

Urbanization processes related to the development of residential functions in gminas adjacent to the city of Olsztyn

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Abstract. Political transformations in Poland have led to rapid suburbanization. Suburbias are beginning to develop functions and services characteristic of urban areas. The highest rate of growth is noted in residential development, in particular in the segment of single-family homes. Those developments bring about changes in demographics and social infrastructure. This study analyzes 4,000 real estate transactions conducted in 2007–2014, involving land plots zoned for residential construction, in order to determine the spatial changes that take place in the gminas adjacent to the city of Olsztyn, in view of the development of the local real estate market. The major trends relating to the number of concluded transactions, changes in real estate prices over time, the number of completed construction projects (new single-family homes) and changes in land-use structure are described. Demographic and social changes that inevitably follow from urbanization are described in the analyzed gminas. The results of this study will be used to determine whether Olsztyn's suburbias are merely “bedroom communities” or whether they constitute autonomous territorial units.

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1. Urbanization processes in areas adjacent to cities

Political transformations in Poland have led to rapid urbanization processes in areas adjacent to cities. Suburbs continue to grow dynamically and develop new functions due to the proximity of metropolitan areas. Those changes were prompted by the abandonment of a central housing policy as the result of the political transformations that had been initiated in Poland in 1989 (Brade, 2009). The rapid development of suburban areas began in the second half of the 1990s, initially in the vicinity of large metro areas, and presently, also in the proximity of medium-sized cities (Kurek et al., 2014).

Suburbanization is a process of urbanization in the outskirts of the urban hinterland, i.e. in rural areas adjacent to a city's administrative boundaries. Kajdanek (2013) and Gonda-Sroczyńska (2009) define this process as urbanization of the zones located in the urban-rural fringe, which involves the sprawl of urban functions, including changes in land-use structure, to suburban zones. Suburbanization outside city limits is also described as external suburbanization (Kurek et al., 2014), and the affected suburban zone is referred to as a settlement sub-system. The changes observed in suburban zones are more likely to be influenced by socioeconomic phenomena rather than natural conditions (Bański, Wesołowska, 2010).

Suburbanization can also be a socioeconomic concept (market suburbanization). In an approach that focuses strictly on demand and supply, suburbanization reflects changes in the decisions of market actors who explore various residential locations (Mantey, 2013) as the real estate market, in particular the residential market, continues to develop and consumers' wealth increases (Kurek et al., 2014). A similar approach was adopted by Kowalewski (2005) who identified two main determinants of the rate and magnitude of urban expansion: population growth and increased consumer spending, including on the housing market, and the desire to increase private residential space.

Urbanization processes take on various forms in rural areas: demographic, economic, spatial, social, cultural and landscape urbanization (Gonda-Sroczyńska, 2009; Małek, 2011; Staszewska,

2012; Ułańska, Borowska-Stefańska, 2012), which is why they are classified according to various spatial criteria. The most common approaches (Ewing et al., 2003; Brańka, 2004; Knaap, 2005; Bitner, 2010; Kotharkar, 2014; Laidley, 2015) are based on:

- flows, distances and spatial accessibility (e.g. migrations, traffic intensity and range, commutation to work and school, access to services),
- density and spatial concentration (e.g. residential, population, arable land, services, roads),
- spatial clustering (clusters of spatial units characterized by spatial autocorrelation),
- spatial diversity (e.g. economic functions, land use patterns, structure of land development),
- structural relationships (e.g. transport networks, technical infrastructure networks).

The spatial range of urbanization processes can be evaluated on the basis of the above criteria. The spatial range is usually determined with reference to the boundaries of territorial administrative units, i.e. Polish gminas and poviats or, less frequently, the boundaries of surveyed sections (villages).

Urbanization processes occur not only in the surroundings of metropolises (for which most studies have been conducted), but also in gminas adjacent to medium-sized cities and towns, which have not been thoroughly investigated. The objective of this study was to determine spatial changes in the suburban zone of Olsztyn, a medium-sized city, with particular emphasis on the local real estate market.

2. Spatial changes in suburban areas – residential development

From the point of view of spatial development, progressing urbanization implies that rural areas take on an urban character (Gosik, 2009), which leads to changes in land-use structure and an increase in the proportion of urbanized areas at the expense of farmland. Urbanization pressure is manifested mainly by the expansion of residential property which is built on land formerly used for agricultural purposes (Poniży, 2008). For this reason, suburbanization is defined as a phase of the urbanization process, which leads to a population decrease in downtown areas and the introduction of residential functions in suburban areas, in particular in dis-

tricts with a predominance of single-family homes (Bański, Wesołowska, 2010; Gorzelany-Plesinska, 2012; Warczewska, Przybyła, 2012). The term “residential suburbanization” has been introduced to the literature (Brade et al., 2009) to highlight the main consequence of the process, in particular in areas zoned for luxury residential construction (Gonda-Soroczyńska, 2009) where new estates constitute gated communities (Bajwoluk, 2008). The above results from intensive investment projects in the residential sector where the resulting landscape is a product of the decisions made by many individual developers (Wójcik, 2010). Suburban residential districts also feature retail and service outlets as well as industrial facilities. The physical transfer of those amenities from the urban core is the most obvious consequence of suburbanization. In the most extreme cases, it leads to the deindustrialization of urban areas and the industrialization of rural neighborhoods.

Spatial changes in suburbia, in particular residential development, are influenced by various factors, including (Bajwoluk, 2008; Domagalski et al., 2008; Bański, Wesołowska, 2010; Małek, 2011; Kurek et al., 2014): (a) benefits of a cleaner environment, proximity of nature, safer neighborhood, (b) desire to own a suburban home, (c) limited availability and higher prices of urban land plots, cost and area of land zoned for residential construction, high supply of construction land in suburbia, (d) improved availability of public utilities in rural areas, (e) improved transport infrastructure and road networks, (f) migration, functional and occupational structure of the local population, (g) local policy and management standards, applicable laws and regulations, absence of local zoning plans in rural areas, (h) growing affluence of Polish consumers, (i) trendy and prestigious character of suburban residential districts, suburban homes are indicative of high social status, (k) degradation of urban housing resources, housing shortage.

3. Demographic changes in suburban areas

Residential development in suburban areas is determined by the influx of urban residents. In Poland,

urban-rural migration is a major trend in population movement, where migrating residents continue to commute to the city for professional, educational or entertainment purposes (Kurek et al., 2014). According to Noworól (2014), suburbanization is a phase in the demographic stagnation of the urban core, whereas suburban areas are characterized by population growth. In Poland, the above hypothesis was confirmed by Szymańska and Biegańska (2011) who demonstrated that suburban areas attract mainly young people of working age who have a growing share of the overall population. Suburbanization involves the migration of more affluent members of the community, and according to research, the majority of suburban migrants are middle-class settlers, where higher income families with small children are most active (Ahas et al., 2010; Zimnicka, Czernik, 2007). Some authors observed that migration trends had been gradually reversing in recent years and that more people were leaving suburbia for the city. This change can be attributed to the following factors (Brade, 2009; Mantey, 2013; Wójcik, 2013): (a) waning ideal of a country home and the growing appeal of the urban lifestyle, (b) growing costs of living in suburban areas, (c) degradation of housing resources due to wear and decrease in real estate value, (d) population decline and significant reduction in the urban population, (e) degradation of the cultural landscape (planning chaos) and natural landscape (anthropogenic pressure) in suburban villages, which lowers the standard of living, (f) shortage of services unrelated to agriculture in suburban areas. Similar observations were made by Kotus (2006) who noted that selected social groups, in particular single people and couples without children, were increasingly likely to return to the city, mostly due to the inconvenience of commuting.

4. The analyzed site and methodology

Suburbanization processes are generally analyzed in the vicinity of large cities, and Polish researchers have studied metropolitan areas such as Warsaw, Poznań, Wrocław, Szczecin, Kraków and Łódź. It should be noted, however, that urban-rural migration is also becoming a major trend in smaller met-

ro areas and it takes on similar forms (Jelenia Góra, Opole, Lublin, Rzeszów cf. Maciejuk, 2011; Szczygielski, 2011; Ferenc, 2012; Łuków, 2015). Olsztyn is a good example of a medium-sized city with a large suburban zone whose limits are defined by the ad-

ministrative boundaries of the adjacent gminas: Stawiguda, Purda, Barczewo, Dywity, Jonkowo and Gietrzwałd (Fig. 1). The adjacent gminas are characterized by various levels of growth and different rates of development of social amenities.

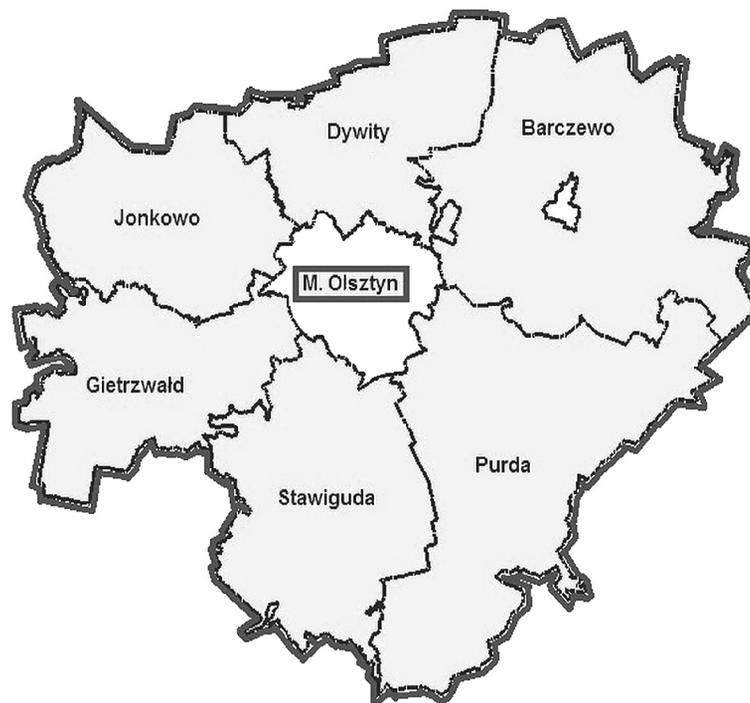


Fig. 1. Gminas in the suburban zone of the city of Olsztyn

Source: Own elaboration based on data from a geodesy website of Olsztyn powiat at <http://powiatolsztynski.geoportal2.pl>

Changes in spatial planning and the associated demographic transitions are the most frequently analyzed phenomena in rural neighborhoods situated in suburban zones of metropolitan areas. Residential development in suburban zones can serve as an indicator of the rate and scope of suburbanization (Kurek et al., 2014); therefore, this study analyzed the variability and main trends in real estate development in Olsztyn's suburbia in connection with the variability in demographics and the supply of social amenities, in particular: (a) spatial changes – area under residential use, number of real estate transactions involving construction land plots, new buildings commissioned for use (single-family homes), spatial distribution of land prices; (b) demographic changes – total population, pre-working-age and working-age population, population density, net migration rate; (c) changes

in social infrastructure in the area of culture, art, healthcare and education. The following sources of data were used: Land Inventory kept by the Voivodship Center of Geodetic Documentation and Maps in Olsztyn, Register of Real Estate Prices and Values kept by the Poviast Center of Geodetic Documentation and Maps in Olsztyn, and the Local Data Bank kept by the Central Statistical Office (GUS). The authors analyzed data for 2007–2014.

5. Demographic characteristics of Olsztyn and its suburban zone

Olsztyn's suburban zone continues to undergo demographic changes. The adjacent gminas are characterized by a steady increase in population, which

ranged from 10% to 40% in 2007–2014, whereas the city of Olsztyn shows negative population growth (Table 1). Similar trends and relative growth values are noted in population density.

Table 1. Total population of suburban gminas and the city of Olsztyn in 2007–2014

Territorial unit	Total population								Relative growth (%)
	2007	2008	2009	2010	2011	2012	2013	2014	
Barczewo	9280	9435	9599	9715	9872	10019	10093	10185	9.75
Dywity	9620	9862	10100	10399	10642	10791	11011	11097	15.35
Gietrzwałd	5450	5621	5734	5980	6066	6191	6348	6485	18.99
Jonkowo	5978	6167	6351	6653	6799	6877	7014	7090	18.60
Purda	7487	7604	7721	8118	8238	8335	8463	8507	13.62
Stawiguda	5386	5743	6116	6361	6775	7105	7398	7656	42.15
Olsztyn	175710	176142	176457	175388	175420	174641	174675	173831	-1.07

Source: Local Data Bank of the Central Statistical Office (GUS)

All of the analyzed gminas were characterized by a positive net migration rate with a minor negative trend in recent years (Fig. 2). The net migration rate in Stawiguda was significantly higher in comparison with the remaining gminas. Reverse trends

were noted in the city of Olsztyn in the analyzed period. The negative net migration rate peaked in 2010, after which the negative trend was minimized to reach positive values in 2014.

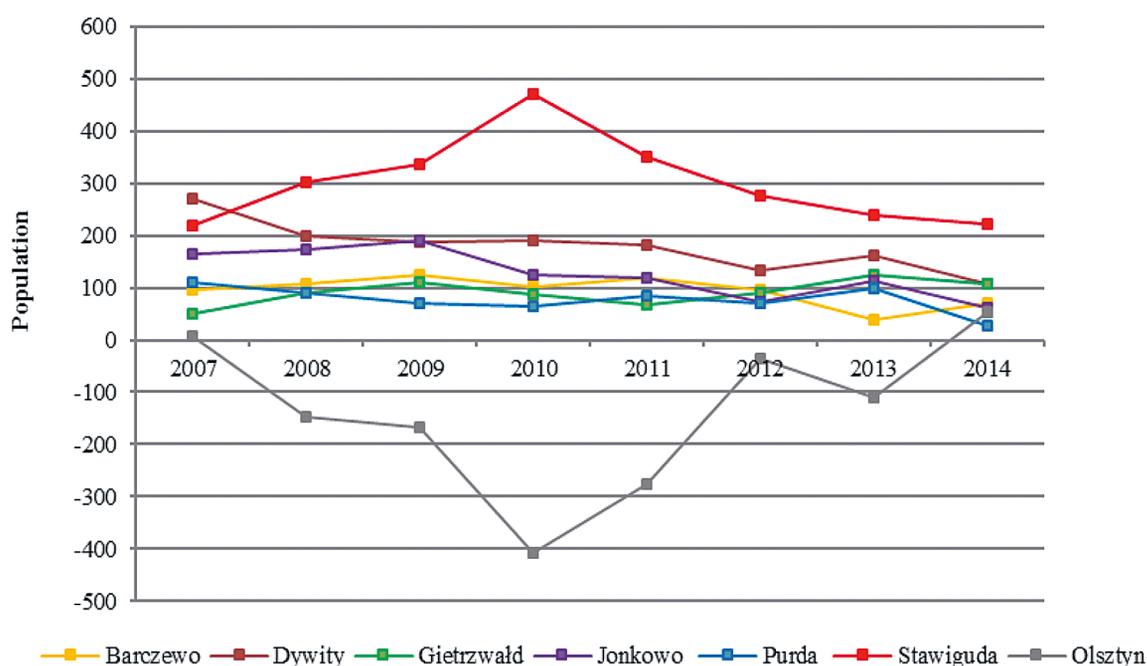


Fig. 2. Net migration rate in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Local Data Bank of the Central Statistical Office (GUS)

Changes in the pre-working-age and working-age population testify to a given area's demographic potential, and they are vital indicators of suburban development. The pre-working-age population was on the rise in Stawiguda and Dy-

wity, and it was maintained at a stable level in the remaining gminas (Fig. 3). In the analyzed period, a reverse trend was reported in Olsztyn where the pre-working-age population decreased by 1423.

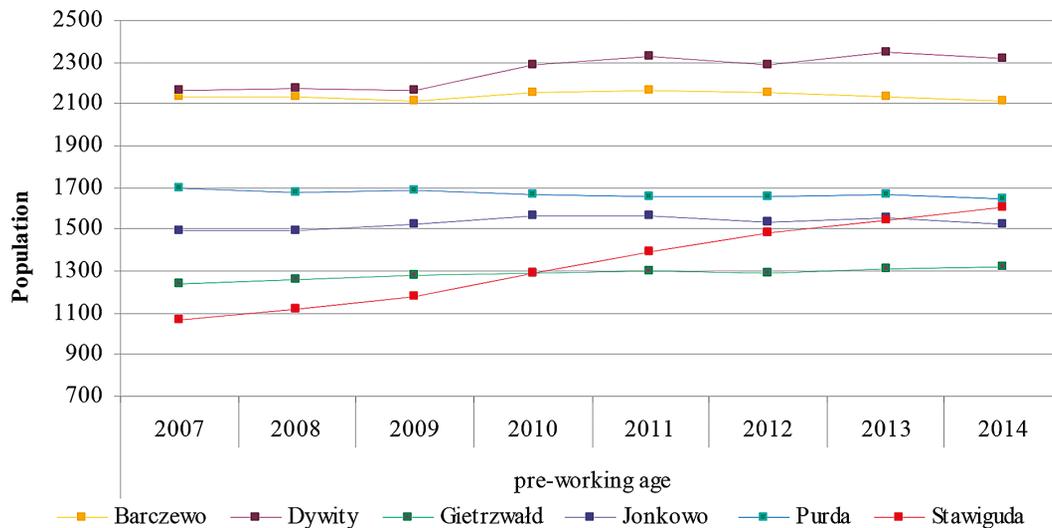


Fig. 3. Pre-working-age population in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Local Data Bank of the Central Statistical Office (GUS)

The working-age population increased in all suburban gminas (Fig. 4), but it decreased in the city of Olsztyn from 119,642 in 2007 to 111,295 in 2014.

It is also worth noting that growing income tax receipts continued to expand local budgets in all of the analyzed gminas in 2007–2014.

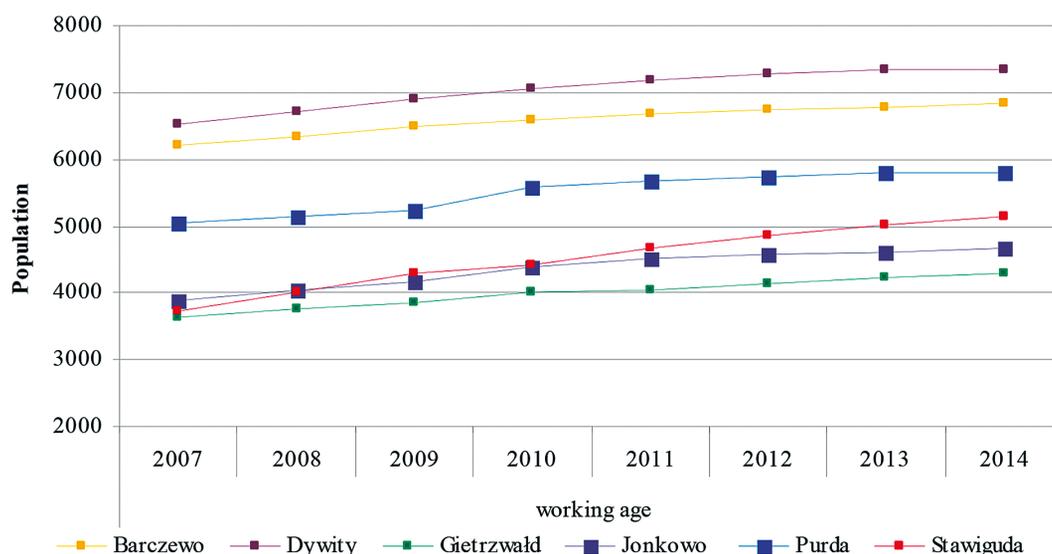


Fig. 4. Working-age population in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Local Data Bank of the Central Statistical Office (GUS)

6. Spatial transformations and changes in social infrastructure in Olsztyn's suburban zone

Changes in area under residential use are the key parameter describing spatial transformations in

Olsztyn's suburban zone. Those processes were evaluated by analyzing changes in the area occupied by residential estates. The graphs plotted in Figure 5 clearly indicate that land area under residential development increased steadily and significantly in all of the analyzed gminas.

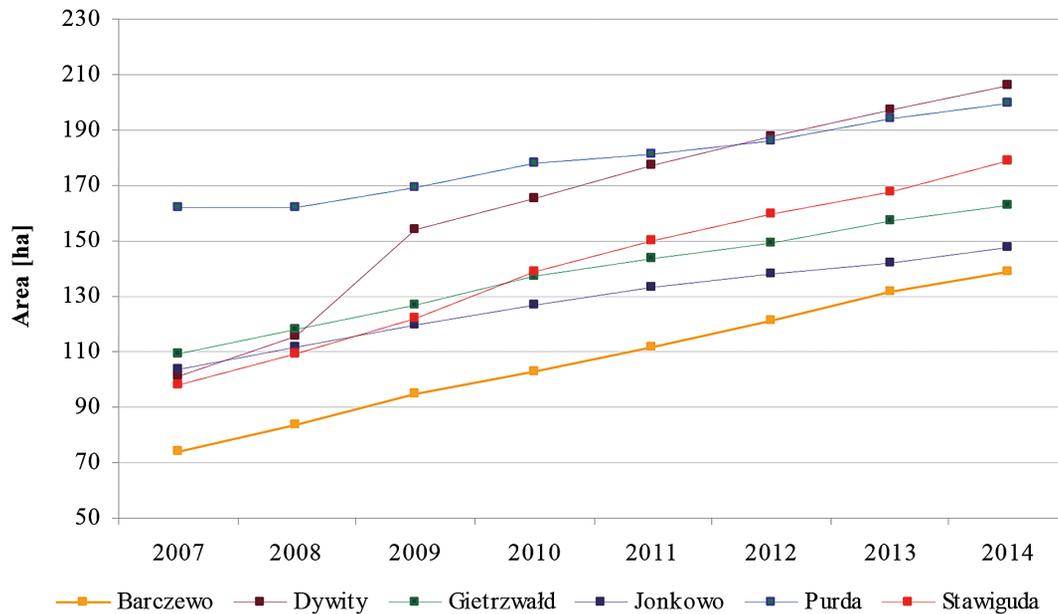


Fig. 5. Changes in land area under residential use in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Land Inventory kept by the Voivodship Center of Geodetic Documentation and Maps in Olsztyn

The above changes were reflected in the number of real estate transactions involving construction land plots (Fig. 6). More than 6,500 transactions

concluded by individuals and legal entities were analyzed.

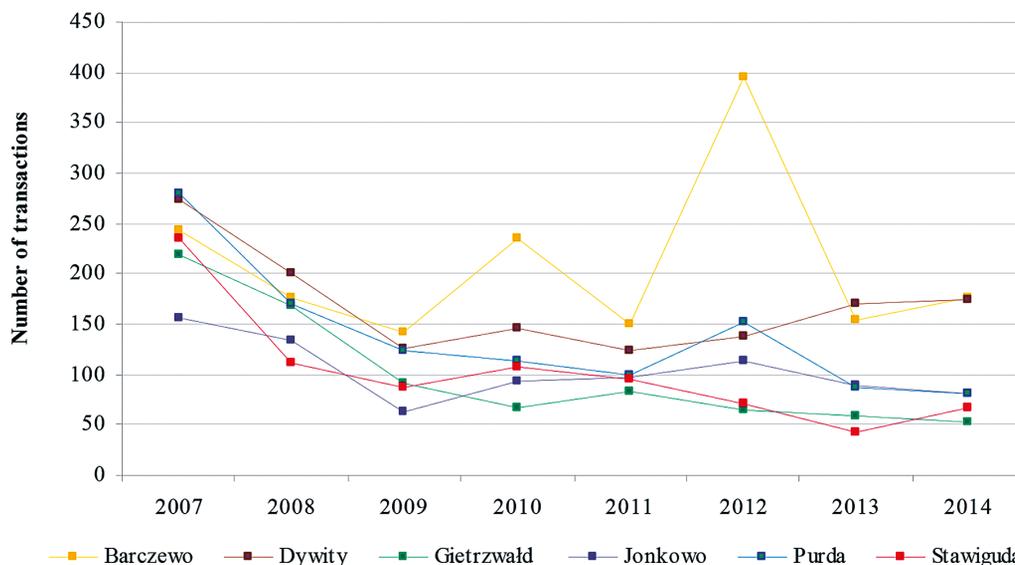


Fig. 6. Number of real estate transactions involving construction land plots in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Register of Real Estate Prices and Values kept by the Poviatic Center of Geodetic Documentation and Maps in Olsztyn

In most gminas, the number of real estate transactions stabilized after the boom of 2005–2007, but the lingering impact of the economic recession and insufficient funding for real estate projects are still felt on the property market. The number of transactions in the analyzed segment

ranges from 600 to 900 per year. The highest percentage (35%) of traded land plots were built up in Stawiguda, and the lowest – in Barczewo (12%) (Fig. 7). In the remaining gminas, residential development took place on 20% of the traded land plots on average.

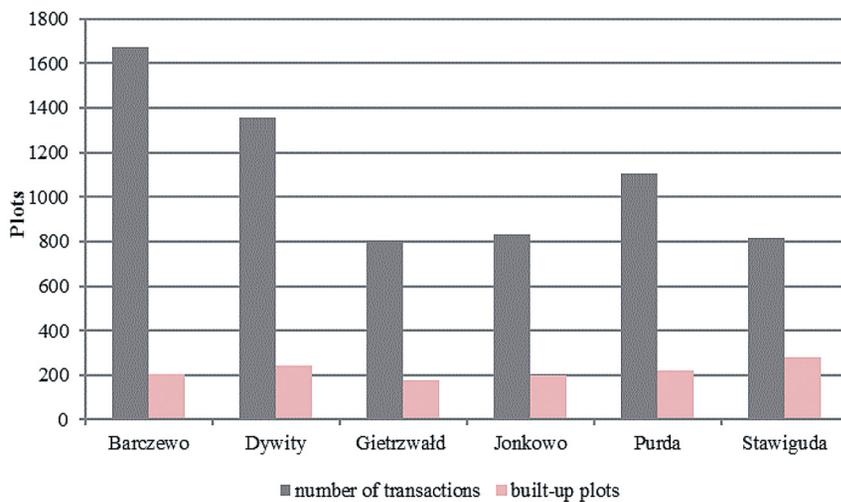


Fig. 7. Number of traded construction land plots and number of built-up plots in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Register of Real Estate Prices and Values kept by the Poviatic Center of Geodetic Documentation and Maps in Olsztyn

A minor drop was observed in the number of construction permits issued in the analyzed period, nevertheless, several dozen single-family houses

were commissioned for use in each of the analyzed gminas per year (Fig. 8). A total of around 4,300 homes were put to use in the analyzed period.

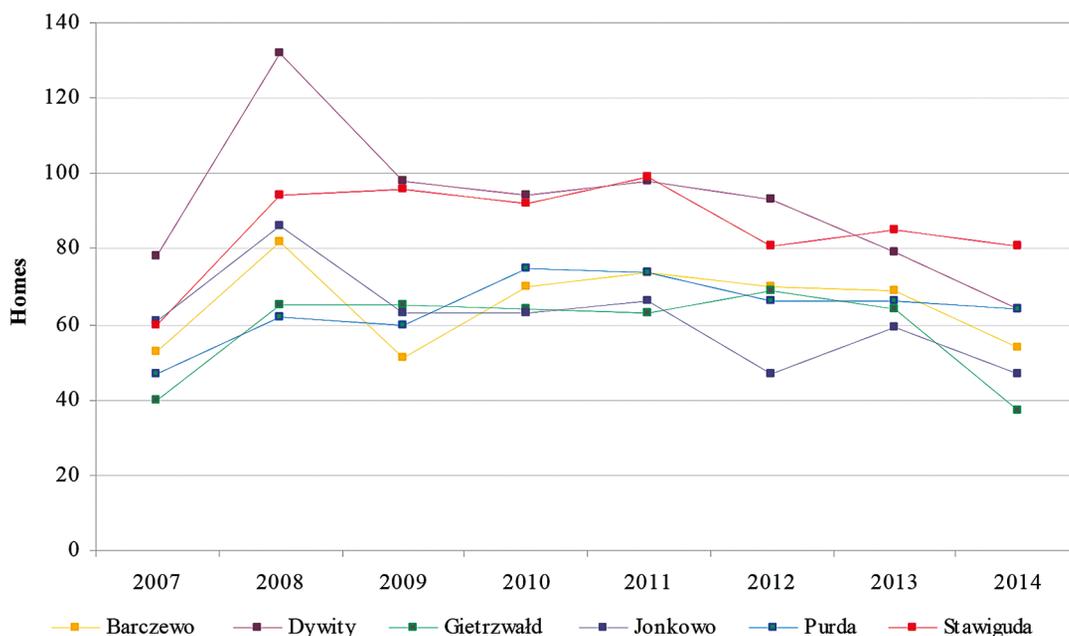


Fig. 8. Single-family homes commissioned for use in suburban gminas of the city of Olsztyn in 2007–2014

Source: Own elaboration based on the Local Data Bank of the Central Statistical Office (GUS)

In the analyzed land plots (Fig. 9), the prices per unit area of land were interpolated to identify areas with the highest rate of urbanization. Land prices are indicative of a given location's attractive-

ness, and they determine demand. A spatial analysis of land prices clearly indicates that Stawiguda was the most attractive location for potential home buyers.

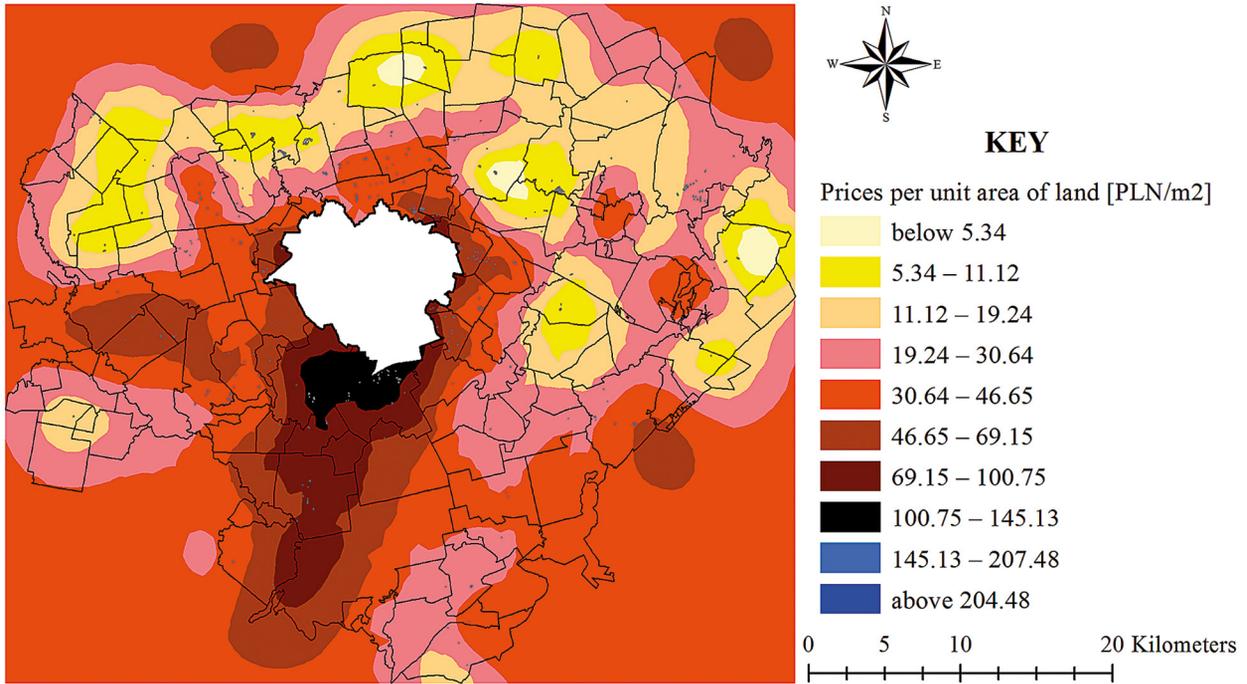


Fig. 9. Interpolation of prices per unit area of construction land in the suburban zone of the city of Olsztyn in 2014

Source: Own elaboration based on the Register of Real Estate Prices and Values kept by the Poviát Center of Geodetic Documentation and Maps in Olsztyn

The trends and directions in suburban development should account for the growing demand for basic social amenities. The availability of social infrastructure in the area of culture, art, education

and healthcare was analyzed in the suburban zone of Olsztyn (Table 2). In this respect, Stawiguda was also the leading gmina with the highest number of implemented social infrastructure projects.

Table 2. Development of social infrastructure in suburban gminas of the City of Olsztyn in 2007–2014.

Gmina	Culture and art				Healthcare			Education	
	1	2	3	4	5	6	7	8	9
Barczewo	↓↓				=		=	=	↑
Dywity	=	↑↑	↑↓	=	↑↑	↑↓	↑	=	=
Gietrzwałd	=	↑↓	↑↓	↑	↑↓	=	↑	=	=
Jonkowo	=	↑		=	↑↓	=	↑	=	=
Purda	↓↓				↑↑	↓	↑	=	=
Stawiguda	=	↑↑	↑↓	=	↑	↑	↑	=	=

Explanation: 1. Libraries and library departments, 2. Clubs and associations, 3. Music bands and performance groups, 4. Culture and community centers, 5. Outpatient clinics, 6. Pharmacies, 7. Kindergartens, 8. Primary schools, 9. Middle schools

↓ – decrease; ↓↓ – significant decrease; ↑ – increase; ↑↑ – significant increase; ↑↓ – increase followed by decrease; ↓↑ – decrease followed by increase; = – no change

Source: Own elaboration based on the Local Data Bank of the Central Statistical Office (GUS)

The highest number of social infrastructure projects were implemented in Stawiguda and Dywity which were characterized by the highest land prices and the highest demand among potential home buyers. Each year, several dozen single-family homes were commissioned for use in the above gminas, which increased the number of pre-working-age and working age residents in the analyzed period. High levels of residential development in Stawiguda and Dywity were accompanied by the introduction of social amenities and projects relating to culture, education and healthcare. The results of the analysis indicate that both gminas enjoy the status of autonomous territorial units.

7. Conclusions

The growing demand for residential property and construction land plots is consistent with the predictions formulated in the European Spatial Development Perspective Towards Balanced and Sustainable Development of the Territory of the European Union (ESDP, 1999). Those processes contribute to extensive changes in suburban zones. Suburban areas are developing rapidly in response to urban expansion and demographic pressure resulting from the movement of populations away from the urban core (Hełdak, 2010). Urban sprawl contributes to the development of new functions, in particular residential functions, in suburban areas. However, rapid suburbanization is often accompanied by a deficit of social infrastructure, public space and recreational areas.

The above observations were confirmed in the study of suburban gminas adjacent to the city of Olsztyn which are witnessing a growing number of residential development projects and the resulting increase in population, a typical phenomenon in large and medium-sized cities in Poland. The area under residential use continues to increase in all analyzed gminas, and the demand for construction land remains high, as demonstrated by the number of transactions on the real estate market. Approximately 500 single-family homes were commissioned for use in each of the analyzed years, which increased the pre-working-age and working-age population in the examined areas. Despite the noted

growth, the developments on the residential market were not accompanied by positive changes in social infrastructure. The highest number of social amenities and services were implemented in Stawiguda and Dywity. The extent of spatial and demographic changes in those gminas indicates that they are rapidly acquiring the status of autonomous territorial units. The remaining suburban gminas appear to be bedroom communities where most of the workforce commutes to Olsztyn. Uneven development is primarily determined by the availability of transport facilities, technical infrastructure and services in each gmina (trade, education, health care), and environmental conditions (forest cover, relief/landforms, surface waters). A certain role is also played by local trends.

The results of this study corroborate previous findings reported for other post-communist cities in Central and Eastern Europe such as Tallinn (Tammaru et al., 2009), České Budějovice (Kubeš, 2015), Riga (Krišjāne et al., 2012), Vilnius (Burneika, Ubarevičienė, 2011) and Brno (Sýkora, Ouředníček, 2007).

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