

IN BETWEEN CITY AND VILLAGE: THE DEVELOPMENT OF SPATIAL PATTERNS OF CZECH SUBURBANISATION 1997–2016

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INTRODUCTION

Although the suburbanisation process is one of the most studied issues within CEE urban studies, most work published during the last two decades has looked at separate case studies of individual cities (Kok–Kovács, 1999; Nuissl–Rink, 2005; Ouředníček, 2007; Krišjāne–Bērziņš, 2012; Šveda–Madajová–Podolák, 2016). The comparison of the scope and intensity of suburban development on the national level lacks a common methodological approach and a generally accepted definition of the process itself. Consequently, relatively different measurements used in the case studies (Timár–Váradi, 2001; Tammaru *et al.*, 2013) obstruct any rigorous comparison of the process between cities and countries.

Moreover, many social and demographic processes are influenced by uneven regional distribution of population, migration and demographic behaviour. Groups of municipalities classified according to population size are almost solely employed as a crucial descriptive tool for the spatial and hierarchical distribution of population in Czechia. However, these groupings are often inadequate for distinguishing geographical position within the settlement system. One of the best-known efforts to distinguish the horizontal position of settlements is

the classification of exposed municipalities (Hampel–Gardavský–Kühnl, 1987: 124–128 and Figure 2). Today, the suburbanisation process has a distributive function in new migration in terms of age and social status and creates spatial differences between peripheral and suburban municipalities. Thus, the geographical position of the municipality plays a crucial role for the evaluation of contemporary demographic, social and economic processes within the settlement system.

The assessment of the scope of suburbanisation within the hinterlands of Czech cities is one of the core issues of both pure and applied research of settlement geography and related disciplines. The main objective of this article is to furnish a coherent methodology for the delimitation of suburban municipalities in Czechia, to describe and explain the scope and spatial distribution and to compare the development of residential suburbanisation during two distinct periods: 1997–2008 and 2009–2016. The article uses the delimitation of zones of residential suburbanisation (Ouředníček–Špačková–Novák, 2013; Ouředníček–Špačková–Klsák, 2018), as an analytical tool for the evaluation of positional aspects of municipalities within the Czech settlement system.

DEFINITION OF SUBURBANISATION AND SUBURBAN MUNICIPALITIES

Suburbanisation is defined as process of deconcentration of population and its activities from

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the cores of metropolitan regions to their hinterland (similarly *Timár–Váradi*, 2001; *Tammaru et al.*, 2013). The deconcentration of economic and leisure time activities, logistics, offices, industry and services is not evaluated in this article. Instead, we focus on residential suburbanisation, as a partial process of suburbanisation closely linked to the population and housing function. Using Czech statistical information, residential suburbanisation can be taken as migration (change of permanent residency) of population from the core cities of metropolitan regions towards their hinterlands.

A matrix of nine different urbanisation processes is presented in Table 1. According to the analytical matrix, traditional urbanisation processes (urbanisation, suburbanisation, counterurbanisation and reurbanisation) are results of migration from different types of settlement – i.e. urbanisation is migration from countryside to cities, counterurbanisation from cities and suburbs to the countryside etc. The change of residential environment is a crucial factor in the urbanisation process which creates tensions and gradual adaptations of the incoming population to a new physical, functional and social environment. These tensions are consequently the main topics of empirical investigation in urban geography, sociology and demography (*Špačková–Ouředníček*, 2012). Moreover, the inflow of new residents and new residential construction are also crucial problems for the decision-making sphere, municipalities and planning authorities (*Feřtřová–Špačková–Ouředníček*, 2013). On the other hand, migration within the same type of settlements is much less interesting for academic research, even when migration moves within the urban space or between rural municipalities make up by far the largest group of moves between different

types of settlements. The impact of this type of migration on tensions between the aspirations, requirements and wishes of the newly incoming population and the actual equipment, conditions and social structure of target settlements is relatively small.

To refine the definition of suburbanisation, we can distinguish seven different processes of suburban development (*Ouředníček*, 2007) and we argue that these processes have specific consequences for the local social and functional environment. Therefore, the character and minimal intensity of new housing construction was considered as the second factor of our definition. In the case of migration from the core city to the suburban hinterland there are four special migration streams according to types of housing: (i) suburbanisation (migration to a new house); (ii) migration to older houses (former villages); (iii) elderly migration (to social care institutions); and (iv) migration to recreational houses (cottages). All these types of migrations are relatively common within the hinterlands of Czech cities. Finally, suburbanisation is defined as the migration of population from the core city to new houses constructed within its hinterland. Our approach to the delimitation of suburban space used in empirical part of the article is based exactly on this definition. A suburban municipality is delimited as a place with a certain minimal level of housing construction (see Table 2) and share of new population in-migrated from the core city. The exact values of indicators are described in the following methodological section.

METHODS AND DATA

The main idea of the methodological approach is to distinguish three basic types of Czech municipalities: (i) cities and towns as core source

Table 1 Matrix of source and target types of settlement and definition of suburbanisation (and other urbanisation processes)

Type of settlement		Target of migration		
		City	Suburb	Countryside
Source of migration	City	Intra and inter-city migration	SUBURBANISATION	Counterurbanisation
	Suburb	Reurbanisation	Tangential migration	Counterurbanisation
	Countryside	Urbanisation (reurbanisation)	Urbanisation	Rural migration

areas of suburban migration and representatives of an urban environment; (ii) suburban municipalities; and (iii) rural villages and small towns which are only marginally influenced by suburban development. Municipalities with 10,000 or more permanently resident inhabitants were selected as cores of suburban migration (total number of 130 core municipalities). This population threshold was chosen during the 2000s when it was not likely that towns smaller than the centres of administrative districts (*okres*) would be significantly influenced by suburbanisation process. However, today it is more and more obvious that all selected cores of suburbanisation have at least one suburban satellite settlement and it is highly probable that some smaller towns also generated decentralisation of the residential function to their own hinterlands. To secure similar samples of core cities for the two periods of observation, we have decided to maintain the same threshold of 10,000 inhabitants⁴⁾ for the newer delimitation.

As a second step, we developed a method for the selection of suburban municipalities. Based on the theoretical and methodological discussion of the delimitation of suburbanisation process above, we can measure residential suburbanisation in the specific context of Czech statistical evidence. We employ two statistical sources, which are available at the level of municipalities and are supplied annually by the Czech Statistical Office: (i) records of migration; and (ii) data on housing construction. Although both

statistics have some drawbacks, they provide relatively massive samples which are available at the level of municipalities. Moreover, we use longer periods of evaluation to smooth annual variations in the case of less populous municipalities.

The combination of a minimal intensity of housing construction and the number of completed apartments serves as criteria for the distribution of municipalities into three zones of suburbanisation. We decided to employ a slightly different criterion for the threshold values of new housing construction within the first and second periods. These values are described in the Table 2 below. Suburbanisation is defined as migration from the core cities to municipalities within their hinterland. We measured the share of in-migrated persons on the total number of in-migrated persons to the municipality in selected periods (1997–2008 and 2009–2016). Then, the minimal share of migration from the core city to a municipality was set at 30 per cent in the case of one core city and 40 per cent in the case of two or three core cities⁵⁾. The whole set of suburban municipalities was then structured into three zones with different intensities of housing construction (see Table 2). We also delimited a fourth zone containing all municipalities which met the criteria in the past, but whose migration and housing construction have weakened or become restricted and do not fulfil the threshold values for the current delimitation. We have distinguished two different periods of suburban development: an initial phase

Table 2 Threshold criteria for the delimitation of three zones of residential suburbanisation in 1997–2008 and 2009–2016

Zones according to intensity of suburbanisation	Minimal average intensity of annual housing construction in both periods	Minimal absolute number for housing construction in 1997–2008 (2009–2016 respectively)
Zone 1	10 apartments per 1000 inhabitants	50 (34) apartments
Zone 2	5 apartments per 1000 inhabitants	30 (20) apartments
Zone 3	-	20 (14) apartments

Source: *Ouředníček–Špačková–Novák*, 2013; *Ouředníček–Špačková–Klsák*, 2018

- 4) Municipalities, which meets the conditions for being classified as suburbs by its characteristics are not considered as core cities. This is the case of Říčany, Brandýs n. Labem-Stará Boleslav, Čelákovice and Milovice in Prague Metropolitan Area and Kuřim in Brno Metropolitan Area. These exceptions were determined manually with respect to the context and qualification of authors.
- 5) There are also suburban municipalities with two or more sources (core cities) in Czechia. So, the threshold of minimal in-migration share was set-up to 40 percent of in-migration from the two and three core cities altogether.

and gradation of suburbanisation during 1997–2008 and the period of economic crisis and contemporary development during 2009–2016.

The methodology for the first evaluated period (1997–2008) is thoroughly described and discussed in the final chapter of the book *Sub Urbs (Ouíředníček–Špačková–Novák, 2013)*, the new delimitation is published on the website www.atlasobyvatelstva.cz (*Ouíředníček–Špačková–Klsák, 2018*). The methodology was officially certified by the Ministry of Regional Development (*Ouíředníček–Špačková–Novák, 2014*) and the two older delimitations are presented in the form of specialised maps (*Špačková et al., 2012; 2016*). The distribution of Czech municipalities into the three categories: core cities, suburbs and rural municipalities is available in the form of geodatabase and excel file online: <http://www.atlasobyvatelstva.cz/cs/zony-2016>.

SCOPE OF RESIDENTIAL SUBURBANISATION

The scope of residential suburbanisation in Czechia can be measured by the absolute and relative numbers of municipalities or inhabitants living within suburban zones (Tables 4 and 5). It is not surprising that all the indicators used here grow through the evaluated periods. The structure of municipalities sorted into the three basic categories – cities, suburbs, and rural municipalities – through the four different delimitations of residential suburbanisation is shown in Table 3. The stable sample of core cities and the

gradually growing share of municipalities within the first and second zone are pronounced. On the other hand, the number of municipalities within the third zone was increasing only till 2010 and since then has slowly fallen. However, by definition, municipalities once influenced by suburban development remain as a specific category under zone 4, and their number is, logically, growing. The situation is evaluated in more detail in the next section focused on spatial patterns of suburbanisation. Finally, the number of rural municipalities decreased by 575 units between 2008 and 2016.

The population living in suburban municipalities (1st-3rd zones) increased from 1,314,000 in 2008 to 1,438,000 in 2016. This does not of course mean that all these people can be counted as newly in-migrated suburbanites. We can estimate approximately one third of the population in suburban municipalities as new incomers. i.e. roughly 5 per cent of the total population of Czechia, which is a surprisingly low number. This can be derived from the share of in-migrants per 100 permanently resident inhabitants (third rows in Tables 4 and 5). Moreover, the intensity of in-migration to suburbs is gradually increasing from 28 per mille in 1997–2008 to 37 per mille in the 2009–2016 period, and the intensity is very high especially within the first zone (more than 50 per mille). Thus, the suburbanisation process is far from ended and will no doubt play a significant role in the future.

Table 3 The structure of municipalities in zones of residential suburbanisation in 2008, 2010, 2013 and 2016

Type of settlement	Delimitation 2008	Delimitation 2010	Delimitation 2013	Delimitation 2016
Core cities	129	130	130	130
Zone 1	83	112	141	216
Zone 2	179	241	333	469
Zone 3	632	771	745	497
Zone 4	163	NA	206	440
Suburbs 1–3 altogether	894	1,124	1,219	1,182
Rural municipalities	5,073	4,996	4,695	4,498

Source: *Ouíředníček–Špačková–Klsák, 2018*

Note: Total number of municipalities in each type and year.

Table 4 Basic characteristics of municipalities within the 1st, 2nd and 3rd zones of residential suburbanisation in 1997–2008

Indicator	Zone 1	Zone 2	Zone 3	Total
Number of municipalities	83	179	632	894
Number of population (2008)	96,000	190,000	1,028,000	1,314,000
Average share of in-migrated inhabitants during the whole period 1997–2008	60%	45%	33%	37%
Average annual intensity of in-migration per 1000 inhabitants (1997–2008)	46‰	35‰	25‰	28‰

Source: Ouředníček–Špačková–Novák, 2013

Table 5 Basic characteristics of municipalities within the 1st, 2nd and 3rd zones of residential suburbanisation in 2009–2016

Indicator	Zone 1	Zone 2	Zone 3	Total
Number of municipalities	216	469	497	1,182
Number of population (2016)	286,076	564,800	587,767	1,438,643
Average share of in-migrated inhabitants during the whole period 2009–2016	42%	29%	24%	30%
Average annual intensity of in-migration per 1000 inhabitants (2009–2016)	52‰	37‰	30‰	37‰

Source: Ouředníček–Špačková–Klsák, 2018

SPATIAL DISTRIBUTION OF SUBURBS

The general description of the scope can be extended by the evaluation of spatial patterns of suburban development. The map in Figure 1 depicts all suburban municipalities and core cities. The three shades of colour correspond to the different intensities of residential suburbanisation (zones 1–3), small crosses inside the choropleths mark the 4th zone of suburbanisation, i.e. 440 municipalities which did not meet the (even softer) criteria for actual delimitation but were recognised as residential suburbs in one or more past delimitations. The map therefore not only shows the actual extension of suburbanisation but also reflects past delimitations.

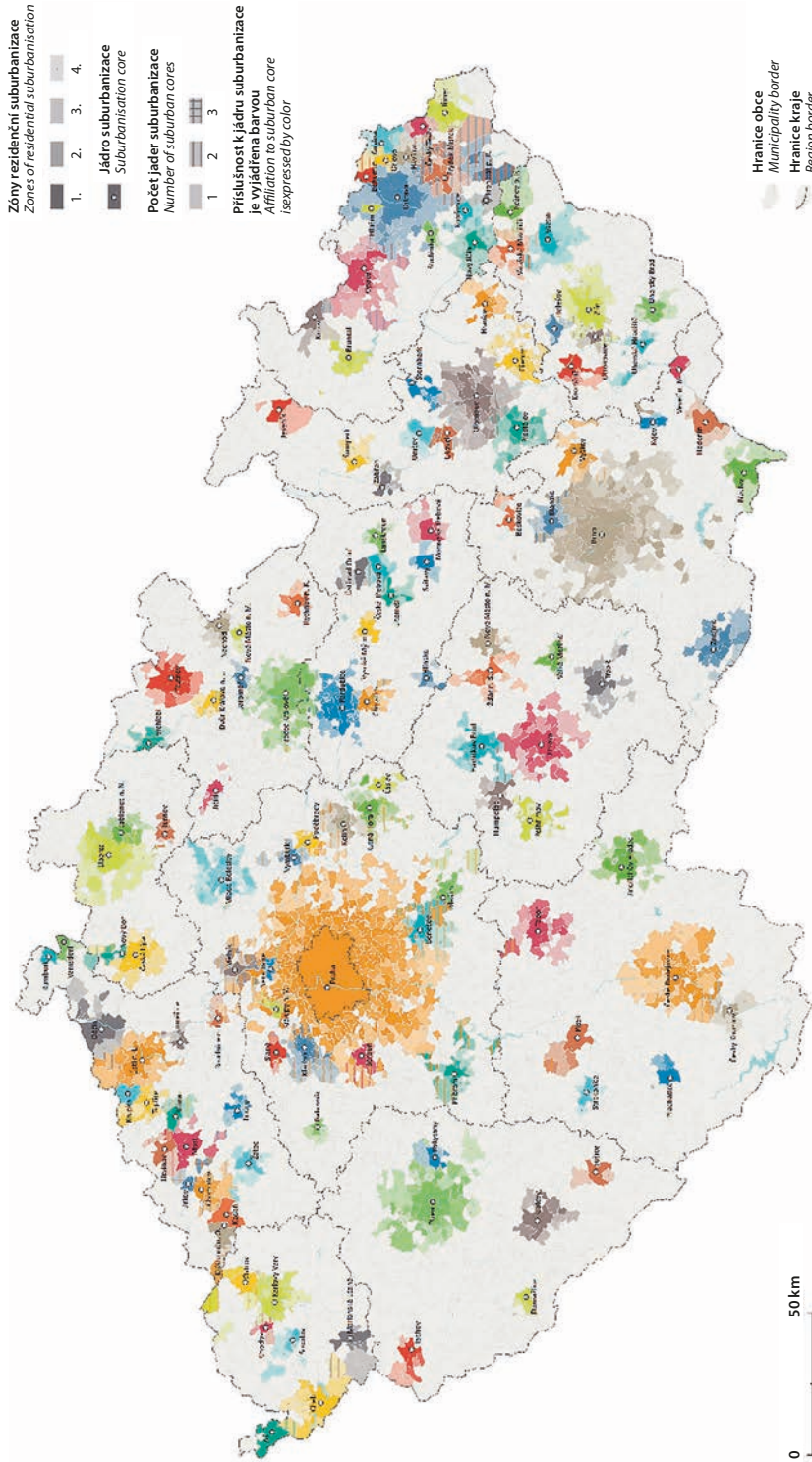
The interpretation of spatial patterns can be summarised in the following way: (i) suburbanisation is a widespread phenomenon in Czechia; (ii) there are considerable regional differences in the extent of suburban development around cities of similar size categories; and (iii) the spatial patterns have changed significantly between the 2000s and 2010s.

Ad (i) The map clearly shows that suburbanisation is a relatively widespread process, which hit not

only capital city and regional centres, but literally every small town within Czechia. All 130 selected core centres of suburbanisation display a spatial connection to at least one suburban municipality which fulfilled the criteria of housing construction and share of in-coming population. This finding is very important because no literature was published on the suburbanisation around small cities until now. There is not enough space to thoroughly discuss the reasons for such extensive suburban development, which is relatively specific to Czechia. Fragmentation of the settlement system and especially the system of master planning with stricter control of housing construction inside administrative boundaries of cities and less control and knowledge about core planning principles within the smaller adjacent municipalities are definitely among the main factors in such development (Feřtřová–Špačková–Ouředníček, 2013).

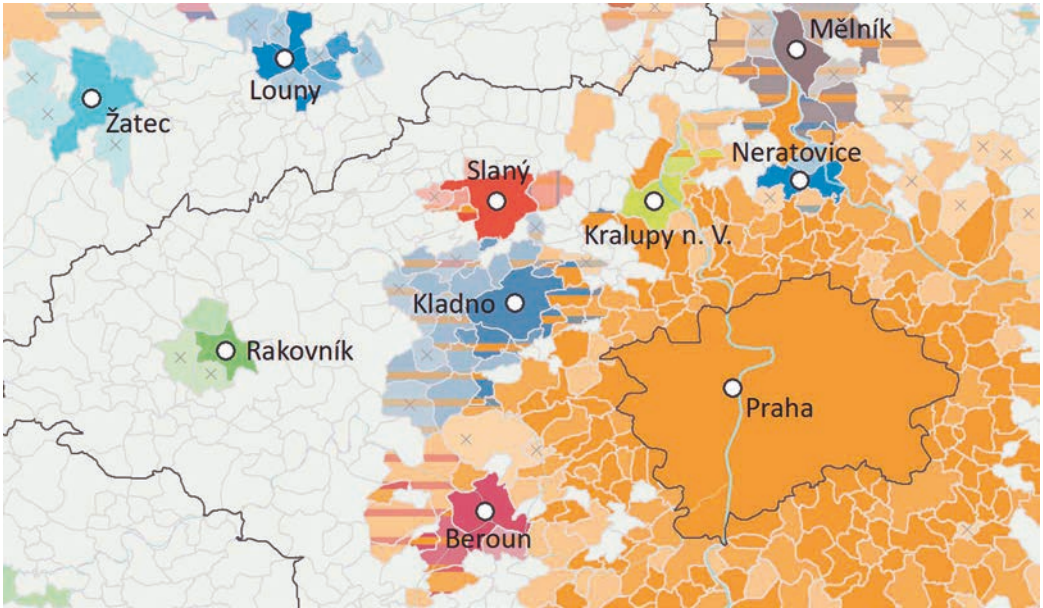
Ad (ii) However, the spatial distribution of suburbanisation is far from uniform in pattern. Economic development within the successful and unsuccessful urban regions significantly influences purchasing power, housing construction and deconcentration tendencies in cities of similar

Figure 1 Zones of residential suburbanisation in Czechia 2016



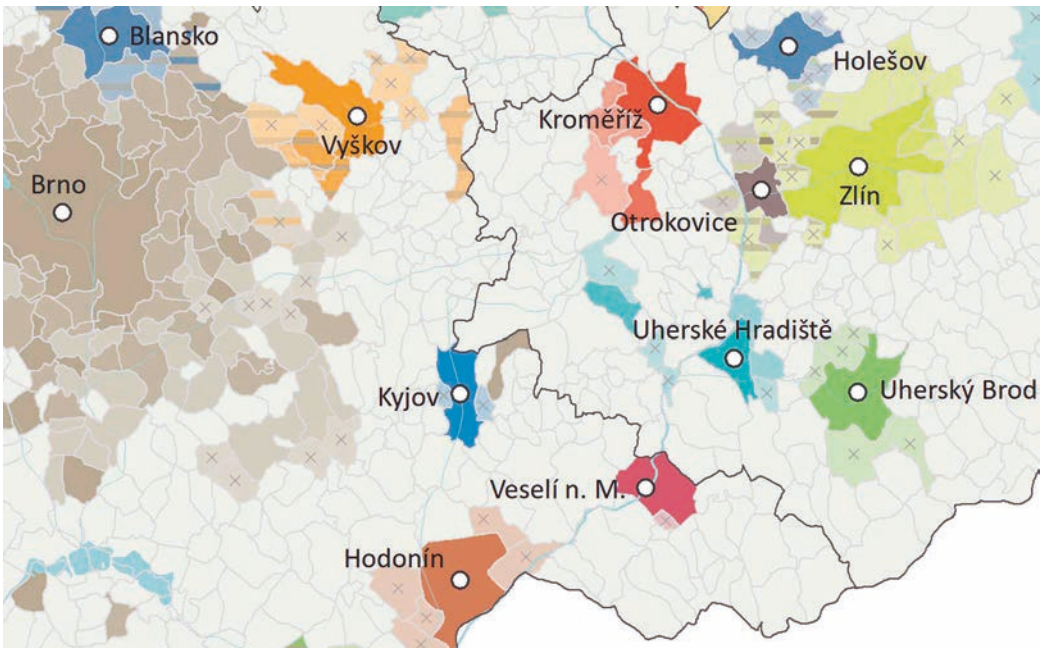
Source: Oufředníček-Špačková-Kisák, 2018

Figure 2 Zones of residential suburbanisation in Czechia 2016 – detailed view of west of Prague



Source: Ouředníček–Špačková–Klsák, 2018

Figure 3 Zones of residential suburbanisation in Czechia 2016 – detailed view of east of Brno



Source: Ouředníček–Špačková–Klsák, 2018

population size. This is very visible in a comparison of the suburban ring between Ústí nad Labem with only a number of suburban developments and České Budějovice or Mladá Boleslav with very intensive development.

Ad (iii) A relatively high number of crosses on the map can be interpreted as a shrinkage or contraction of suburban development during the second period after the economic crisis. During the 2000s all cities and towns had their own satellite settlement, whereas now many smaller cores are surrounded only by municipalities categorised as the 4th zone. While the suburbanisation during the 2000s could be described as a spread of suburbanisation due to hierarchical and neighbourhood diffusion, spatial development during the 2010s has the reverse character, i.e. contraction or concentration of suburban development to selected municipalities located closer to regional centres. Suburban construction and migration around smaller towns have almost disappeared (Rakovník, Žatec, Kyjov, Veselí na Moravě, Uherský Brod) and the edges of the Prague and Brno hinterlands also display a considerable number of municipalities belonging to the 4th zone of residential suburbanisation (see details in Figures 2 and 3). It seems that, at least currently, suburbanisation has reached spatial limits and new housing construction will not expand to more distant settlements. However, other processes of suburban development (transformation of second housing, migration to older houses) and also counterurbanisation processes are likely to increase in the near future.

DISCUSSION AND CONCLUSION

The dataset of residential suburbs provides a basis for determining the extent of residential suburbanisation in Czechia and an analytical tool for assessing settlement structure. In addition to the size categorisation of municipalities based on the number of residents, municipalities are also divided according to their geographic position and the dynamics of their migration growth. Three zones of suburban municipalities with different intensities of housing construction and the structure of in-migration were defined. The suburbanisation zones can be seen as one of the possible types of delimitation of metropolitan areas, in addition to traditional commuting ties

(*Ouředníček et al., 2018*). Compared to commuting regions, which are mainly based on the impact of the job function, zones of residential suburbanisation represent areas of urban population spread, indirect urbanisation and the lifestyle that new suburbanites bring from the urban environment (*Doležalová–Ouředníček, 2006*).

According to this methodology, a total number of 1,182 municipalities in Czechia were identified, whose development is significantly influenced by the process of suburbanisation. In 2016 1.4 million inhabitants lived in the suburbs most affected by the suburbanisation process. Approximately, one third of them have moved from the core city, therefore 5 per cent of the total population of Czechia could be classified as suburbanites. International comparison of this value is relatively obstructed due to a lack of information on the national levels and different measurements of suburbanisation, but we could roughly compare the situation in the USA. According to the American Housing Survey, more than 52 per cent of Americans categorise their household as suburban (AHS, 2017), when distinguishing between suburbs and exurbs it is 38.5 and, 17.8 per cent respectively (56.3 per cent; *Johnson–Shifferd, 2016*). Although no similar comparison with European countries is available, the scope of residential suburbanisation in this light is relatively low in Czechia.

The descriptive statistics and cartographic analysis of residential suburbanisation during the two selected periods – 1997–2008 and 2009–2016 – show relatively significant changes in spatial patterns of suburban development. Generally, this can be explained as a shift from an extensive to an intensive form of residential suburbanisation. Although housing construction did not extend significantly to other parts of metropolitan regions, the intensities of migration and housing construction are even higher, thus creating more concentrated development closer to regional centres. Suburbs located around small towns and at the edges of larger metropolitan areas have at least temporarily halted suburban development.

This intensive residential suburbanisation described during the 2010s confirms that suburban municipalities are more and more integrated into daily urban systems of wider metropolitan regions

with intensive commuting to core cities but also dispersion of specific activities important for the complex functioning of metropolitan region, i.e. logistics, shopping, entertainment and recreational activities. Today, a typical feature is the appearance of new suburban nodes which serve as centres of regional and local commuting and create new micro-regions with a concentration of administrative functions, retail, primary and secondary education and a wide spectrum of services. This development has subsequently led to creation of new jobs, many of

them tightly connected to (induced by) the growing demand of the new suburban population. The impacts of suburbanisation on functional differentiation of the Czech metropolitan regions is beyond the scope of this article.

ACKNOWLEDGEMENTS

The paper was supported by the Czech Science Foundation, project number GA18-14510S, Contemporary changes of the social environment within Czech suburbs.

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