



Drivers, Scale, and Geography of Urban Shrinkage in Poland and Policy Responses

Emilia Jaroszevska, Ph.D.¹; and Tadeusz Strykiewicz²

Abstract: The answer to the question of why cities are shrinking and what the drivers behind this process are is not clear. However, there are common features of urban shrinkage, and each case has its origins and manifestations. In addition, different policies are counteracting the negative consequences of the shrinkage. Regeneration strategies vary a lot, depending on the way the problem is perceived by both central and local governments. The previously mentioned issues are discussed in this paper, using Poland and one of its old industrial cities, Wałbrzych, as the case study. This paper has two aims: (1) the identification and analysis of the drivers and scale of the process of urban shrinkage in Poland and its geographical distribution (in the national and local context) and (2) the analysis and assessment of different policies adopted to mitigate negative effects of urban shrinkage (including such forms as special economic zones and urban regeneration projects). This paper closes with recommendations for policymakers at national and local levels. The findings highlight that more than one-third of Polish cities have been characterized by advanced urban shrinkage since the postsocialist transformation started (i.e., since 1990), and integrated strategies that would allow them to adapt to negative demographic trends have become part of urban policies at national and local levels only in the recent years. **DOI:** [10.1061/\(ASCE\)UP.1943-5444.0000601](https://doi.org/10.1061/(ASCE)UP.1943-5444.0000601). © 2020 American Society of Civil Engineers.

Author keywords: Drivers of shrinkage; Poland; Regeneration strategies; Urban policies; Urban shrinkage; Wałbrzych.

Introduction

Urban shrinkage is a process that can take a different course in different socioeconomic patterns depending on the geographical situation and the time of observation. However, it leads to unfavorable results in each location, first of all decreasing the number of inhabitants (Oswalt and Rieniets 2006; Recken and Martinez-Fernandez 2011; Haase et al. 2014; Hospers 2012, 2014a, b; Richardson and Nam 2014; Strykiewicz et al. 2014; Wiechmann and Bontje 2015; Haase et al. 2017; Pallagst et al. 2017; Hollander 2018; Li and Mykhnenko 2018). In some regions, such as Central and Eastern Europe (CEE), the process of urban shrinkage is connected to great institutional changes. These began almost three decades ago and have significantly altered the situation of cities, diversifying them in terms of socioeconomic and demographic development. In many of them, as numerous studies show (e.g., Bontje 2004; Franz 2004; Steinführer and Haase 2007; Großmann et al. 2008; Wiechmann 2008; Wiechmann and Wolff 2013; Strykiewicz 2014; Batunova and Gunko 2018; Runge et al. 2018), the process of shrinkage is becoming one of the major challenges for cities in this part of Europe, including Poland, which belongs to the group of countries with a moderate, although growing, scale of urban shrinkage. Despite the importance of this issue for postsocialist countries, there is a research

gap in comprehensive studies focused on major drivers, scale, and spatial differences between shrinking cities and, in particular, on policies coping with the negative effects of urban shrinkage.

In contrast to Western countries, the problems in Polish cities occurred with the radical political and economic changes at the beginning of the 1990s that was called shock therapy. New determinants of development that appeared at that time and contributed to the new division of cities into winners and losers of the postsocialist transformation (Parysek and Wdowicka 2002). The start of the 1990s opened up opportunities for the dynamic development and growth of the first group of cities; for the second group it created conditions for the acceleration of urban shrinkage. This resulted from the direct outcomes of the system transformation that caused the fall of industrial plants and, therefore, an economic crisis for an entire city. Hence, the mechanism is a combination of the negative effects of the system transformation with the impact of world processes, such as deindustrialization, globalization, or changes in demographic and social behavior.

A rapid acceleration of urban shrinkage in Poland and other countries in CEE is related to the results of the second demographic transition (Lesthaeghe and van de Kaa 1986; Kurkiewicz 2010) that took place faster than in the Western countries. This process involves a unidirectional change in many types of demographic behavior around marriage and replacement rates (Okólski 2005). Its effects include a change in lifestyle, the appearance of a new model of the family and household, advanced aging of society, and a decline in birth rates, which have turned out to be one of the largest problems. Despite this fact, for many years the issues related to depopulation and its negative consequences have remained unmentionable in many Polish cities (Kantor-Pietraga et al. 2014) and, until recently, were marginalized and disregarded at both the national and local levels.

Taking the aforementioned information into account, this paper draws attention to the issue of shrinking cities in three aspects: theoretical, empirical, and practical. The paper discusses the study area, the database and methodology, and the theoretical context of urban shrinkage and policy responses. The main drivers, scale, and geography of urban shrinkage in Poland in its demographic aspects are then presented; and the policies adopted to mitigate the

¹Adam Mickiewicz Univ. in Poznań, Wieniawskiego 1, 61-712 Poznań, Poland; Faculty of Socio-Economic Geography and Spatial Management, Bogumiła Krygowskiego 10, 61-680 Poznań, Poland (corresponding author). ORCID: <https://orcid.org/0000-0001-9347-9900>. Email: emiliagp@amu.edu.pl

²Full Professor, Adam Mickiewicz Univ. in Poznań, Wieniawskiego 1, Poznań, Poland; Faculty of Socio-Economic Geography and Spatial Management, Bogumiła Krygowskiego 10, 61-680 Poznań, Poland. Email: tadek@amu.edu.pl

Note. This manuscript was submitted on October 7, 2019; approved on April 15, 2020; published online on August 14, 2020. Discussion period open until January 14, 2021; separate discussions must be submitted for individual papers. This paper is part of the *Journal of Urban Planning and Development*, © ASCE, ISSN 0733-9488.

negative effects of urban shrinkage with the focus on an old industrial city, Wałbrzych, are discussed. Finally, challenges for the future and some policy recommendations are formulated.

Study Area

The analysis of urban shrinkage is carried out at two spatial levels: national (Poland), and local (an old mining city, Wałbrzych). Located in East Central Europe, Poland is an example of a country where the process of shrinkage rapidly accelerated from the beginning of the postsocialist transformation in the 1990s. The specificity of urban shrinkage in Poland is manifested by the pace of this process (which is much faster compared with Western cities) and when it started. Whereas many Western cities began to shrink in the 1960s and 1970s, Polish cities went through this process much later, at the end of the twentieth century.

In 2018, Poland had a population of 38.4 million, of which 60% lived in cities. The country's urban structure is strongly diversified.

As well as some quickly developed metropolitan areas (such as Warsaw, Cracow, Poznań, Wrocław, and Tricity), there are large areas with a concentration of shrinking cities. One of the aims of this paper is to identify the scale and spatial distribution of such cities.

Among the cities with the most visible shrinking process are those where the population grew during the socialist period and were the centers of heavy industries. This group includes the city of Wałbrzych which is the subject of the case study presented in this paper.

The choice of this city is justified for several reasons. First, Wałbrzych is a city with one of the highest population losses among the Polish cities with > 100,000 inhabitants and with permanent shrinkage observed since the 1990s.

Wałbrzych is a former mining city situated in southwestern Poland in the Lower Silesian voivodeship, close to the borders with the Czech Republic and Germany (Fig. 1). After Wrocław, the voivodeship's capital, it ranks as the region's second center with 112,594 residents (December 31, 2018).



Fig. 1. Location of Wałbrzych in Poland.

By the mid-nineteenth century, Wałbrzych had grown into an important industrial center. The chief industries of the city and the entire region were mining for hard coal and coke making. Immediately after the Second World War, it was the biggest industrial center in the region. Apart from mining, there were other industrial establishments, mostly coking plants, clothing, and textile factories, as well as glass and ceramics works. The transformation period of the Polish economy that was initiated in 1990 was a time of very deep changes in the economic structure of the city and the entire region. At the same time, three state-owned coal mines located in Wałbrzych faced the Polish government's decision for their closure. This caused a rapid increase in unemployment, higher than the country's average. Never before had liquidation steps been taken at such a scale in Poland; Wałbrzych served as a type of testing ground. According to official statistics, the record year in which the highest proportion of unemployment was noted in Wałbrzych was 2002 with an unemployment rate of 28.1%. However, as Rakowski stated (2009), real unemployment could have reached 50% between 2002 and 2006. The situation was additionally aggravated by the fact that the city was inhabited by low-skilled people who either had elementary education or had finished vocational mining schools. Finding a different job became a significant problem. In addition, among the unemployed in 2002 (the year with the highest unemployment in the city) 74% were young people in the age range of 18–34 years. No prospect of finding a job was the main reason that young people left the city.

Although the situation in the city has improved in many aspects in recent years (creation of new jobs, the decline in unemployment, revitalization of run down areas, and housing investments), the population loss has continued since the 1990s. In the years 1990–2015, the population decreased by 18.12%, which made Wałbrzych one of the cities shrinking the most in the country. According to the demographic forecast of Statistics Poland (Central Statistical Office 2014), the city will have < 100,000 inhabitants (99,187) in 2030, thereby, reaching the population level of 1950–1951. In turn, by 2050, the predicted population will be 74,463, which means that if the forecasts are accurate, Wałbrzych will shrink by approximately half (47%) compared with the population peak year 1989 when it had 141,504 inhabitants.

Database and Methodology

This paper aims to find answers to the questions of why certain Polish cities have lost the greatest number of their inhabitants and what kinds of policies were adopted to mitigate the negative effects of urban shrinkage.

To answer the first question, the changes in the population of 829 cities that existed in 1990 were studied, excluding municipal units created after this time. The temporal scope of the analysis covers the years 1990–2015. Overall, 25 years seems a long enough period to capture the picture of the population changes that have occurred in Polish cities since the beginning of the transformation. The research drew on published and unpublished materials from Statistics Poland. To present demographic phenomena determining the shrinking process, use was made of a statistical indicator of dynamics in the form of the annual average rate of changes in the population number within the period of 25 years, which allowed the distinguishing of particular types based on the methodology adopted in the Cities Regrowing Smaller—Fostering Knowledge on Regeneration Strategies in Shrinking Cities across Europe (CIRES) project implemented under the European Union's Cooperation in Science and Technology Actions 2009–2013 (e.g., Wiechmann and Wolff 2013; Wolff and Wiechmann 2018).

The research procedure was composed of two phases. First, the annual population change for 25 years was analyzed, which allowed the separation of the following types of cities: growing, stable, and shrinking. The second stage of our research procedure involved the analysis of the average annual rate of changes in the population number in the five subsequent 5-year subperiods (1990–1995, 1995–2000, 2000–2005, 2005–2010, and 2010–2015). This procedure allowed the designation of the following types of cities: permanently shrinking, temporarily shrinking, and episodically shrinking.

Then, to answer the second question about the policies adopted to mitigate the negative effects of urban shrinkage, a desk research method was applied. It consisted of the analysis of national documents and reports from the Ministry of Development, in particular, and on the comprehensive analysis of the reaction of local authorities to shrinkage as well as adopted strategies to mitigate its negative effects on the selected case study, Wałbrzych. Therefore, documents from the City Office in Wałbrzych, the Labour Office in Wałbrzych, and the Wałbrzych Special Economic Zone (WSEZ) were used.

Theoretical Background of Urban Shrinkage and Policy Responses

Urban shrinkage has no single explanatory theory. The multiaspect nature of this process made it necessary to resort to many theoretical concepts to gain insight into its mechanisms, pattern, and effects (Strykiewicz et al. 2014). To date, the diverse aspects of the urban shrinkage have been investigated, for example, the identification of the reasons for the population decline, the description of development trajectory, or analysis of planning solutions to mitigate its negative effects. However, there has been no comprehensive approach to understand the shrinkage of cities. This gap was addressed by Haase et al. (2014), who developed a heuristic model of urban shrinkage, irrespective of its national or local specificity. In addition, the term *shrinking city*, although it has been established in the literature, has not been clearly defined. This was confirmed by the variety of definitions related to this issue and different approaches to their operationalization (e.g., Haase et al. 2014; Strykiewicz et al. 2014; Bernt 2016; Strykiewicz and Jaroszewska 2016; Haase et al. 2017).

The research carried out to date (e.g., Oswalt 2005; Turok and Mykhnenko 2007; Haase et al. 2008, 2013; Pallagst et al. 2009; Wiechmann and Wolff 2013; Wolff and Wiechmann 2018) allowed the development of three main fields of argument related to this definition:

1. Does the notion of a shrinking city involve exclusively its depopulation (i.e., a drop in the population number), or must there be other indicators (i.e., a structural crisis in the economy combined with a high unemployment rate, degradation of the housing stock, a great accumulation of social problems)?
2. Does a drop in the population number within a city's administrative limits owing to its growth in the suburban area (hence the process of suburbanization) justify describing this city as shrinking?
3. How long must the period of a population decline last to justify the talk of a shrinking city?

Based on the previous questions, it seems that the notion of a shrinking city is gradable, as shown in Fig. 2. Each type of shrinkage demands different forms of governance.

According to the definition adopted in the CIRES project formulated by the Shrinking Cities International Research Network (SCIRN), "a shrinking city is a densely populated urban area that has on the one hand faced a population loss in large parts of it (for at least 5 years, more than 0.15% annually), and is, on the other hand, undergoing economic transformation with some

Time perspective Character/ indicators/area of shrinkage	constant/permanent/continuous		fluctuating/periodical/ episodic
	long-term (e.g. 10 years and more)	short-term (e.g. less than 10 years)	
population loss + socio-economic decline (city + city region)	permanent, long-term multidimensional shrinkage		
population loss (city + city region)	serious symptoms of shrinkage		
population loss (city only → effect of suburbanization)		selected evidence of shrinkage	

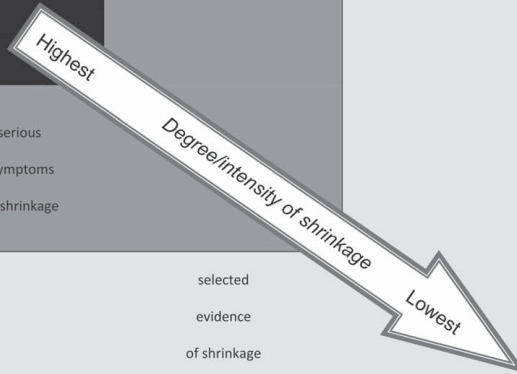


Fig. 2. Typology of shrinking cities (graduation) of shrinkage. (Reprinted from Strykiewicz 2013 with the consent of the editors of the *Romanian Journal of Regional Science*.)

symptoms of a structural crisis.” This is the definition that is used in this paper.

The chief drivers of urban shrinkage are demographic changes connected primarily to a negative rate of natural increase, the aging of society, and migration. The questions still to be answered are the identification and classification of the remaining factors responsible for urban shrinkage, and the choice of socioeconomic indices characterizing this process (Jessen 2012; Wiechmann and Wolff 2013; Haase et al. 2017). The difficulty lies in the uniqueness of each city, its history, political situation, and socioeconomic condition. According to Wu and Martinez-Fernandez (2009), the same factors that underlie the socioeconomic development of one city might trigger shrinkage in another.

The answer to the question about the proper policy responses for a shrinking city is undetermined. The experience of cities affected by shrinkage shows that there is no simple method to counteract the negative consequences of this process. Based on the results of the Shrink Smart project, Bernt et al. (2012) and Haase (2013) list various kinds of factors determining the nature of a policy adopted toward shrinking cities. They include:

1. the existing governance systems and cultures;
2. political traditions;
3. the way of formulating and addressing problem issues;
4. the nature of multilevel arrangements and relationships;
5. the mode of governance; and
6. the availability and origin of resources.

Strategies intended to respond to the process of shrinkage can be classified in a variety of ways. (Danielzyk et al. 2002; Wiechmann 2008; Hollander and Németh 2011; Hospers 2012, 2014a, b; Pallagst et al. 2017). According to Hospers (2012, 2014a, b) and Wiechmann (2008), the adopted measures depend to a large extent on how the process is perceived by local authorities. The CIRES project distinguishes four stages of their reaction to the process of shrinkage including:

1. ignoring the demographic changes;
2. attempting to reverse unfavorable changes by stimulating economic growth;
3. adapting to the conditions of shrinkage; and
4. reinventing the city.

Depending on which stage dominates, the adopted strategies can be divided (according to Danielzyk et al. 2002) into passive strategies and active strategies. Passive strategies involve no action. After some time, such a passive attitude results in the activation of the vicious circle of shrinkage. This approach is characterized by the absence of specific goals on the part of local authorities and the expectation of financial support and external intervention (e.g., from central and regional authorities). In practice, this approach means, as Hospers (2012) highlighted, disregard for the urban shrinkage process.

Active strategies, however, can have three characteristics. These are:

1. expansive strategies intended to retain and even to increase the population within cities;
2. maintenance strategies, aimed at preserving the attractiveness of existing urban structures, development of present forms of land use and functions; those are usually programs oriented toward selected target groups; and
3. planning for shrinkage, meaning an organized shrinkage (with the main focus on qualitative development, adaptation, and reduction of existing infrastructure and development of recreational areas).

In the case of shrinking cities, strategies for renewed growth are usually doomed to failure. The unfavorable processes, especially demographic ones related, for example, to aging, preclude their renewed growth in quantitative terms. Strategies ignoring the process of shrinkage and those attempting to reverse unfavorable changes and stimulate recovery represent a traditional approach to the challenges of urban shrinkage. Therefore, what is postulated in the source literature is a new way that consists of the liberation from the “obsessed paradigm of continuous growth” in the urban policy and taking action for planning in the conditions of shrinkage (Hollander et al. 2009) (Fig. 3).

Challenges facing shrinking cities require the cooperation of many local actors and residents, and they need external support, including assistance from EU institutions, government and regional authorities, scientific communities, entrepreneurs, and nongovernmental organizations. Therefore, strategies for mitigating the negative effects of shrinkage can be divided into two types (Strykiewicz 2013; Strykiewicz and Jaroszewska 2014):

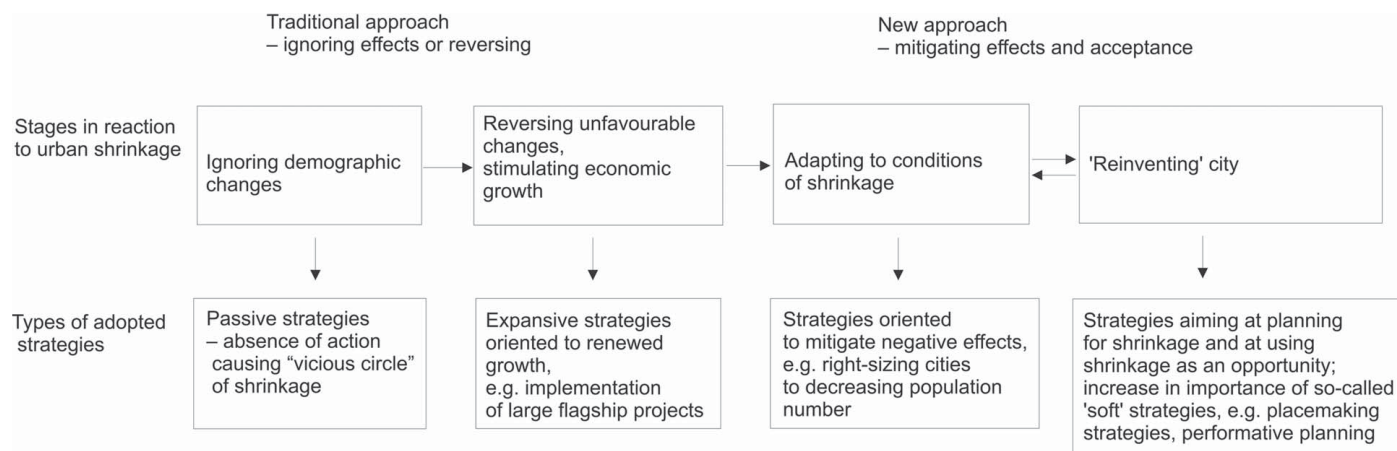


Fig. 3. Stages in the reaction of local authorities to urban shrinkage and adopted strategies for mitigating its negative effects. (Data from Danielzyk et al. 2002; Wichmann 2008; Hospers 2012; Hospers 2014a, b.)

1. on-site strategies (i.e., implemented in the area of a specific shrinking city); and
2. networking strategies.

The former type primarily embraces measures intended to stimulate local entrepreneurship, reduce unemployment, and revitalize downtown or postindustrial areas. The latter involves creating conditions for the intensification of relations with other more advanced cities, for example, by improving the quality of transport infrastructure and increasing the frequency of links (which can facilitate commuting to work and school, therefore counteracting the outflow of the labor force).

Schlappa and Neill (2013) indicated the acceptance of shrinkage is key to the success of the strategy. Only after fulfilling this condition can short- and long-term objectives be implemented. In addition, as they emphasized, regeneration is a process of learning again which, can take place in a crisis and under constraints of taking action, or under the conditions of uncertainty related to the chances of its success. Although copying strategies is not recommended owing to an individual specificity for each city, certain solutions applied to some shrinking cities can inspire other cities facing similar problems.

One of the concepts of mitigating the negative effects of shrinkage is the so-called right sizing of cities. As Schilling and Logan (2008) and Hummel (2015) discussed, this consists of the adaptation of cities to a smaller number of residents and embraces mainly activities in built-up areas. Adaptation involves, for example, rehabilitation of degraded areas, demolition, and consolidation of liberated places, and their greening and transformation into new urban greenery. As a result of these activities, degraded areas perceived recently as symbols of crisis and problematic areas can become new spaces for social innovations. In particular, this concerns initiatives connected with urban agriculture which often spring from bottom-up activities of local communities creating so-called community gardens or urban farming. Therefore, many researchers perceive new possibilities coming with the liberation of land as an opportunity to regain and revitalize degraded neighborhoods and integrate inhabitants. Increasing free areas creates conditions for shaping a new model of urban development. The formation of a perforated city can serve as an example of this, where the existing buildings blend in with the greenery that appeared after demolition (Jessen 2012).

In the literature, many researchers pay attention to the importance of strategies that use soft planning tools based on cultural projects and the development of creative activities. Altrock and

Huning (2014) emphasized that what is helpful in the formation of the vision of the development of a shrinking city is a performative planning approach. It consists of the cultural intervention in the public spaces, which causes changes in the awareness of residents and their attitude to the process of shrinkage through installations or artistic events.

Urban Shrinkage in Poland in Its Demographic Dimension

For almost three decades Polish cities have been subject to many changes regarding, for example, material, functional, and social aspects. The pace and direction of these changes have been influenced by processes connected to political transformation, progressing globalization and the internationalization of the economy, Poland's accession to the EU, and new possibilities of financial support. In some cities, particularly, old industrial ones and those small and medium-sized cities situated at the peripheries, the changes contributed to the activation of negative processes leading to urban shrinkage in the long-term.

Among the key drivers that have influenced the shrinkage of cities in Poland, we can distinguish:

- demographic change (decline in the birth rate, aging of population);
- massive outmigration (intensified especially after the EU enlargement);
- transformation of the settlement system (metropolization, suburbanization); and
- transformation of the economy (in particular its deindustrialization).

Because changes in the population number are the most important indicator on which the assessment of the scale of this process can be based, the following sections of this paper show the demographic aspect of urban shrinkage in Poland.

Forecasts on Poland's demographic future up to 2050 are alarming. According to Statistics Poland (Central Statistical Office 2014), the country's population will gradually decrease. In 2050, the population of Poland will reach 33,951 million people (38,411 million in 2018), and the rate of this decline will increase with time.

Considering the division into urban and rural areas, important differences in demographic processes are visible (Fig. 4). Most of the projected population decline by 2050 will be in the urban

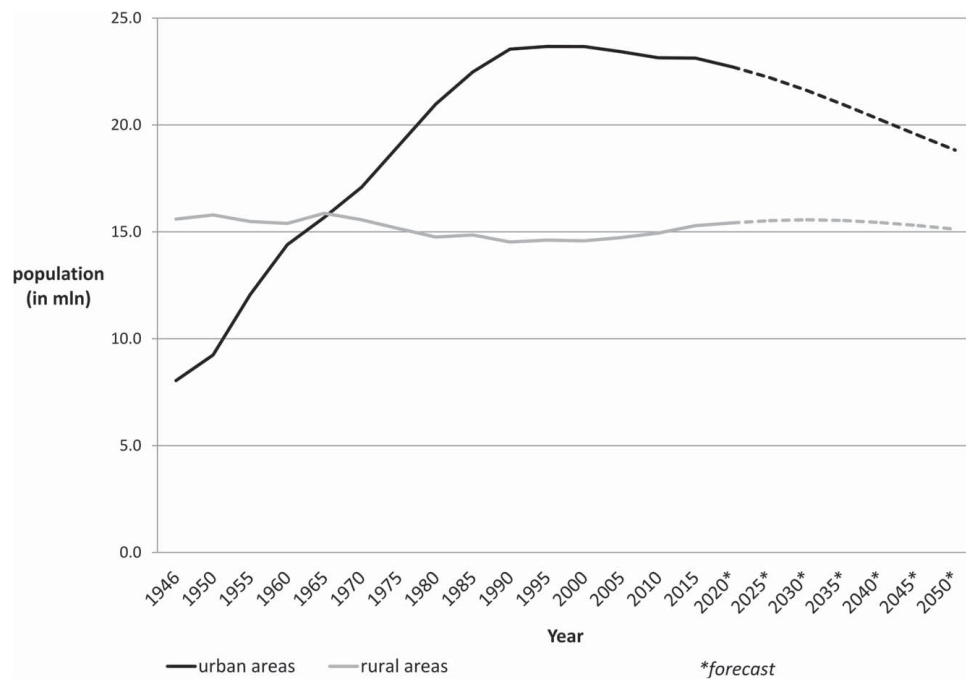


Fig. 4. Change of urban and rural population in Poland 1946–2050. (Data from [Statistics Poland n.d.](#))

Table 1. Demographic drivers of urban shrinkage in Wałbrzych, urban areas, and Poland, 2010–2018

Year	Natural increase/decrease per 1,000			Migration balance per 1,000			Aging index (percentage of pop. 65+)		
	Wałbrzych	Urban areas	Poland	Wałbrzych	Urban areas	Poland	Wałbrzych	Urban areas	Poland
2010	−4.5	0.6	0.9	−5.17	−2.05	−0.05	15.8	13.9	13.5
2015	−6.7	−1.1	−0.7	−2.75	N/A	N/A	18.6	17.0	15.8
2018	−6.8	−1.2	−0.7	−2.86	−1.13	0.09	21.2	19.2	17.5

Source: Data from Statistics Poland ([n.d.](#)).

population (and, in particular, people residing within the administrative boundaries of cities). Between 2015 and 2020, the annual decline in the number of people living in urban areas will increase from 69,000 to 88,000. After 2020, the population reduction will continue to increase, reaching > 100,000/year and after 2035, on average approximately 140,000/year. Therefore, in 2050, city dwellers will make up 80% of the 2015 population. With the decrease in the number of urban residents, unfavorable changes in the structure of the population will intensify (Table 1) and, therefore, the aging population and the decline in the number of women of childbearing age will increase.

The analysis of the annual population change for 25 years revealed that among the 829 cities, the following can be distinguished:

- a total of 257 growing cities characterized by > 0.15% of an annual increase in the population number over 25 years;
- a total of 265 stable cities characterized by an annual change in the population number from −0.15% to 0.15% over 25 years,
- a total of 307 shrinking cities characterized by > 0.15% of an annual decline over 25 years.

In comparison, in 2010, the number of shrinking cities was 245.

Considering the size of cities, it should be noted that statistically, the process of shrinking mainly affects cities of > 50,000 inhabitants (Table 2). The shrinkage of the largest cities (> 200,000) is, however, the effect of the suburbanization process taking place in metropolitan centers and can be caused by the fact that the previously mentioned group includes old industrial cities (e.g., Łódź and the cities of the Katowice conurbation), from which

Table 2. Shrinking, stable and growing cities in Poland by size groups in 2015

Size group (number of inhabitants)	Total number of cities	Shrinking cities		Stable cities		Growing cities	
		Number	%	Number	%	Number	%
< 5,000	255	89	34.90	75	29.41	91	35.69
5,000–9,999	172	57	33.14	57	33.14	58	33.72
10,000–19,999	183	66	36.07	62	33.88	55	30.05
20,000–49,999	130	48	36.92	45	34.62	37	28.46
50,000–99,999	49	27	55.10	11	22.45	11	22.45
100,000–199,999	24	13	54.17	8	33.33	3	12.50
≥ 200,000	16	7	43.75	7	43.75	2	12.50

Source: Data from Statistics Poland ([n.d.](#)).

there has been an outflow of people for many years, with a greater loss of inhabitants than in other cities ([Zborowski et al. 2012](#)).

For economically strong metropolitan centers that lost residents within their administrative boundaries, mainly to the benefit of the neighboring units functionally connected with a city (e.g., Poznań), it cannot be said that this is typical shrinkage. Although the suburbanization process causes a series of problems, the situation of the largest centers regarding their population number is, in many cases, slightly more favorable than indicated by the data. It is noted that these cities are home to a substantial number of unregistered internal immigrants, including students and university graduates, who constitute a significant group not mentioned in the statistics.

The importance of adopting appropriate measures and strategies to mitigate the negative effects of urban shrinkage is reinforced by the fact that in cities recognized as shrinking in 2015, there were

slightly over 9 million people in total, which makes up as much as 38.8% of the entire population of Poland.

The results of the second stage of our research procedure involved the analysis of the average annual rate of changes in the population number in the subsequent five 5-year subperiods (1990–1995, 1995–2000, 2000–2005, 2005–2010, and 2010–2015) allowing us to distinguish the following types among 829 cities:

- 28 permanently shrinking cities, for example, in all the 5-year subperiods a decline in the population was -0.15% and more;
- 279 temporarily shrinking cities, for example, those whose population in the analyzed 25 years decreased ($> 0.15\%$) and at least one 5-year period of stability was recorded (from -0.15% to $+0.15\%$) or their population even increased ($> 0.15\%$);
- 395 episodically shrinking cities where the total population number did not fall from 1990 to 2015 (by $> 0.15\%$ per year), but at least one 5-year period of a decline in the population took place.

As shown in Fig. 5, urban shrinkage does not affect the whole country equally. What was noticed were large regional disproportions. The presented map shows that the southwestern area of Poland stands out against other regions in terms of the intensification of the number of shrinking cities. The large scale of this process is connected with their specific economy to a great extent, for example, the location of industrial plants that fell or went through a serious

crisis after 1990, which resulted in higher unemployment rates than in other regions and, therefore, population outflows.

In the group of 28 cities in which the process of shrinking was permanent, the old industrial centers of Katowice, Sosnowiec, Bytom, Zabrze, Ruda Śląska, Chorzów, Łódź, and Wałbrzych could be found. They are characterized by both large absolute and relative losses of inhabitants. The shrinkage process causes a series of unfavorable social, economic, spatial, and image related phenomena which, when left without intervention, lead to the intensification of future development problems.

The analysis of Polish cities from 1990 to 2015, taking into account negative demographic trends, means it can be stated that the process of shrinkage has, and will have in the future, a significant impact on their development and is one of the most important challenges that should be included in the state's and local level policies.

Policies Adopted to Mitigate Negative Effects of Urban Shrinkage in Poland

National Level

The awareness of the process of urban shrinkage and its consequences in Poland is still low, comprehensive regeneration



Fig. 5. Permanently, temporarily, and episodically shrinking cities in demographic terms 1990–2015. (Data from [Statistics Poland n.d.](#))

strategies that would integrate the hardware (housing, infrastructure), software (image, governance), and human resources (social and economic structures) types of intervention are lacking. However, in recent years it has been observed that the discussion about challenges posed by urban shrinkage have slowly become part of public debate ([Kancelaria Senatu RP 2013](#)).

Markowski (2013) emphasized, “policy on shrinking cities must be closely related to the determinants and development of the whole settlement system.” Therefore, in agreement with Parysek (2010), a key role in a broadly understood urban policy, including shrinking cities, is played by the state’s urban policy, which requires legal regulations on the part of central authorities. In Poland, however, the national urban policy reflected in a separate document specifying the most important objectives of and directions in the development of cities was adopted as recently as 2015. It states, “observed demographic changes pose particularly important challenges for cities The first is the decreasing population in cities—in extreme cases in the form of depopulation and shrinking cities” ([Ministerstwo Infrastruktury i Rozwoju 2015](#)). In addition, the document points to the need for support for the implementation of the National Urban Policy. One of the solutions is creating knowledge centers that would be aimed at initiating and conducting pilot projects promoting and disseminating the so-called good practices, model documents, or schemes of the procedure. One of the included projects is: Mitigating negative effects of urban shrinkage. It serves to prepare a comprehensive, multisectoral program/strategy of measures necessary to counteract the negative effects of urban shrinkage for the optimization of functioning of public services and urban infrastructure by:

- adapting planned investments to demographic projections;
- building infrastructure in a modular way, which makes it possible to resign from certain modules when the population number falls, or expand when the population grows;
- creating facilities so that the purpose of their functioning could be changed;
- social actions for seniors; and
- measures for increasing the attractiveness of cities as places of residence.

Although the document contains an accurate diagnosis of the most important issues and challenges for Polish cities and a series of recommendations connected to challenges of urban development, they often remain on paper. Many unfavorable decisions are still being made, both at national and local levels. This can be illustrated by the overestimation of needs for land for housing development in many Polish communes [in the country’s territorial division, the basic lowest level unit is the commune (gmina) among a total of 2,477 communes; in 2019, there were 302 urban communes (all urban communes have the status of a city), 638 urban-rural communes, and 1,537 rural communes], where new areas are designated in planning documents for development, regardless of the demographic, economic, and ecologic rationale. Therefore, they are condemning themselves to the possibility of losing control over land development, which in shrinking cities, leads to the urban sprawl in the conditions of the declining population number. This process is accompanied by the movement of more affluent residents into suburban zones, which is conducive to the growth of sociospatial segregation, an increase in the costs of infrastructure maintenance, and a decrease in the city’s income.

Therefore, one of the basic conditions for carrying out an effective urban policy and working out appropriate regeneration strategies in shrinking cities is an awareness and knowledge of the processes taking place, in particular, among local decision makers. As shown by the examples of shrinking cities in some Western countries, the adopted strategies often depend on how the process

of shrinkage is perceived by local authorities and if they reconcile themselves to the fact that the population number will diminish. Although, as previously mentioned, the awareness of the process of urban shrinkage among local politicians appears to be low, it is slowly beginning to change. An example is Wałbrzych, which is presented in the following sections.

Local Level: The Case of an Old Industrial City, Wałbrzych

The development paths of the strategies adopted in Wałbrzych can be described as follows: from mitigating the negative effects of the shrinkage to its adaptation.

One of the most urgent strategies in the city following the closure of the mining industry at the beginning of the 1990s was the improvement of the local labor market. Steps to address the issue started the same year the last mine closed. The problems of the city needed support from the local authorities and the government. The majority of assistance programs focused on Wałbrzych were intended to reduce unemployment by stimulating entrepreneurship ([Urząd Miejski w Wałbrzychu 2005](#)).

The most important step taken was the creation of INVEST-PARK, or the WSEZ in 1997 (3 years after the Polish parliament passed the Special Economic Zones Act). The creation of selected areas designated to run business activity on favorable terms (e.g., tax exemptions) aimed to reduce unemployment in areas especially affected by the shock of transformation. Unfortunately, an increase in new jobs in the WSEZ occurred slowly in relation to the number of unemployed (Table 3).

Despite high unemployment, the WSEZ investors faced many problems, particularly in the initial period, with finding highly skilled workers (e.g., managers with technical education and managerial staff) and those with lower qualifications. This was mostly due to the monofunctional character of the region, which for years had been oriented toward mining. In addition, schools were geared to educating people working in this sector of the economy. When the situation in the labor market changed, many retraining programs were organized to prepare people for different occupations.

The largest group of investors in the zone are from the automotive industry manufacturing car subassemblies, including Japan’s Toyota. Unfortunately, this concentration of firms from a single industry poses a threat illustrated by the latest world crisis when the first WSEZ investor, Takata Petri, decided in 2009 to liquidate its Wałbrzych plant and move production to a special zone in Romania, where the labor cost was lower.

After more than 20 years, there is no doubt that the inflow of investment into the Wałbrzych zone has substantially improved the situation in the local labor market. It leads various ranking lists as the best performing zone in the country. Today 7,000 people work in its Wałbrzych city section and many residents have found jobs in local firms providing all kinds of services or subcontracted to the businesses located there (unfortunately, this indirect effect is hard to measure in figures).

Table 3. Number of unemployed registered with the Labour Office and the number of employed in the WSEZ, 2000–2014

Employment status	2000	2002	2004	2006	2010	2014
Registered unemployed	11,371	15,518	13,939	10,451	7,079	5,816
Employed in WSEZ	1,470	3,146	5,676	6,835	8,300	6,825

Source: Data courtesy of Poviast Labour Office in Wałbrzych; Wałbrzych Special Economic Zone (WSEZ).

New opportunities in the form of access to EU funds opened for Wałbrzych after Poland joined the community. To date, the city has absorbed resources for the implementation of many projects, mainly infrastructural and cultural, including joint transborder projects with the neighboring towns in the Czech Republic. Due to support from EU funds (Sectoral Operational Programme 2004–2006, Regional Operational Programme for Lower Silesian Voivodeship 2007–2013), the Wałbrzych authorities were able to proceed with most of the planned urban regeneration projects (which included the revitalization of the degraded areas). In 2004, the Local Programme for the Revitalisation of Wałbrzych City 2004–2006 was passed, followed in 2008 by the next program covering 2008–2015. It gives priority to the revitalization of downtown and postpones the reclamation of the former coal mining areas to later years. The first projects involved the renovation of historic tenement houses and the modernization of public spaces.

One of the most important revitalization challenges turned out to be the old coal mine Julia, which is one of the largest complexes of former mine buildings in the city, that fortunately survived. In 1999, after the decision to liquidate the mines, the Industry and Technology Museum was created there because of the historical character of the place (Julia is the oldest and best preserved complex of historical industrial buildings from the late nineteenth and early the twentieth centuries). Unfortunately, due to the lack of financial means, almost no financial outlays were made for the modernization and protection of historical buildings. The museum operated for a decade in the buildings that had not changed after the liquidation and had deteriorated without proper conservation. In addition, they were occasionally robbed.

In 2008, the Wałbrzych Commune received EU funds for the revitalization of the mine into the “Former Mine” Science and Art Centre. The cost of the revitalization was a total of 52.5 million zlotys (approximately EUR 12.5 million), of which 35.7 million (approximately EUR 8.5 million) was funded by the EU. The first stage of revitalization was completed in 2014, although initially it was planned in 2012. During the process, however, it turned out that the projected amounts of money were insufficient. The project ended up over three times more costly; its estimated value until then was > 166 million zlotys (approximately EUR 39.5 million). Such a significant increase in expenses resulted from mistakes and the unreliable inventory of the area, the need to find a new contractor, and numerous corrections and project changes.

However, the “Former Mine” Science and Art Centre is the main tourist attraction in the city. In addition, the “Former Mine,” as the only type of this building in Lower Silesia, and one of seven similar places in Poland, is listed on the European Route of Industrial Heritage. In addition, it is new due to its function and old at the same time because of the mining past, which is a symbol of Wałbrzych. The mine is an important meeting spot for creating and passing the identity and for preserving local cultural heritage related to the mining past of the city.

A significant role in mitigating the negative effects of the process of shrinkage is played by local government authorities. There is no doubt that a new chapter in the local political scene followed the corruption scandal, the culmination of which was in 2010 when self-government elections had to be repeated due to voter fraud. In 2011, a new city president was elected, who started to exercise office from a critical diagnosis of the situation in Wałbrzych contained in the document entitled: *Report on the City's state. Development plan*. It states that “the spheres of the city's life in crisis and its scale are so vast that without substantial, external material assistance provided in special circumstances, Wałbrzych will not regain its balance” (Urząd Miejski w Wałbrzychu 2011).

The city received this support in 2016 when, next to two other shrinking cities, Łódź and Bytom, it was included in the pilot program under the National Revitalisation Plan which serves to develop a model solution for revitalization in Poland. This decision was a turning point in the construction of the city's future. Thanks to this decision, the city received special funds for revitalization. In 2016, the new 2016–2025 Commune Revitalisation Programme for Wałbrzych City was drawn up. This is the first urban document where the term shrinking city was used. It appears to be a very important step toward real measures considering challenges of the urban shrinkage, which can be proved by the following record, “The decreasing population of Wałbrzych causes ever higher operation costs due to a low intensity of land use and high expenditure on infrastructure. The revitalisation measures have to counteract the main problem which is the shrinkage of Wałbrzych.” (Urząd Miejski w Wałbrzychu 2016). At this point, Wałbrzych appears to have a chance to start the process of adaptation to the conditions of urban shrinkage. However, the answer to the question of whether this will happen and whether the city will be able to overcome the negative results of urban shrinkage, becoming a smaller but better place to live for those remaining there, will not be known for several years.

Conclusions and Recommendations

The analysis of the population change in Polish cities from 1990 to 2015 leads to the conclusion that more than one-third of them have been characterized by shrinkage since the postsocialist transformation began. There are 28 cities in this group, mainly old industrial centers (including our case study of Wałbrzych) with permanent shrinkage since 1990. In addition, urban shrinkage does not affect the whole country equally and large regional disparities were noticed.

The results of our research clearly show that the scale and intensity of the process of urban shrinkage require measures to be adopted to mitigate its unfavorable aftereffects, more so because further urban population losses are predicted which, in the situation of uncontrolled shrinkage and the accelerating aging process, could cause a series of problems in urban functioning. However, as revealed by the analysis of the strategies adopted at national and local levels, for a long time no comprehensive policies were formulated to address the challenges of the shrinking process. The issue of urban shrinkage was reluctantly taken up by the authorities of both levels and the term itself has only recently appeared in official documents.

As illustrated by the example of Wałbrzych, despite the national government's intervention at the beginning of the 1990s (in particular, the establishment of the WSEZ and the stimulation of economic growth), these measures, although undoubtedly necessary, proved insufficient to stop the shrinking process. Even though unemployment fell eventually, the city has been continuously losing inhabitants for almost 30 years. It seems that due to the predicted population loss and advanced aging, Wałbrzych will face the need to reduce its housing stock in the near future. This process must be well thought out; therefore, the experience of Western European cities that practice right sizing strategies and adapt them to the needs of an aging population might be useful in this regard.

The case of Wałbrzych shows that over time, the adopted regeneration strategies evolve, from those initially aiming to improve the labor market to more complex ones focusing on the qualitative development of the city. An important element in the regeneration strategy of Wałbrzych (and many other old industrial cities) is the use of industrial heritage for the development of new creative spaces. Although it has not solved the main problems, the positive effects of its implementation have allowed the strengthening of the

cultural potential and contributed to a better image of the city. However, similar to other Polish shrinking cities, the regeneration measures appear to have been taken too late, and what is still dominating are top-down, rather than bottom-up, strategies. The experience of Walbrzych shows that the local authorities will not be able to cope with the negative effects of shrinkage on their own.

As a result of this study, several recommendations for policy-makers were formulated. Taking into consideration the limited power of local authorities, the support from central institutions is essential for the success of policies coping with shrinkage. This support should include:

- initiating a wider public debate and fostering knowledge about opportunities and risks resulting from the shrinking process;
- preparation and implementation of comprehensive multisectoral programs that would integrate the hardware (housing, infrastructure), software (image, governance), and human resources (social and economic structures) types of intervention in shrinking cities;
- financial support for local governments in dealing with the shrinking and aging processes; and
- developing an active migration policy (so far poorly articulated in the discussions about shrinkage).

At the local level, it is very important to accept the shrinking process and notice its positive implications, such as lower population density, larger housing supply, better access to some services, wider areas of greenery, and the improvement of the natural environment quality. In addition, shrinking cities should:

- implement long-term, flexible, and place specific policies that take the ongoing process of shrinkage into account and treat it as both a challenge and an opportunity for reinventing the city;
- engage all local actors, including enterprises, schools, NGOs and supralocal government institutions, academic circles, and (or perhaps primarily) local communities in the working out of a common vision of their development and adaptation to the conditions of shrinkage and aging; and
- build an environment of trust around the adaptive measures taken by local authorities and engage residents in local initiatives, particularly in promoting grassroots neighborhood responses in the places where they live.

Since the issue of urban shrinkage and the strategies to counteract its negative effects seem to be a vast and highly complex problem, it is impossible to discuss all of its aspects. There is no doubt that shrinkage will be a major challenge for future urban policies. The creation of visions for the long-term development of cities and towns under the condition of shrinkage is of key importance. However, the answer to the question of whether Polish cities will be able to overcome the negative effects of shrinkage and become smaller but better places to live for those living there will be known in the future. Further research should include, the dynamics of demographic developments in smaller units (neighborhoods, housing estates) as well as the financial outcomes of ongoing changes resulting from, for example, ineffective use of technical infrastructure. Martinez-Fernandez et al. (2016) drew attention to the need for greater interest among researchers in the issue of community resilience in shrinking cities. This issue seems particularly important in the context of the recent unexpected global crises following the coronavirus pandemic. Its influence on the process of shrinkage might be a new challenge for shrinking cities.

Data Availability Statement

Some or all data, models, or code generated or used during the study are available from the corresponding author by request:

1. The population of cities in Poland in the years 1990–2015.
2. Population data for urban and rural areas in Poland in the years 1946–2015.

References

- Altrock, U., and S. Huning. 2014. "Cultural interventions in urban public spaces and performative planning: Insights from shrinking cities in Eastern Germany." In *Public space and relational perspectives: New challenges for architecture and planning*, edited by C. Tornaghi, and S. Knierbein, 148–166. London: Routledge.
- Batunova, E., and M. Gunko. 2018. "Urban shrinkage: An unspoken challenge of spatial planning in Russian small and medium-sized cities." *Eur. Plann. Stud.* 26 (8): 1580–1597. <https://doi.org/10.1080/09654313.2018.1484891>.
- Bernt, M. 2016. "The limits of shrinkage: Conceptual pitfalls and alternatives in the discussion of urban population loss." *Int. J. Urban Reg. Res.* 40 (2): 441–450. <https://doi.org/10.1111/1468-2427.12289>.
- Bernt, M., M. Cocks, C. Couch, K. Grossmann, A. Haase, and D. Rink. 2012. *Shrink smart. Policy response, governance and future directions*. Research Brief No. 2. Leipzig, Germany: Helmholtz Centre for Environmental Research—UFZ.
- Bontje, M. 2004. "Facing the challenge of shrinking cities in East Germany: The case of Leipzig." *GeoJournal* 61 (1): 13–21. <https://doi.org/10.1007/s10708-005-0843-2>.
- CSO (Central Statistical Office). 2014. *Population projection 2014–2050*. Warszawa, Poland: CSO.
- Danielczyk, R., B. Mielke, and R. Zimmer-Hegmann. 2002. *ILS beiratsbericht Demographische Entwicklung—Schrumpfende Stadt*. Dortmund, Germany: Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen.
- Franz, P. 2004. "Shrinking cities—Shrinking economy? The case of East Germany." *German J. Urban Stud.* 44 (1): 1–15.
- Großmann, K., A. Haase, D. Rink, and A. Steinführer. 2008. "Urban shrinkage in East Central Europe? Benefits and limits of a cross-national transfer of research approaches." In *Declining cities/developing cities: Polish and German perspectives*, edited by M. Nowak, and M. Nowosielski, 77–99. Poznań, Poland: Instytut Zachodni.
- Haase, A. 2013. "No one-size-fits-all. O różnorodności kurczących się miast w Europie." In *Zarządzanie rozwojem miast o zmniejszającej się liczbie ludności (w kontekście perspektywy finansowej 2014–2020)* [Management of the development of cities with declining populations in the context of the financial perspective 2014–2020], 31–43. Warszawa, Poland: Kancelaria Senatu Rzeczypospolitej Polskiej.
- Haase, A., M. Bernt, K. Großmann, V. Mykhnenko, and D. Rink. 2013. "Varieties of shrinkage in European cities." *Eur. Urban Reg. Stud.* 23 (1): 86–102. <https://doi.org/10.1177/0969776413481985>.
- Haase, A., D. Haase, and S. Kabisch. 2008. "Simulation and scenarios of a social science concept on urban shrinkage." In *Proc., iEMSs 4th Biennial Meeting: "International Congress on Environmental Modelling and Software"*, edited by M. Sánchez-Marré, J. Béjar, J. Comas, A. Rizzoli, and G. Guariso, 2074–2075. Barcelona, Spain: International Environmental Modelling and Software Society.
- Haase, A., A. Nelle, and A. Mallach. 2017. "Representing urban shrinkage—The importance of discourse as a frame for understanding conditions and policy." *Cities* 69: 95–101. <https://doi.org/10.1016/j.cities.2016.09.007>.
- Haase, A., D. Rink, K. Grossmann, M. Bernt, and V. Mykhnenko. 2014. "Conceptualizing urban shrinkage." *Environ. Plann. A: Econ. Space* 46 (7): 1519–1534. <https://doi.org/10.1068/a46269>.
- Hollander, J. B. 2018. *A research agenda for shrinking cities*. Cheltenham, UK: Edward Elgar Publishing.
- Hollander, J. B., and J. Németh. 2011. "The bounds of smart decline: A foundational theory for planning shrinking cities." *Housing Policy Debate* 21 (3): 349–367. <https://doi.org/10.1080/10511482.2011.585164>.
- Hollander, J. B., K. Pallagst, T. Schwarz, and F. J. Popper. 2009. "Planning shrinking cities." *Prog. Plann.* 72 (4): 223–232.

- Hospers, G. J. 2012. "Urban shrinkage and the need for civic engagement." In *Shrinking areas: Front runners in innovative citizen participation*, edited by A. Haase, G. J. Hospers, S. Pekelsma, and D. Rink, 7–28. The Hague, Netherlands: EUKN.
- Hospers, G. J. 2014a. "Policy responses to urban shrinkage: From growth thinking to civic engagement." *Eur. Plann. Stud.* 22 (7): 1507–1523. <https://doi.org/10.1080/09654313.2013.793655>.
- Hospers, G. J. 2014b. "Urban shrinkage in the EU." In *Shrinking cities: A global perspective*, edited by H. W. Richardson, and C. W. Nam, 47–58. Abingdon, UK: Routledge.
- Hummel, D. 2015. "Right-sizing cities in the United States: Defining Its strategies." *J. Urban Affairs* 37 (4): 397–409. <https://doi.org/10.1111/juaf.12150>.
- Jessen, J. 2012. "Conceptualizing shrinking cities—A challenge for planning theory." In *Parallel patterns of shrinking cities and urban growth. Spatial planning for sustainable development of city regions and rural areas*, edited by R. Ganser, and R. Piro, 45–58. Farnham, Surrey: Ashgate.
- Kancelaria Senatu RP (Chancellery of the Polish Senate). 2013. *Zarządzanie rozwojem miast o zmniejszającej się liczbie mieszkańców (w kontekście perspektywy finansowej 2014–2020)* [Management of the development of cities with declining populations in the context of the financial perspective 2014–2020]. Warszawa, Poland: Kancelaria Senatu RP.
- Kantor-Pietraga, I., R. Krzysztofik, J. Runge, and T. Spórna. 2014. "Problemy zarządzania miastem kurczącym się na przykładzie Bytomia" [Problems with governing the shrinking city on the example of Bytom]. In *Spoleczna odpowiedzialność w procesach zarządzania funkcjonalnymi obszarami miejskimi* [Social responsibility in the governance of functional urban areas], 253, edited by T. Markowski, and D. Stawasz, 162–175. Warszawa, Poland: Biuletyn KPZK PAN.
- Kurkiewicz, J., ed. 2010. *Procesy demograficzne i metody ich analizy* [Demographical processes and methods of their analysis]. Kraków, Poland: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.
- Lesthaeghe, R., and D. van de Kaa. 1986. "Twee Demografische Transitities?" In *Bevolking: Groei en Krimp*, edited by R. Lesthaeghe, and D. van de Kaa, 9–24. Deventer, Netherlands: Van Loghum Slaterus.
- Li, H., and V. Mykhnenko. 2018. "Urban shrinkage with Chinese characteristics." *Geogr. J.* 184 (4): 398–412. <https://doi.org/10.1111/geoj.12266>.
- Markowski, T. 2013. "Wykład wprowadzający" [Introductory lecture]. In *Zarządzanie rozwojem miast o zmniejszającej się liczbie mieszkańców (w kontekście perspektywy finansowej 2014–2020)* [Management of the development of cities with declining populations in the context of the financial perspective 2014–2020], 179–189. Warszawa, Poland: Kancelaria Senatu RP.
- Martinez-Fernandez, C., T. Weyman, S. Fol, I. Audirac, E. Cunningham-Sabot, T. Wiechmann, and H. Yahagi. 2016. "Shrinking cities in Australia, Japan, Europe and the USA: From a global process to local policy responses." *Prog. Plann.* 105: 1–48. <https://doi.org/10.1016/j.progress.2014.10.001>.
- Ministerstwo Infrastruktury i Rozwoju (Ministry of Infrastructure and Development). 2015. *Krajowa Polityka Miejska 2023* [National urban policy 2023]. Warszawa, Poland: Ministry of Infrastructure and Development.
- Okólski, M. 2005. *Demografia. Podstawowe pojęcia, procesy i teorie w encyklopedycznym zarysie* [Demographics. Basic concepts, processes and theories in an encyclopedic outline]. Warszawa, Poland: Wydawnictwo Naukowe Scholar.
- Oswalt, P., ed. 2005. *Shrinking cities. Vol. 1 of international research*. Ostfildern, Germany: Hatje Cantz Verlag.
- Oswalt, P., and T. Rieniets, eds. 2006. *Atlas of shrinking cities*. Ostfildern, Germany: Hatje canz Verlag.
- Pallagst, K., et al., eds. 2009. *The future of shrinking cities—Problems, patterns and strategies of urban transformation in a global context*. Center for Global Metropolitan Studies, Monograph Series. Berkeley, CA: Univ. of California.
- Pallagst, K., R. Fleschurz, and S. Said. 2017. "What drives planning in a shrinking city? Tales from two German and two American cases." *Town Plann. Rev.* 88 (1): 15–20. <https://doi.org/10.3828/tpr.2017.3>.
- Parysek, J. J. 2010. "Rozwój miast a polityka miejska w Polsce po 1989 roku" [Urban development and urban policy in Poland after 1989]. In *Przekształcenia struktur regionalnych. Aspekty społeczne, ekonomiczne i przyrodnicze*, edited by S. Ciok, and P. Migoń, 117–132. Wrocław, Poland: Uniwersytet Wrocławski, Instytut Geografii i Rozwoju Regionalnego.
- Parysek, J. J., and M. Wdowicka. 2002. "Polish socio-economic transformation: Winners and losers at the local level." *Eur. Urban Reg. Stud.* 9 (1): 73–80. <https://doi.org/10.1177/096977640200900108>.
- Rakowski, T. 2009. *Łowcy, zbieracze, praktycy niemocy* [Hunters, gatherers, practitioners of powerlessness]. Gdańsk, Poland: Wydawnictwo Słowo/Obraz Terytoria.
- Reckien, D., and C. Martinez-Fernandez. 2011. "Why do cities shrink?" *Eur. Plann. Stud.* 19 (8): 1375–1397. <https://doi.org/10.1080/09654313.2011.593333>.
- Richardson, H. W., and C. W. Nam, eds. 2014. *Shrinking cities. A global perspective*. Abingdon, UK: Routledge.
- Runge, A., I. Kantor-Pietraga, J. Runge, R. Krzysztofik, and W. Dragan. 2018. "Can depopulation create urban sustainability in postindustrial regions? A case from Poland." *Sustainability* 10 (12): 4633. <https://doi.org/10.3390/su10124633>.
- Schilling, J., and J. Logan. 2008. "Greening the rust belt: A green infrastructure model for right sizing America's shrinking cities." *J. Am. Plann. Assoc.* 74 (4): 451–466. <https://doi.org/10.1080/01944360802354956>.
- Schlappa, H., and W. J. V. Neill. 2013. *From crisis to choice—Re-imagining the future in shrinking cities*. Findings from the URBACT capitalisation project on shrinking cities and demographic change. Paris: URBACT.
- Statistics Poland. n.d. Local data bank. <https://bdl.stat.gov.pl/BDL/start>.
- Steinführer, A., and A. Haase. 2007. "Demographic change as future challenge for cities in East Central Europe." *Geogr. Ann. Ser. A Phys. Geogr.* 89 (2): 183–195. <https://doi.org/10.1111/j.1468-0467.2007.00247.x>.
- Strykiewicz, T. 2013. "The process of urban shrinkage and its consequences." *Rom. J. Reg. Sci.* 7: 29–40.
- Strykiewicz, T. 2014. *Kurczenie się miast w Europie Środkowo-Wschodniej* [Urban shrinkage in East-Central Europe]. Poznań, Poland: Bogucki Wydawnictwo Naukowe.
- Strykiewicz, T., and E. Jaroszevska. 2014. "Kurczenie się miast jako wyzwanie dla polityki miejskiej" [Urban shrinkage as a challenge for urban policy]. In *Kurczenie się miast w Europie Środkowo-Wschodniej* [Urban shrinkage in East-Central Europe], edited by T. Strykiewicz, 137–140. Poznań, Poland: Bogucki Wydawnictwo Naukowe.
- Strykiewicz, T., and E. Jaroszevska. 2016. "The process of shrinkage as a challenge to urban governance." *Quaestiones Geog.* 35 (2): 27–37. <https://doi.org/10.1515/quageo-2016-0013>.
- Strykiewicz, T., E. Jaroszevska, S. Marciniak, A. Ogrodowczyk, P. Rumpel, T. Siwek, and O. Slach. 2014. "Współczesny kontekst i podstawy teoretyczno-metodologiczne analizy procesu kurczenia się miast" [Present-day context of the process of urban shrinkage and the theoretical and methodological foundations of its analysis]. In *Kurczenie się miast w Europie Środkowo-Wschodniej* [Urban shrinkage in East-Central Europe], edited by T. Strykiewicz, 9–14. Poznań, Poland: Bogucki Wydawnictwo Naukowe.
- Turok, I., and V. Mykhnenko. 2007. "The trajectories of European cities, 1960–2005." *Cities* 24 (3): 165–182. <https://doi.org/10.1016/j.cities.2007.01.007>.
- Urząd Miejski w Wałbrzychu (Wałbrzych City Office). 2005. *Strategia Zrównoważonego rozwoju miasta Wałbrzycha do 2013 r* [Strategy for the sustainable development of Wałbrzych City till 2013]. Wałbrzych, Poland: Wałbrzych City Office.
- Urząd Miejski w Wałbrzychu (Wałbrzych City Office). 2011. *Raport o stanie Miasta. Plan Rozwoju* [Report on the City's state. Development plan]. Wałbrzych, Poland: Wałbrzych City Office.
- Urząd Miejski w Wałbrzychu (Wałbrzych City Office). 2016. *Gminny Program Rewitalizacji Miasta Wałbrzycha na lata 2016–2025* [The commune revitalisation programme for Wałbrzych city for the years 2016–2025]. Wałbrzych, Poland: Wałbrzych City Office.

- Wiechmann, T. 2008. "Conversion strategies under uncertainty in post-socialist shrinking cities—The example of Dresden in Eastern Germany." In *The future of shrinking cities—Problems, patterns and strategies of urban transformation in a global context*, edited by K. Pallagst, et al., 5–16. Berkeley, CA: IURD.
- Wiechmann, T., and M. Bontje. 2015. "Responding to tough times: Policy and planning strategies in shrinking cities." *Eur. Plann. Stud.* 23 (1): 1–11. <https://doi.org/10.1080/09654313.2013.820077>.
- Wiechmann, T., and M. Wolff. 2013. "Urban shrinkage in a spatial perspective—Operationalization of shrinking cities in Europe 1990–2010." In *AESOP-ACSP Joint Congress*, 1–20. Dublin. <http://aesop-acspdublin2013.com/>.
- Wolff, M., and T. Wiechmann. 2018. "Urban growth and decline: Europe's shrinking cities in a comparative perspective 1990–2010." *Eur. Urban Reg. Stud.* 25 (2): 122–139. <https://doi.org/10.1177/0969776417694680>.
- Wu, T., and C. Martinez-Fernandez. 2009. "Shrinking cities: A global overview and concerns about Australian cases." In *The future of shrinking cities: Problems, patterns and strategies of urban transformation in a global context*, edited by K. Pallagst, et al., 29–36. Berkeley, CA: IURD.
- Zborowski, A., M. Soja, and A. Łobodzińska. 2012. *Population trends in Polish cities—Stagnation, depopulation or shrinkage? Prace Geograficzne 130*, 7–28. Kraków, Poland: Instytut Geografii i Gospodarki Przestrzennej UJ.