FOLIA 178

Annales Universitatis Paedagogicae Cracoviensis

Studia Geographica VIII (2015)

Bartosz Bartosiewicz

Influence range of towns in the light of economic linkages – an example of small and medium-sized towns in the Lodz voivodeship

Abstract

The main aim of the author was to determine the influence range of towns in the light of their economic linkages. The text is part of the author's larger research project which focuses on the problem of identification and delimitation of functional areas of small and medium-sized towns. An important element of the analyses, apart from their cognitive aspect, is a proposal of an independent tool to measure the phenomenon of economic linkages with the use of data included in the REGON (National Register of Business Entities) database. All the analyses have been conducted on the basis of 38 small and medium-sized towns in the Lodz voivodeship.

Key words: economic linkages; influence range of towns; Lodz region; medium towns; small towns

Introduction

The topic of relations between the city and its surroundings has a well-established position in science. Geographers play the leading role in this topic as explaining spatial correlations represents one of their many (if not the most important one) subjects of research interests. Adequate recognition of human spatial behaviours (in their different dimensions: demographic, social and economic) is the key to appropriate social and economic, as well as spatial policy-making. This is of great importance above all in the case of regions characterized by considerable population concentration, or urban areas in other words. Consequently, researchers are mostly interested in the problem of social and political relations in the case of town, including predominantly the largest ones. One proof of this phenomenon is the popularity of research into metropolisation of space. The metropolis status shaped by the type of its functions is nothing else but a derivative of solutions which take place between the city and the globalizing world, other towns and countries but also linkages between the metropolis and its immediate surroundings which does not only perform the function of hinterland but very often also shapes or reinforces metropolitan functions of the centre. For this reason adequate identification of correlations on the metropolis – surroundings axis plays such an important role.

The most reliable tool scrutinizing the problem of relations between the city and its surroundings can be found in correlations resulting from the existing movement of persons, goods and information. Komornicki (2003) defines them as interaction, influence, connection or relations which take place in space. They form a common subject of interest of social and economic geography. There are numerous types of linkages depending on the kind of research and the author of the given study. The most frequent, however, include: economic, social, transport, institutional and environmental (ecological) ones (compare: Bartosiewicz, Pielesiak, Marszał, 2012). Due to statistical data resources identification and measurement of these linkages is difficult, in particular in local relations between the town and its surroundings. Better opportunities are provided by analyses on the interregional or intentional level.

Geographers have been interested in adequate recognition of linkages in the relation between the town and its surroundings for many years but currently (at least in Poland) this topic has gained importance anew. This is connected with the problem of delimitation of functional areas forced to a certain extent by the new European Union policy for 2014–2020. As part of this urban policy assumptions have been established and they envisage tighter co-operation on the town and its surroundings axis through implementation of new instruments of financing investment from the EU funds, or Integrated Territorial Investment (ITI). It is assumed that implementation of this tool is to take place within the so-called Functional Urban Areas (FUA). In this way meeting the requirements necessary to apply for funds within ITI has given rise to an increase in the number of executed association agreements between communes of metropolitan areas.

Looking at the topic of spatial relations in urban regions, the greatest problem, from the Polish perspective, concerning co-operation in management on urbanized areas is independence reinforced by law in relation to local authorities which are often unwilling to take initiative which goes beyond their statutory competences. This translates into lack of co-operation on the supralocal level and tackling problems in a coincidental way. In an attempt to tackle this situation there have been many endeavours (unsuccessful so far) to institutionalize statutorily co-operation of local authorities, in particular in case of cities (metropolis). Parallelly, there are bottom-up initiatives of co-operation of metropolitan areas. There are a number of associations or agreements aimed at solving common developmental problems, even though the effectiveness of these activities tends to be limited (Pielesiak, 2012).

Another significant difficulty in shaping functional areas of towns resides in determining their spatial range (delimitation). If bottom-up willingness of individual territorial units (municipalities) to associate plays an important role here, then another important factor resides in determining spatial framework of such an area resulting from the existing linkages (relations) between the town and its hinterland. This problem has been already dealt with from the top down in the case of big cities in Poland. Delimitation of 16 capitals of voivodeships has been accomplished to the order of the ministry in charge of regional policy (compare Śleszyński, 2013). The author of this work presented not only results of this delimitation but also put forward a set of criteria and indicators[1] which such a procedure should be accompanied by.

[1] The following criteria were used in delimitation of functional areas of provincial centres in Poland: journeys to work, volume and directions of migrations, level of social and economic development of communes or density of population and distance to the central town.

The proposed method did not meet with full approval of the scientific circles (e.g. Heffner and Gibas, 2014a, 2014b). One should bear in mind, however, that the broad scope of the research, as well as limited resources of statistical data (mainly the lack of a number of data allowing to establish real functional linkages) required a number of simplifications. Hence the document should be treated as a guideline for potential disambiguation of delimitation in individual cases of functional areas.

The complexity of the problem of functional area delimitation has been reflected in the literature of this subject. Focusing only on Polish works, although the situation is similar in other countries, there are plenty of works devoted to the issue of relations which take place between the town and its surroundings. Most of them focus on the analysis of volumes and directions of functional linkages. The most interesting works are, for instance: Heffner and Gibas (2014a, 2014b), Churski (ed.) (2009); Jewtuchowicz and Wójcik (ed.) (2010), Marszał and Pielesiak (2008) as well as Bartosiewicz, Marszał and Pielesiak (ed.) (2012).

The output concerning smaller towns is far more modest. And this does not refer to only recent years. Generally speaking, small and medium-sized towns in Poland are still waiting for large-scale research concerning their relation with the surroundings. The existing studies are either contributory in character or concern specific urban centres while they fail to lead to larger generalizations. Analyzing this output it should be remembered that researchers tend to believe that small towns, especially those located peripherally in relation to big cities, have a nodal function for the rural areas surrounding them. There are direct and mutual social and economic relations between local centres and rural, predominantly agricultural, areas surrounding them (Heffner, 2000), which unambiguously point to the validity of the research topic. a number of publications devoted to the problem of functional hinterland or the influence range of towns. In 1970s and 1980s many studies of this type were published in Lodz geographical centre, like: Matczak and Michalski (1982), Michalski (1980, 1985), Matczak (1984), Michalski and Suliborski (1989) and Dziegieć (1984). More contemporary analyses comprise, among others, texts by: Bartosiewicz (2012), Bartosiewicz and Pielesiak (2010), Czarnecki (2007), Heffner (2000, 2005), Heffner and Solga (2006), Kwiatek-Sołtys (1998), Matczak and Szymańska (1997) and Jażewicz (2006).

Diversification of approaches to analysis of functional area of towns does not translate itself into different attitudes towards defining this term in scientific circles. In Polish realities it is defined in the most accessible way in National Spatial Development Concept 2030: the urban functional area is the town together with its outer zone which, through a dense network of connections, creates functionally "one organism" of intensive linkages and relations. According to this document one of its great advantages is stressing the importance of these linkages (primarily social, economic and infrastructural, including transportation connections) as the basic indicator of the functional zone.

Scope and goal of research

From the viewpoint of relevance of delimitation of functional areas the basis is an analysis of linkages which take place between the town and its surroundings. For

this purpose, both in national and international research, scientists use commuting to work which tends to shape spatial relations in the most durable manner. Comprehensive studies also take into consideration other types of linkages. Consequently, in the above-mentioned work by Śleszyński (2013) these are most frequently migrations as an indirect effect of the existing connections. In case studies these may be also, for instance, commuting to schools or to retail outlets (Bartosiewicz, 2012). Studies on economic linkages are much less frequently encountered, both as a separate topic and considering their use in research into identification of functional areas.

The reason for decreased interest in economic linkages understood as all kinds of interactions taking place in the space and resulting from conducting business activities is poor access to suitable data. These are not collected in public statistics and access to them in the source, i.e. entities conducting business activities, is hampered. Companies treat information concerning their counterparty connections as a business trade secret. These limitations concern to a lesser extent analyses conducted on the interregional or international levels. In turn, they hinder research on the local level in the relation between the town and its surroundings. In Poland research into economic linkages has a long tradition. In particular in the 1960s and 1970s it was quite popular to do research into the movement of goods from the regional perspective (see, e.g. Chojnicki, 1961). Among contemporary studies it is worth mentioning above all works by Komornicki (2003) who dealt with this issue from the international perspective and Śleszyński (2010) who did research into economic linkages among biggest Polish cities.

From the point of view of the author's interests, the measurement methods are the most important issue in the scope of research into economic linkages. This interest arises from the research project conducted by the author which concentrates on the problem of functional areas of a set of small and medium-sized towns in Poland. This project is aimed at identifying and delimiting these areas, and subsequently accounting for diversification of this phenomenon through identification of factors which determine their occurrence and spatial range.

One may ponder if it is necessary for this type of research to include analyses concerning economic linkages. In the author's opinion, the answer is yes as in case of small and medium-sized towns identification of relations with the surroundings is not so obvious as in case of big cities. Recognition of the widest possible spectrum of functional connections increases the chances of adequate identification of the researched phenomenon.

The main aim of this work is to characterize relations among a set of towns and their surroundings in the scope of economic connections. What is equally important is the methodological aim, which is elaboration of an independent method of measuring this phenomenon, which is a kind of compromise between research precision and accessibility to statistical data.

In the course of search of different solutions to the measurement problem it turned out that the only source of knowledge which may be used in this type of analyses is the REGON database which comprises a list of all business entities together with their location and profile of activity. This database also includes data concerning the location of parent companies – headquarters of companies as well as location of regional branches (local units) of these companies. In this way it is possible to identify expansion directions of companies outside the place where their

core business activity is conducted. These data may be used to determine economic relations which take place on the given territory. But data from the REGON database have their own limitations and require certain assumptions to be taken. Firstly, this database includes all the business entities operating on the market. Regrettably, this assumption is not always true as the obligation to register and deregister companies in the REGON database lies with the entrepreneurs themselves who in particular in the case of deregistering the company fail to fulfil this obligation (there are no administrative or financial consequences to this end).

The author presents results of a test research (the proper research includes all centres in the country) conducted on a set of small and medium-sized towns (up to 50,000 inhabitants) of the Lodz voivodeship, a region situated in the central part of Poland, whose capital, Lodz, is the third biggest city in Poland (after Warsaw and Krakow) as far as the number of inhabitants is concerned. The analysed set comprises 38 towns diversified in terms of their size: 13 of them are towns with up to 5,000 inhabitants while in the case of 5 of them the number of inhabitants exceeds 40,000 people. This is a set with a highly diversified social and economic structure which to a large extent is determined by the pattern of transport and settlement network (primarily the distance from Lodz). This set includes typical centres catering for rural agricultural hinterland, dynamically growing service and industrial areas as well as typical suburbia (this is in the case of towns adjoining Lodz).

Economic linkages

Among nearly 56 thousand companies located in the researched towns, 16% have their local units (branches) outside their administrative boundaries. Their number is directly proportional to the size of the given centre. Analyzing location of these local units, it may be observed that the majority of them are situated in the Lodz voivodeship. Only one fourth of them is located outside of this region. The structure of local units by type is dominated by service and commercial companies (nearly 60%) as well as the industrial ones (20%). Small and medium-sized towns of Lodz region as a set are characterized by a negative balance of economic linkages. For one branch of a company based in town there is 1.3 unit which headquarters are outside the town boundaries. This situation may be accounted for in a number of ways, the most well-aimed, however, seems to be the factor of attractiveness of these towns as markets. The town, also the smaller one, implies concentration of population, at the same time being a frequent destination from adjacent areas which is used to satisfy basic livelihood needs (services, trade).

The balance of economic linkages looks similar from the regional perspective, although in this case the difference is much smaller (1.1). What seems to be the most interesting in supraregional linkages of the analyzed towns is their diverse spatial structure depending on their direction (see Fig. 1).

In the case of both directions of economic linkages the main factor of the scale of the phenomenon is the distance: the strongest connections are observed in relation to the adjoining regions (predominantly Mazowieckie and Wielkopolskie voivodeship). Then in the case of the influx of entities to towns from outside the region we can observe a more even dispersion of their place of origin than in the case

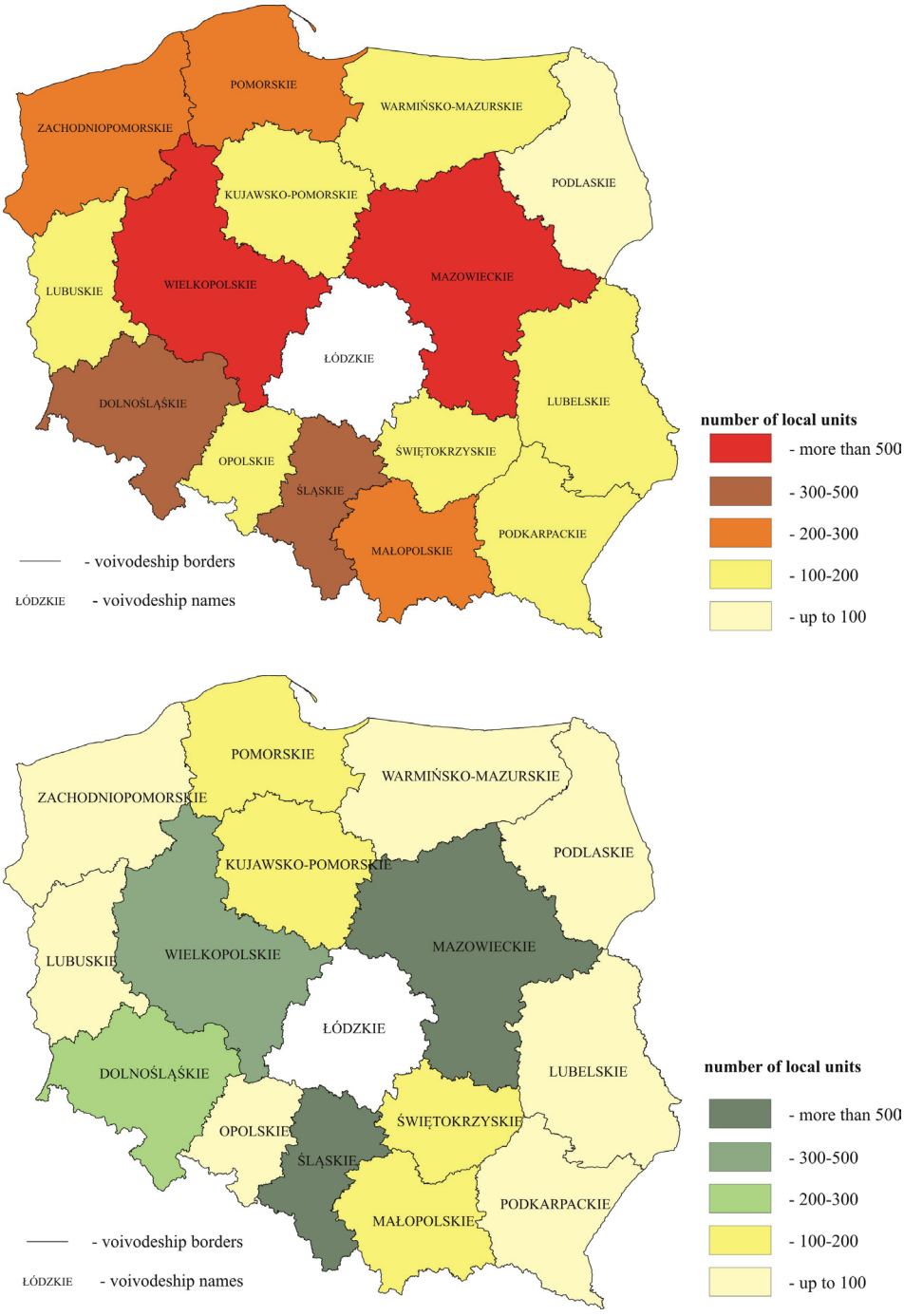

Fig. 1. Spatial layout of local units in Poland from towns (A) and to towns (B) of the Lodz voivodeship
Source: own elaboration on the basis of the REGON National Register of Business Entities, 2014

of expansion of town-based companies which are characterized by a clearly greater concentration on areas directly adjoining the Lodz voivodeship.

Interesting conclusions may be also drawn on the basis of an analysis of structure of economic linkages by kind scrutinized from the supraregional perspective. In the case of branches opened in towns by companies located outside Lodz region, one third of them represents the commercial sector (section G following Polish Classification of Activity 2007) (see Fig. 2). This structure is complemented mostly by entities of the sector of services (sections S, K and M). The most expansive group of business entities with headquarters in the researched towns comprises, in turn, companies from the construction sector (section F) – over 40%. The share of the remaining kinds of entities is rather even and generally oscillates in the discussed region of 5%.

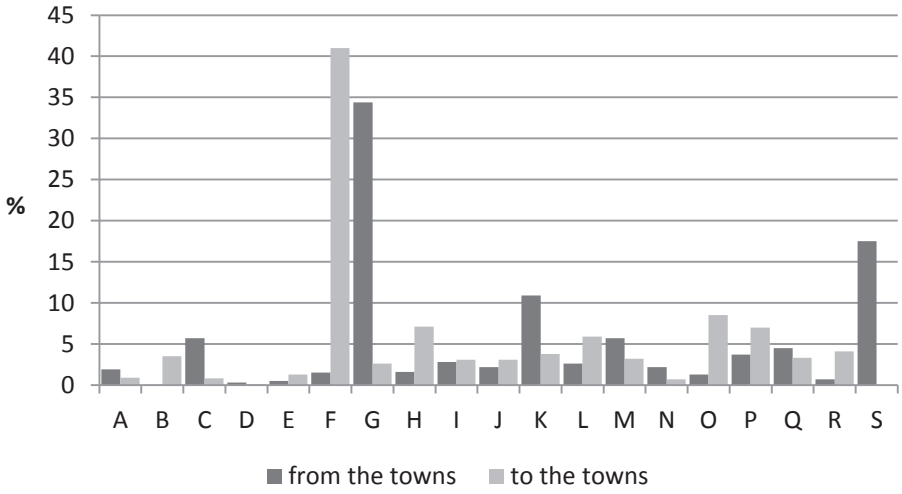

Fig. 2. Structure of local units by kind in the supraregional perspective

A.Agriculture, foresting and fishing; B. Mining and quarrying; C. Manufacturing; D. Electricity, gas, steam and air conditioning supply; E. Water supply, sewerage, waste management and remediation activities; F. Construction; G. Trade, repair of motor vehicles; H. Transportation and storage; I. Accommodation and catering; J. Information and communication; K. Financial and insurance activities; L. Real estate activities; M. Professional, scientific and technical activities; N. Administrative and support service activities; O. Public administration and defence, compulsory social security; P. Education; Q. Human health and social work activities; R. Arts, entertainment and recreation; S. Other service activities

Source: own elaboration on the basis of the REGON National Register of Business Entities, 2014

Such specialization in this group of companies may be connected with the specificity of this trade. Construction companies are characterized, against the background of other companies, by a big spatial scope of business activity. Commencing large and long-lasting construction projects, companies open their branches in the place where at the given time construction work is being carried out in order to facilitate their business operations. The scale of this expansion, however, may be inflated. One may imagine a situation in which companies completing an investment

on the given territory just fail to deregister their branch, hoping that they will continue works on the given area in the future.

Due to the aim of this work and the volume of economic linkages it is important that a more thorough analysis of spatial relations of the researched towns in Lodz province be conducted in the future. This phenomenon is illustrated by Fig. 3, where the scale and character of identified linkages have been presented against the background of the region's administrative division.

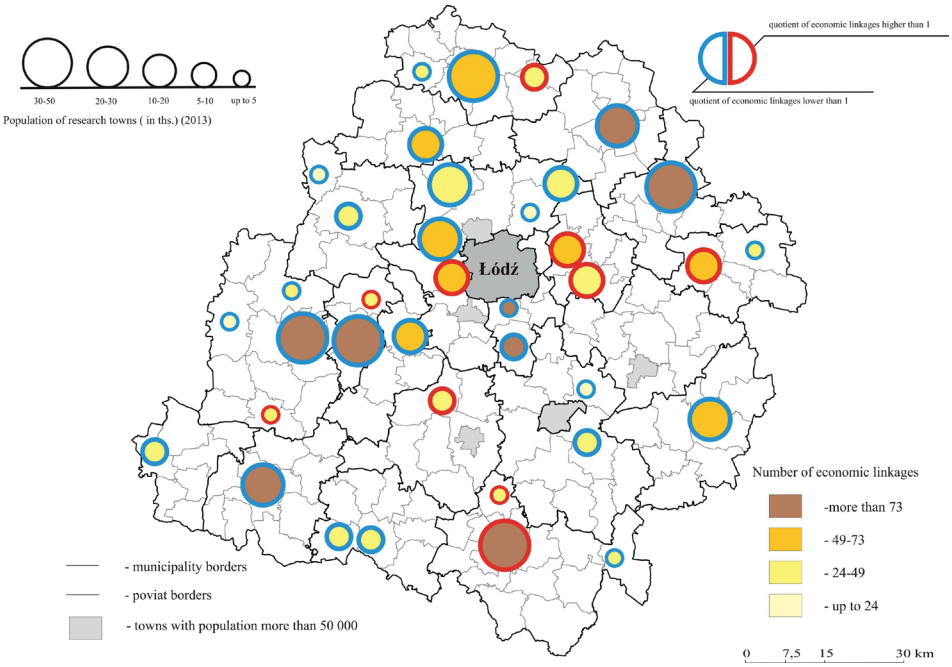

Fig. 3. Spatial diversification of the number and the quotient of economic linkages in towns with up to 50 thousand inhabitants in the Lodz voivodeship

Source: own elaboration on the basis of the REGON National Register of Business Entities, 2014

The scale of linkages has been defined constructing 0x2 matrix for the relation between the town and all communes of Lodz region[2] where '0' means lack of economic linkages, '1' one-way linkage and '2' two-way linkage[3]. Subsequently the values obtained from the matrix constructed in such a way were added. The maximum possible value which entities may have achieved was 404, which is twice the number of researched entities. The results obtained point to a considerable correlation between the number of linkages and the size of the centre measured by the number of

[2] In the case of urban and rural communes, the urban part and the rural part of the commune have been treated as separate research units.

[3] Two-way linkage should be understood as a situation in which at the same time there are branches of parent companies from the given town in the given commune and branches of parent companies from this commune in the town.

its inhabitants (the value of Pearson correlation coefficient calculated for these two features is 0.75). The bigger the town, the larger its market, which results, on the one hand, in its greater attractiveness for location of business activity, while, on the other, the bigger the number of companies in town, the greater the potential willingness to expand outside the town.

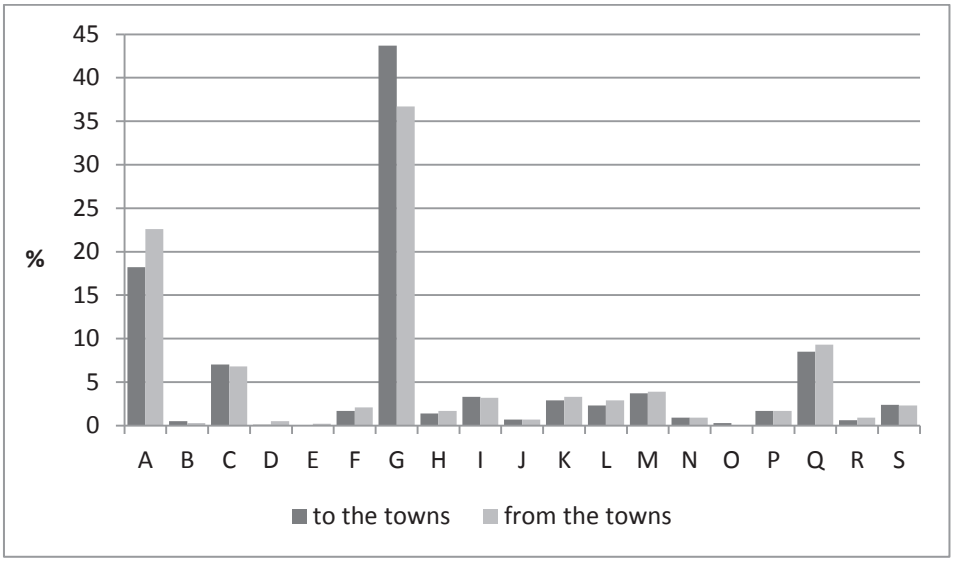

Fig. 4. Structure by kind of local units from towns and to towns in the Lodz voivodeship
A-S – see Fig. 2

Source: own elaboration on the basis of the REGON National Register of Business Entities, 2014

Figure 3 also shows the quotient of economic linkages illustrating the ratio of the number of parent unit branches from a town located outside its boundaries to units located in this town whose headquarters are outside its boundaries. When the this indicator value is higher than 1 it means that the given town is characterized by prevalence of linkages which are expansive in character.

In the case of differentiation in the value of the quotient of economic linkages it is difficult to find any spatial regularities. An interesting dependence is illustrated by comparing the value of the quotient of economic linkages and the indicator of entrepreneurship (the value of Pearson correlation coefficient is –0.55). The only logical explanation of this dependency seems to be the existence of benefits arising from localizing business activity in a town whose attractiveness results from absorbency of the market. This kind of reasoning is supported by the structure of economic linkages by kind (Fig. 4). In both the case of influx and expansion of economic entities, companies from the trade sector tend to prevail.

Influence range

With the use of the size category of town as a variable, this work comprehensively analyzes the spatial layout of economic linkages which at the same time constitutes an answer to the question concerning what the town's scope of influence is. The choice of such a variable seems to be correct, taking into account conclusions drawn from the analysis of dependency between the number of economic linkages (reflecting the spatial scope of linkages) and the demographic potential of the given centre.

An illustration of the spatial distribution of economic linkages has been effected through the classification of local units into four categories (depending on the distance to town): a) district in which the given town is located, b) districts surrounding the one in which the town is located, c) the remaining part of the voivodeship and d) area outside the Lodz voivodeship. All analyses have been conducted separately for local units coming to towns (Fig. 5) and for local units established by companies from towns (Fig. 6).

The two analyzed groups differ considerably. In the case of local entities inflowing to small and medium-sized towns of the Lodz voivodeship the size of the centre does not affect the place of their origin in a considerable manner. What is characteristic of this group is an appreciable share of local entities coming from areas situated farther away from towns. Depending on the centre's size group their share oscillates from nearly 50% to as much as 80%. At the same time, there are visible correlations between the place of origin of branches and the centre's size category. The bigger the centre is, the greater share of companies from outside the Lodz voivodeship it gets.

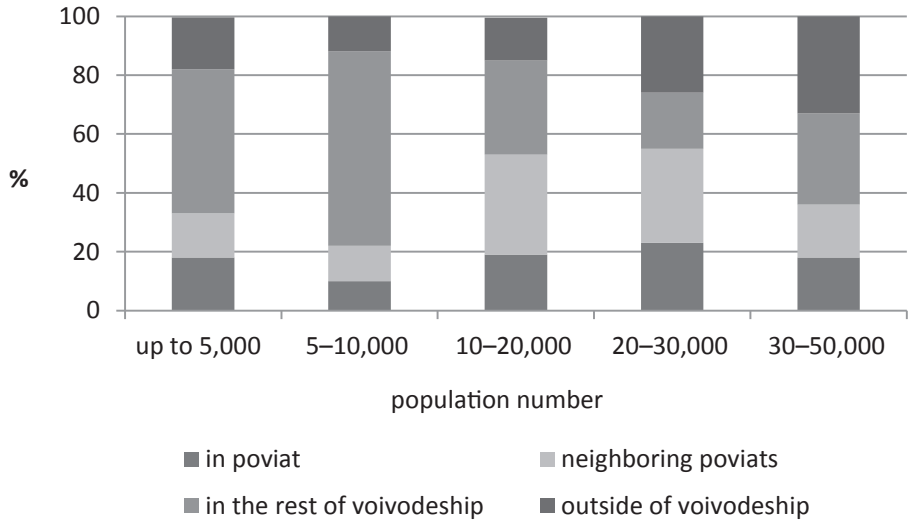

Fig. 5. Source of local entities in small and medium-sized towns of the Lodz voivodeship according to the size of the urban centre

Source: own elaboration on the basis of the REGON National Register of Business Entities

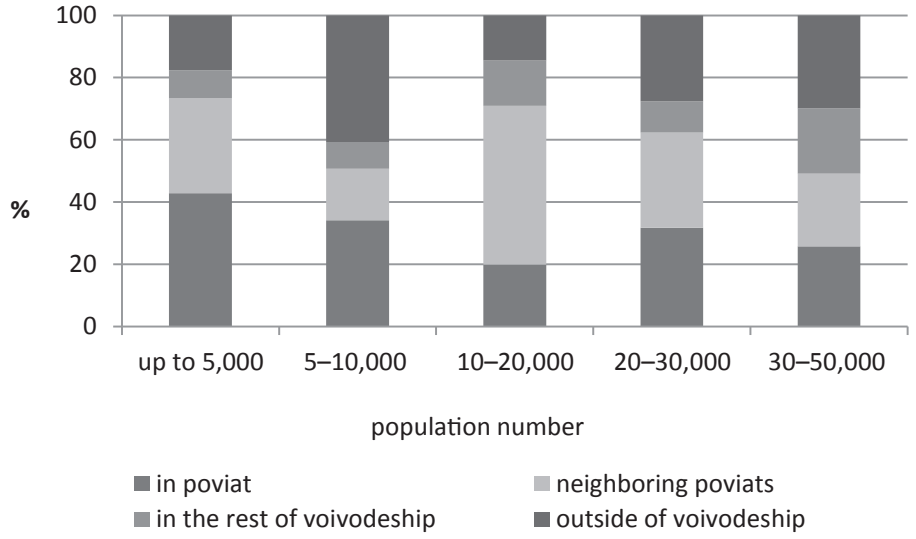

Fig. 6. Location of local entities from small and medium-sized towns of the Lodz voivodeship according to the size of the urban centre

Source: own elaboration on the basis of the REGON National Register of Business Entities, 2014

The situation is different in the case of expansions of companies outside towns. Above all, irrespective of the town's size category the dominant direction of expansion are areas located directly in the vicinity of the given centre (within the neighbouring district or districts). At the same time the importance of this direction tends to drop together with the increase in the centre's size. The biggest towns are characterized by the most even structure of spatial expansion. This phenomenon may be easily explained by the centre's economic potential which generally grows together with an increase in the demographic potential. Additionally, this coincides with an array of functions (including predominantly administrative ones) performed by the larger towns.

Analyzing the spatial layout of economic linkages it must be stressed that the assumed way of illustrating the phenomenon in question ignores a possibility of identifying factors which in some particular situations may significantly determine the character of this phenomenon. Such a factor, for instance, is the location of town in the settlement network. Towns located peripherally are characterized by an increase in the number of connections with the neighbouring region. At the same time towns situated in the vicinity of a large urban centre (in Lodz) display a stronger connection with this centre than with its immediate surroundings.

Conclusion

In conclusion, despite numerous disadvantages of the REGON National Register of Business Entities, it remains a tool which offers ample possibilities of analysis of

economic linkages. The universal character of this tool allows for its use in different types of research. It may be used both for research into economic integrity (coherence) of the given area, identification of economic linkages between towns and regions as well as relations between the town and its surroundings. In the author's opinion of the author the presented research approach may be used successfully also in the case of research into the delimitation of functional areas with the assumption that it cannot be the only method of measuring this phenomenon.

From the viewpoint of the analyses conducted in this article, special attention should be paid to spatial layout of functional connections. And in this scope this is above all their different character depending on the direction of these linkages. With a relatively small spatial scope of expansions of companies from the territory of small and medium-sized towns of the Lodz voivodeship, the area from which local units get location in towns is appreciably larger.

References

Bartosiewicz, B. (2012). Powiązania społeczne w Łódźkim Obszarze Metropolitalnym. In: B. Bartosiewicz, I. Pielesiak, T. Marszał (ed.), Spójność terytorialna Łódźkiego Obszaru Metropolitalnego, *Studia KPZK PAN*, *147*, Warszawa, 83–101.

Bartosiewicz, B., Marszał, T., Pielesiak, I. (ed.) (2012). Spójność terytorialna Łódźkiego Obszaru Metropolitalnego, *Studia KPZK PAN*, *147*.

Bartosiewicz, B., Pielesiak, I. (2010). Relacje małe miasto-metropolia w świetle powiązań przestrzennych. In: M. Nowak, T. Skotarczak (ed.), *Zarządzanie miastem. Studium ekonomiczne i organizacyjne*, CeDeWu, Warszawa, 91–114.

Chojnicki, Z. (1961). *Analiza przepływów towarowych w Polsce w układzie międzywojewódzkim: Kartogramy*. Polska Akademia Nauk. Komitet Przestrzennego Zagospodarowania Kraju.

Churski, P. (ed.) (2009). *Spójność i konkurencyjność regionu wielkopolskiego*, UAM, Poznań.

Czarnecki, A. (2007). Rola małych miast w strukturze rynków pracy ludności wiejskiej (przykład dojazdów do pracy), *Biuletyn KPZK PAN*, *232*, 109–203.

Dziegieć, E. (1984). Zasięg oddziaływania centrum handlowego małego miasta, *Acta Universitatis Lodziensis. Folia Geographica*, *3*, 69–85.

Heffner, K. (2000). Problemy sieci osadniczej a kształtowanie się lokalnych centrów rozwoju, In: M. Kłodziński, A. Rosner (ed.), *Rozwój przedsiębiorczości na terenach wiejskich wschodniego i zachodniego pogranicza (społeczne, ekonomiczne i instytucjonalne uwarunkowania)*, Instytut Rozwoju Wsi i Rolnictwa PAN, Warszawa, 103–118.

Heffner, K. (2005). *Małe miasta w rozwoju obszarów wiejskich*, Prace Naukowe/Akademia Ekonomiczna w Katowicach, *Małe miasta a rozwój lokalny i regionalny*, 11–34.

Heffner, K., Gibas, P. (2014a). Polityka spójności UE a obszary funkcjonalne centrów regionalnych w Polsce, In: *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, *390*, 127–138.

Heffner, K., Gibas P. (2014b). Zasięg stref oddziaływania metropolii, *Studia miejskie*, *13*, 10–26.

Heffner, K., Solga B., (2006). *Lokalne centra rozwoju obszarów Wiejskich – znaczenie i powiązania małych miast*, Studia Obszarów Wiejskich, t. 11, 25–38.

Jażewicz, I. (2006). Rola małych miast w przestrzeni rolniczej Pomorza Środkowego. In: E. Rydz (ed.), *Rola małych miast w rozwoju obszarów wiejskich*, Słupsk-Ustka, 159–173.

Jewtuchowicz, A., Wójcik, M. (ed.) (2010). *Łódźka metropolia. Problemy integracji gospodarczej.,* Wyd. Biblioteka, Łódź.

Komornicki, T. (2003). *Przestrzenne zróżnicowanie międzynarodowych powiązań społeczno-gospodarczych w Polsce* (Vol. 190). IGiPZ PAN.

Kwiatek-Sołtys, A. (1998). Zagadnienia współczesnych przemian funkcjonalnych małych miast południowej Polski, na przykładzie województwa tarnowskiego. In: *X Konwersatorium Wiedzy o mieście: metodologia geografii osadnictwa na przełomie wieków*, Łódź: Łódzkie Towarzystwo Naukowe, 105–107.

Marszał, T., Pielesiak, I., (2008). Spójność obszaru metropolitalnego w świetle powiązań infrastrukturalnych (przykład Łódźkiego Obszaru Metropolitalnego), *Studia KPZK PAN*, *120*, 180–196.

Matczak, A. (1984). *Próba określenia zasięgu oddziaływania Prudnika na podstawie danych o przewozach towarowych*,. "Acta Universitatis Lodziensis, Folia Geographica", 3, 87–98.

Matczak, A., Michalski, W. (1982). Przepływy towarowe jako podstawa wyznaczania związków przestrzennych Sieradza. *Acta Universitatis Lodziensis. Folia Geographica*, *1*, 129–152.

Matczak, A. Szymańska, D. (1997). *Studia nad strukturą przestrzenno-funkcjonalną miasta. Przykład Brodnica*. Toruń.

Michalski, W. (1980). Oddziaływanie małego miasta na najbliższe zaplecze na przykładzie Przedborza. *Acta Universitatis Lodziensis. Folia Geographica, 22*, 189–198.

Michalski, W. (1985). Zmiany stref oddziaływania ośrodków lokalnych pod wpływem uprzemysłowienia na przykładzie Bełchatowskiego Okręgu Przemysłowego. *Studia Regionalne*, t. *7–8*(12–13), 83–98.

Michalski, W., Suliborski, A. (1989). Region miejski Nysy w świetle powiązań społeczno-gospodarczych. *Studia Społeczno-Ekonomiczne*, *14*, 47–61.

Pielesiak I. (2012). Delimitacja i instytucjonalizacja Łódźkiego Obszaru Metropolitalnego. *Studia KPZK PAN*, *147*, 169–185.

Śleszyński, P. (2010). Powiązania organizacyjne i właścicielskie przedsiębiorstw przemysłowych i usługowych w Polsce oraz ich znaczenie dla rozwoju regionalnego. *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, *15*, 117–129.

Śleszyński, P. (2013). Delimitacja miejskich obszarów funkcjonalnych stolic województw. *Przegląd Geograficzny*, *85*(2), 173–197.

Biographical note of author: University of Lodz, Faculty of Geographical Sciences, Department of the Built Environment and Spatial Policy; graduated with a Master's and Ph.D. in Geography; since 2007 working at the Faculty of Geographical Sciences of the University of Lodz. Author's research interests concentrate on issues related to the functional areas especially of small towns, transportation geography, spatial economy as well as spatial cohesion of metropolitan areas.

Bartosz Bartosiewicz, PhD
University of Lodz
Department of the Built Environment and Spatial Policy
ul. Kopcińskiego 31
90–142 Łódź
Poland
b.bartosiewicz@geo.uni.lodz.pl