achieved in a multi-stage procedure, ending in the construction of a synthetic index of the spatial orientation of support under the regional operational programmes of 2007–2013.

The results presented here demonstrated the features of the polarising model to predominate over those of the equalising one, but even so, as has been described in detail, only in every third voivodeship did the pattern of the spatial orienta-

tion of intervention display actual closeness to one of the models. In most cases, the distribution of means in terms of peripherality classes departed from the two theoretical models, representing one that could be described as mixed, with a shift towards the polarising one. This indicates that in the Polish voivodeships, the European funds from regional operational programmes tend to concentrate in regional capitals, their suburban zones, and towns of subregional importance.

Keeping the above in mind, one should remember that regional operational programmes accounted for slightly over 25% of all the European funds granted to Poland in the financial years 2007–2013, which means that they were only complementary to national programmes. This is significant in that altogether more than one-half of the money was assigned to two all-Polish operational programmes: Infrastructure and Environment (more than 42%) and Innovate Economy (close to 13%), which largely supported investment in Poland's biggest agglomerations. Hence the allocation of the EU funds, taken jointly, in areas representing individual peripherality classes would reveal even more clearly the polarising strategy that turned out to be dominant in the case of ROPs.

While the position of a region on a continuum between the equalising and the polarising model reflects the spatial orientation of the allocation of the EU funds under ROPs, it cannot be a basis for a normative evaluation of the region's intra-regional policy. The point here is not only that it is impossible to settle the dispute about one model having an advantage over the other one, but that it is also necessary to adjust regional policy to local (regional) conditions of development. In this approach, an effective intra-regional policy designed to make the fullest use of a region's development resources should have the form of "coordinated and integrated region-specific strategies that address regional needs" (Bachtler – Raines 2002: 22). Referring to our results, in some regions it can be more justified, for a variety of reasons, to give stronger support to central areas, and in others to concentrate it in peripheral ones. The identification of specific development problems and the best uses for the EU funds in central and peripheral areas is a necessary condition of working out a modern regional policy based on individualised intervention, or a so-called place-based approach.

The issue presented in this article requires further in-depth studies. For example, it is necessary to make a statistically more advanced analysis of the similarity of the absorption profiles of EU means in individual voivodeships together with a typology of allocation models, and a more detailed analysis of the relations between the provisions of the ROPs and the absorption profiles of voivodeships.

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