

# Local Specialization of Cities of the Lubelskie Voivodship

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## Abstract

*The article presents an attempt to determine the economic specialization of cities of the Lubelskie Voivodship. High level market specialization can result from the dominant function of a city related to the socio-economic activities of the citizenship. The study employs Florence's location quotient, also known as the local specialization index. The analysis was carried out on the basis of Statistics Poland data. The main source of information was the REGON register database (National Official Register of National Economy Entities). The survey proved that the vast majority of cities located in the Lubelskie Voivodship have been characterized by a relatively low level of local specialization. This may indicate that the economic structure of the survey units is quite diverse. In the case of smaller centers, lack of the dominant function can result from a problem with proper identification factors constituting the economic base of a given city, and therefore suggest small chances for development.*

**Keywords:** local specialization, economic development of cities, Florence's location quotient, Lubelskie Voivodship

**JEL:** P25, R11

## Introduction

Socio-economic development is a process particularly occurring in spatially expansive urban structures. The city is a place of concentration of human capital, economic, social, and cultural activity. It is also perceived as a factor activating socio-economic development of the surrounding areas, particularly including rural areas. In accordance with the binding legal definition, in Poland, a city is a settlement unit with a prevalence of compact building development and non-agricultural functions, having city rights or city status granted in a course specified in provisions. In administrative division, cities have a status of an independent commune (urban commune) or in the case of small cities they are included in the urban-rural communes (Act on the commune self-government of 8 March 1990 with further amendments). The structure of the urban network of the country covers 923 cities, whereas a considerably higher density of cities is characteristic of western regions of Poland (fig. 1). The uneven distribution of urban centers is undoubtedly a consequence of historical processes determining the diffusion of urbanization. An evident variability of Polish cities is also observed in terms of size and number of fulfilled functions, particularly including those with exogenic character. In this context, vigorous urban centers with national importance can be distinguished (metropolises, the largest cities, and conurbations of cities), as well as cities with regional importance, implementing a number of different functions (administrative, economic, educational, cultural), those with influence outside their administrative boundaries (county cities), and local urban centers aiming at meeting the needs of a given community. Development of cities is determined by a number of socio-economic factors both with an endo- and exogenic character

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(Bronisz 2014). The importance of the development of urban areas for an increase in competitiveness of regions was recognized both at a level of the European Union and national policy, as manifested in strategic documents and programmes dedicated to cities.<sup>1</sup> Functions fulfilled by cities cover all forms of socio-economic activity. It is important to shape the conditions of life of residents and functioning of socio-economic entities, as well as stimulate development processes. The current development conditions constitute a considerably greater challenge for self-government authorities. The effectiveness and efficiency of the implemented measures is of key importance. In this context, effective management of local government aimed at breaking development barriers and inciting local economic activity is of particular importance.

The Lubelskie Voivodship located in East Poland is to a large degree a rural region, characterized by a low degree of urbanization. In 2016, the population inhabiting cities constituted 46% of the total population of the Lubelskie Voivodship. The structure of the urban network of the voivodship is composed of 47 cities, whereas small and medium-sized centers are prevalent, with an insufficient contribution of large cities. One city with a character of an administrative, economic, cultural, and educational-scientific center is dominant. Simultaneously, 40% of urban centers are



Fig. 1. Structure of the urban network of Poland

1. See: Raport Wprowadzający Ministerstwa Rozwoju Regionalnego na potrzeby przygotowania Przeglądu OECD krajowej polityki miejskiej w Polsce. Część II Polityka i zarządzanie rozwojem miast w Polsce [Preliminary Report of the Ministry of Regional Development for the purposes of preparation of an OECD review of the national urban policy in Poland. Part II Policy and governance of development of cities in Poland]. By M. Łotocka and A. Baucz, Ministerstwo Rozwoju Regionalnego, Warszawa, 2010; Cities of Tomorrow. Challenges, Visions, Ways Forward. European Commission, Directorate General for Regional Policy, October 2011, page 7, [@:] [http://ec.europa.eu/regional\\_policy/sources/docgener/studies/pdf/citiesoftomorrow/citiesoftomorrow\\_final.pdf](http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/citiesoftomorrow/citiesoftomorrow_final.pdf).

small cities with less than 5 thousand residents. The structure of the urban settlement system of the voivodship includes seven centers with a range of population of 5–10 thousand, ten with a range of 10–20 thousand, six with a range of 20–50 thousand, three with a range of 50–100 thousand residents, and one city with a population of more than 100 thousand. Small cities with less than 5 thousand residents, often constituting urban-rural forms, are on the boundary of urban character, although they have considerable importance for the development of rural areas, particularly as centers of development of non-agricultural functions and activation of the areas.

The objective of the article is the investigation of the economic specialization of cities of the Lubelskie Voivodship. In the subjective approach, the study covers local potentials and specializations showing the level of diversification and competitive advantage of the analyzed units. In the objective approach, it covers urban centers within the administrative boundaries of the Lubelskie Voivodship. In the literature on the subject, the analysis and functional classification of territorial units in the context of employment structure or structure of employees and surplus of employees in particular branches of the economy was discussed by, among others, Suliborski (1983), Sokołowski (1992), Broszkiewicz (1997), Szymańska (2009), Obrębalski and Walesiak (2015). Their analyses employed a variable research approach focusing on selected factors determining the potential and local specialization of given units.

The article is divided into three main sections. In the first section the concept of the local specialization is defined. In the second the methodological framework of the study is presented. In the following section the results are revealed and finally a short conclusion summarizes the findings.

## 1 Local specialization — theoretical approach

Local specialization can be defined as a distinguishing feature (economic function) of a certain spatial unit in the competitive socio-economic surroundings. Specialization provides the basis for development, although it may also contribute to a relatively low level of diversification of local economies. An important factor determining the location of different functions is geographic location. Specialization of a city also results from its dominant role related to economic activity that constitutes the source of income for a large majority of residents. The basis of the wealth of a city is the developed zone of economic activity. Specialization permits the description of the economic diversity of urban centers, and the identification of the actual role of particular centers in the economy of the entire voivodship. The scale of potentials of a city affects the choice of the profile of economic development based on specialization defined as focusing on support of development of several interrelated economic activities of diversification—i.e., support of economic development in a broad spectrum of activity leading to the complex use of variable resources and potentials of the city (Wrana 2013). Multifunctional cities characterized by variable economic structure are entities with developed socio-economic infrastructure, a network of business and commercial facilities, and scientific institutions. The measure of the strength of a city is its ability in shaping development in the qualitative aspect (i.e., for combining entities, potentials, or activities aimed at generating new solutions). Strong competitive centers become centers of economic development. This is related to factors such as: a considerable contribution of entities developing local and supralocal networks of cooperation in the city's economic structure, or specialized activities and constant strengthening of strategic competences.

In local and regional economies, the key role is played by small and medium-sized cities constituting an important element of the spatial structure of the country, and simultaneously the intermediate stage on the axis of the continuum of urban and rural areas. They are perceived as local centers of provision of services, collection of knowledge, creation of innovation and infrastructure, and therefore the driving force of economic growth. The degree of variability of the structure of the economy is important for the economic development of great cities (Domański 2000; Małuszyńska 2000), both on the scale of the entire economy of the city and within its component activities (e.g., in industry or services). The variable structure is one of the features allowing a given unit to gain competitive advantage (Konecka-Szydłowska 2016). Unilaterally developed economic structure leads to social problems and reduces chances for development. Cities with diversified economic

structure have better development perspectives, because such an economy is more flexible, resistant to prevailing cyclical conditions and economic crises. Moreover, a diversified modern economic structure provides better possibilities for stimulating entrepreneurship, innovativeness, and creativity both among residents and economic entities functioning in a given city.

In the area of socio-economic development, a useful tool to determine the regional or local specialization understood as a concentration of a particular industry can be location quotient (LQ). It is quite a popular concept in the literature of economic geography focusing on the spatial distribution of economic activity (Billings and Johnson 2012; Guimaraes, Figueiredo, and Woodward 2009). LQ was originally introduced by Florence (1929), who pioneered the use of the location quotient as a measure of relative geographic concentration. Location quotient is a way of quantifying how concentrated a particular industry, cluster, occupation or demographic group is in a region as compared to the nation. It can reveal what makes a particular region “unique” in comparison to the national average. The LQ is perceived as an index of relative specialization because it benchmarks the degree of economic specialization at the local level in relation to the economy of the hierarchically higher unit (Basile and Ciccarelli 2015). Initially it was used to compare an industry’s share of regional employment (Florence 1929), however it can also be used for other economic measures, such as value added, import or export. Location quotient can identify potential sources of both comparative and competitive advantage and areas of regional or local specialization (Czyż 2016).

## 2 Methodological framework

To examine the specialization of local cities in the Lubelskie Voivodship Florence’s location quotient was applied. It is usually used for the comparison of asymmetries in economic or social activity in particular spatial units in terms of distribution in the hierarchically higher unit. LQ is a relative measure which enables us to identify the dominant element in the structure. High value of the ratio suggests the dominance of one function and less diversification of the structure of a local economy (Runge 2006). Lower values suggest higher diversification of the local economy. The most popular approach focuses on the local economy. The location quotient is then defined as the ratio between the share of regional employment in one sector and the share of employment in that same sector in the reference economy. Due to the lack of reliable statistical data on the size of employment in municipalities (cities), the analysis of local specialization of the 46 cities in Lubelskie Voivodship was based on the number of economic entities registered in the REGON (National Official Register of National Economy Entities) database according to the PKD (Polish Classification of Activities) section in 2017.<sup>2</sup> The study covered 20 sections of the PKD, in line with the assumption of the research. Despite some imperfections, these statistics give the most reliable picture of the distribution of business entities. Over-representativeness of shares of a given business activity in a certain unit indicates the direction of its specialization, and the size of the measure of intensity and strength of specialization (Czyż 2016; Florence 1929; Szymańska 2009). The study covered all cities located in the Lubelskie Voivodship taking into account their size in terms of population. The LQ was computed individually for each unit under study. For the calculation of Florence’s location quotient, the following formula was applied (Czyż 2016; Obrębalski and Walesiak 2015; Runge 2006; Szymańska 2009):

$$(1) \quad LQ_{ij} = \frac{B_{ij} / \sum_{j=1}^m B_{ij}}{B_{.j} / \sum_{j=1}^m B_{.j}},$$

where:

- $LQ_{ij}$  — the Florence location quotient (local specialization index) of the  $i$ -th city in the  $j$ -th PKD section of economy,
- $B_{ij}$  — number of business entities of the  $i$ -th city in the  $j$ -th PKD section of economy,

2. The analysis considered 46 cities due to the lack of data for the city of Rejowiec, which based on Regulation of 10 July 2016 on the determination of boundaries of certain communes and cities, granting certain municipalities with a status of a city, and changes of name of the commune, obtained the city status on 1 January 2017.

$B_j$  — number of business entities of the  $j$ -th PKD section of voivodship economy,  
 $i = 1, 2, 3, \dots, n$  — number of studied cities in Lubelskie Voivodship ( $n = 46$ ),  
 $j = 1, 2, 3, \dots, m$  — number of studied PKD sections ( $m = 20$ ).

The applied research procedure allows us to indicate the direction of local specialization of the surveyed cities. Based on the Florence location quotient formula the specialization expressed by the over-representation of a particular section of PKD for a given city was determined. Then in order to structure the cities by the degree of their dominant specialization, the index of intensity of local specialization was developed. The proposed measure of the intensity of local specialization was calculated as the highest value of the specialization index for a given city. It allows us to determine the strength of the specialization

$$(2) \quad LQ_{i \max} = \max_j LQ_{ij}.$$

In order to cluster cities into three different groups in terms of the intensity of local specialization the following classification based on the mean and the standard deviation (Runge 2006) was applied:

- Class I—strong degree of local specialization, where

$$(3) \quad LQ_{i \max} > \frac{1}{n} \sum_{i=1}^n x_i + \frac{1}{2} \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2}$$

- Class II—moderate degree of local specialization, where

$$(4) \quad \frac{1}{n} \sum_{i=1}^n x_i - \frac{1}{2} \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2} \leq LQ_{i \max} \leq \frac{1}{n} \sum_{i=1}^n x_i + \frac{1}{2} \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2}$$

- Class III—weak degree of local specialization, where

$$(5) \quad LQ_{i \max} < \frac{1}{n} \sum_{i=1}^n x_i - \frac{1}{2} \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2}$$

The attempts at clustering cities into three groups according to their local specialization was an interesting tool for more detailed local analysis.

### 3 Research results

In order to determine the most important directions of the economic activity of cities of the Lubelskie Voivodship, local specialization was analyzed according to the PKD section understood as a quantitative advantage of registered business entities belonging to one section of the PKD activity. Table 1 includes only the sections in which the value of LQ was higher than 2.

Among forty six cities of the Lubelskie Voivodship, in 2017, surplus of economic activity in section A (agriculture, forestry, hunting, and fishery) concerned only one city, namely Ostrów Lubelski located in the northern part of the Lubelskie Voivodship in the Lubartów County. Specialization of economic activity in the scope of section B (Mining and quarrying) concerned six cities, namely: Bełżyce (4,2), Józefów (8,1), Radzyń Podlaski (2,3), Łęczna (3,2), Lubycza Królewska (4,1) and Stoczek Łukowski (2,6).<sup>3</sup> The Lubelskie Voivodship has 1/5 of the Polish resources of coal. In the conditions of favorable political and legal decisions concerning the Lubelskie Basin, activity related to the extraction and management of raw materials is expected to develop. An equally important role is played by other raw materials, i.e. deposits of limestones and marbles, with an application in the lime and cement industry.

Section D (Production and supply of electricity, gas, vapor, hot water and air for air-conditioning systems) was the most represented activity in four cities, namely: Annopol (2,1), Ostrów Lubelski

3. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]



**Tab. 1.** Specialization of cities of the Lubelskie Voivodship in particular PKD sections (number of cities)

PKD	City population (in thousands)					
	< 5	5–10	10–20	20–50	50–100	> 100
A	1	0	0	0	0	0
B	3	1	2	0	0	0
D	3	1	0	0	0	0
E	8	1	0	0	0	0
H	0	1	0	0	0	0
I	5	0	0	0	0	0
L	2	1	1	1	0	0
O	1	0	0	0	0	0
P	2	0	0	0	0	0
R	1	0	0	0	0	0
U	0	0	0	0	2	1

*Note:* A—Agriculture, forestry, hunting and fishery; B—Mining and quarrying; D—Production and supply of electricity, gas, water vapor, hot water and air for air-conditioning systems; E—Water supply, sewage and waste management, and activity related to reclamation; H—Transport and warehouse management; I—activity related to accommodation and gastronomic services, L—activity related to the support of the real-estate market; O—Public administration and national protection, obligatory social insurance; P—Education; R—Activity related to culture, entertainment, and recreation; U—Exterritorial organizations and bodies.

(6,0), Rejowiec Fabryczny (2,0), and Terespol (2,5). Among cities of the Lubelskie Voivodship, the dominant type of activity was that provided in the scope of section E (Water supply, sewage and waste management, and activity related to cultivation). Surplus of the activity concerned ten cities, namely: Rejowiec Fabryczny (9,0), Józefów (7,4), Tyszowce (6,4), Lubycza Królewska (5,5), Modliborzyce (3,9), Zwierzyniec (3,0), Stoczek Łukowski (2,4), Urzędów (2,1), Bełżyce (2,4) and Frampol (2,2). In section H (Transport and warehouse management), surplus of the number of registered entities was only observed in Terespol (2,1). This certainly resulted from the near-border location of the city. In Terespol, there are road and railway border crossing with Belarus, while the residents of the city mainly gain income from work in companies and institutions related to their support and service.

Specialization in section I (Activity related to accommodation and gastronomic services) concerned five cities, namely: Kazimierz Dolny (9,6), Krasnobród (7,6), Zwierzyniec (5,1), Nałęczów (3,6), and Piaski (2,6). A relatively high level of Florence's index was reached by the first three of them and thus they were included in the group with high degree of local specialization. It is worth mentioning that these are cities with the highest tourist potential in the Lubelskie Voivodship (Bronisz et al. 2017). The size and intensity of tourist traffic undoubtedly affects the development of entities in the tourist industry. In the case of Nałęczów, next to the richness of environmental-landscape and cultural values, it is also important that the city, located in the buffer zone of the Kazimierski Landscape Park, is one of the best known health resorts in Poland. Its status of health resort also contributes to the development of economic entities in the tourist sector in Krasnobród.

Specialization in section L (Activity related to the support of the real-estate market) concerned five cities, namely: Dęblin (2,9), Kraśnik (2,0), Poniatowa (2,7), Rejowiec Fabryczny (2,5), and Zwierzyniec (2,3). Specialization of cities of the Lubelskie Voivodship in further sections was considerably more weakly represented. In section O (Public administration and national protection, obligatory social insurance), a slight surplus of the number of registered entities was only observed in Siedliszcze (2,0), in section P (Education) in Siedliszcze (3,2) and Ostrów Lubelski (2,4), and in section R (Activity related to culture, entertainment, and recreation) only in Józefów (2,1). Specialisation in section U (Exterritorial organizations and bodies) was characteristic of 3 county cities, namely: Biała Podlaska (5,8), Zamość (4,6), and Lublin (2,3).

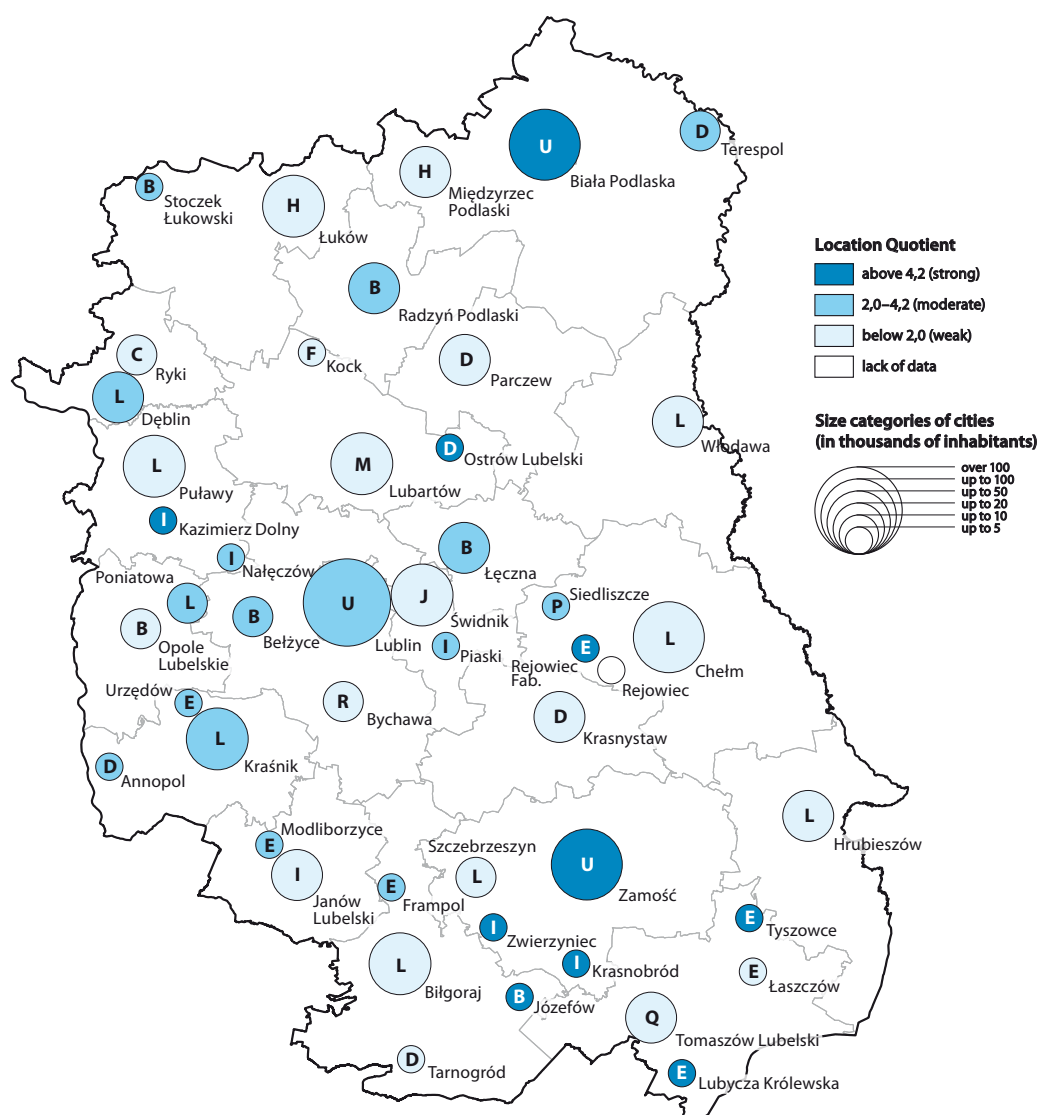
Almost half of the cities of Lubelskie Voivodship showed a weak degree of local specialization, around 30% were characterized by a moderate level of local specialization and less than a quarter by a relative strong degree of specialization (tab. 2). The highest value of Florence's location

quotient was observed for the three following cities: Kazimierz Dolny (9,6), Rejowiec Fabryczny (9,0), and Józefów (8,1). At the same time, only a small group of cities were characterized by multiple specializations, namely Józefów, Ostrów Lubelski, Rejowiec Fabryczny, Zwierzyniec (three specializations each), as well as Bełżyce, Siedliszcze, Stoczek Łukowski, Lubycza Królewska, and Terespol (two specializations each).

The study on the intensity of local specialization of the cities in the Lubelskie Voivodship points to the occurring significant correlation between the strength of specialization and the size of a given center (fig. 2). The analysis of the degree of specialization of cities by population size classes showed that the strongest local specialization characterized small urban centers. In the largest group of cities with a population range of up to 5 thousand, which includes nineteen cities, local specialization was observed for sixteen of them. This group also included centers with the highest

**Tab. 2.** Intensity of local specialization in cities located in Lubelskie Voivodship

Class	Degree of local specialization	Value of location quotient	Number of cities
I	Strong	$LQ > 4,2$	10
II	Moderate	$2,0 \leq LQ \leq 4,2$	16
III	Weak	$LQ < 2,0$	20



**Fig. 2.** Specialization of local economic activity of the cities of the Lubelskie Voivodship in 2017 by intensity, size categories of city, and PKD section

values of Florence's location quotient. In the group of units with a population range of 5–10 thousand residents covering seven cities of the Lubelskie Voivodship, specialization was noted for three of them, namely Bełżyce, Poniatowa, and Terespol. In the group of cities with a population range of 10–20 thousand residents, economic specialization characterized only three out of ten cities, namely Łęczna, Dęblin, and Radzyń Podlaski, and in the group of cities with a range of 20–50 thousand residents, an evident specialization was determined for only one of six cities, namely for Kraśnik. In the group of cities with a population range of 50–100 thousand, covering three county cities such as Biała Podlaska, Chełm, and Zamość, two of them, namely Biała Podlaska and Zamość, recorded an index suggesting the existence of relative strong economic specialization. In the case of Lublin—i.e., the capital of the Lubelskie Voivodship and the only city with more than 100 thousand residents a moderate degree of local specialization (the ratio slightly exceeded the value 2) was observed.

The study proved that local specialization weakens together with an increase in the size of the urban center. This can result from the fact that a characteristic feature of large cities is multifunctionality revealed in socio-economic functions such as: administrative, political, industrial, service, transport, health resort, religious, educational-scientific, or cultural functions (Bronisz 2014; Hołuj and Hołuj 2006). The distinguished functions particularly concern the largest and medium-sized cities that play a substantial role in the provision of conditions for the sustainable development of the country.

## Conclusions

The objective of the article was the investigation of specializations of cities of the Lubelskie Voivodship, and therefore determination of the most important directions of their economic activity. The study used Florence's location quotient, and although it has certain limitations, this tool definitely helps to increase the knowledge of the local economies of the surveyed cities. The obtained results permitted formulation of a few conclusions. The majority of cities of the Lubelskie Voivodship showed moderate and weak levels of local specialization, suggesting diversified economic structures. At the same time high values of location quotient indicating a strong degree of specialization was observed only for ten cities. The strongest local specialization was characteristic of small urban centers of the Lubelskie Voivodship with a population of less than 5 thousand. Some of the cities were not distinguished by a specific economic specialization. This resulted from the fact that in many units the structure of registered entities was so fragmented that the determination any area of specialization was quite difficult. Among cities for which specialization was determined, the following economic picture was formed. The most numerously represented groups of cities in terms of surplus of economic entities concerned section E (Water supply, sewage and waste management, and activity related to reclamation), B (Mining and quarrying), I (Activity related to accommodation and gastronomic services), D (Production and supply of electricity, gas, vapor, hot water and air for air-conditioning systems), and L (Activity related to the support of the real-estate market). According to the study, local specialization weakens together with an increase in the size of the urban center.

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