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THE IMPLICATIONS OF URBAN SHRINKAGE FOR THE BUDGETS OF POLISH CITIES¹

KONSEKWENCJE PROCESU KURCZENIA SIĘ POLSKICH MIAST DLA ICH BUDŻETÓW

Contemporary demographic processes involving the decline and aging of the population and the accompanying economic crisis in many cities around the world are referred to as shrinking. The causes and effects of this phenomenon are still insufficiently explained. The article investigates the financial effects of shrinking on the budgets of Polish cities. The article aims to indicate how the loss of inhabitants may affect the city's economy, and thus the city's budget, and to identify and assess differences between selected budget categories in shrinking cities and in those cities that have not experienced the problem of depopulation. First, a literature review was conducted, followed by a financial analysis of the budgets of shrinking cities, which was supplemented with a comparative analysis of the selected revenues and expenditures of budgets of cities that were not undergoing the shrinking process. The research period covered the years 2018–2022. As the analyses show, the way in which cities' demographic problems impact their financial situation occurs through the economy, the condition of which in the era of knowledge-based economies depends on human capital resources. The financial analysis of selected budget indicators allowed us to conclude that shrinking cities had much lower budget revenues per capita, lower revenue independence, and lower budget expenditures. The opposite situation was observed in the case of expenditure on benefits for natural persons, the higher level of which in shrinking cities confirmed the need for greater involvement of cities in financing social policy.

Keywords: local finance; demography; demographic crisis; aging population; shrinking cities
JEL: H72, J11, R51

Współczesne procesy demograficzne polegające na malejącej liczbie ludności i starzeniu się społeczeństwa oraz towarzyszący temu kryzys gospodarczy w wielu miastach świata określa się mianem ich kurczenia. Przyczyny i skutki tego zjawiska wciąż nie są dostatecznie wyjaśnione, a samo zagadnienie obecne jest w literaturze światowej od końca XX w. Problem ten ze swej natury jest złożony i wielowymiarowy, a badania nad nim często mają charakter interdyscyplinarny. W artykule podjęto problematykę skutków finansowych zmniejszania się budżetów polskich miast w wyniku ww. procesów demograficznych. Celem artykułu jest wskazanie, w jaki sposób zmniejszanie

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się liczby mieszkańców może wpłynąć na gospodarkę miasta, a tym samym na jego budżety, oraz identyfikacja i ocena różnic pomiędzy wybranymi kategoriami budżetowymi w miastach kurczących się i w miastach, które nie doświadczyły problemu wyludnienia. Artykuł ma charakter teoretyczno-empiryczny: zastosowano w nim metodę przeglądu literatury oraz metodę analizy finansowej budżetów kurczących się miast, którą uzupełniono analizą porównawczą wybranych dochodów i wydatków budżetowych miast, które nie ulegały procesowi kurczenia się. Okres badawczy objął lata 2018–2022. Jak wynika z analizy, sposób przenoszenia problemów demograficznych miast na ich sytuację finansową następuje poprzez gospodarkę, której kondycja w dobie gospodarek opartych na wiedzy zależy od zasobów kapitału ludzkiego. Analiza finansowa wybranych wskaźników budżetowych pozwoliła też stwierdzić, że miasta, które się kurczyły, charakteryzowały się znacznie niższymi dochodami budżetowymi na mieszkańca, mniejszą samodzielnością dochodową i niższymi wydatkami budżetowymi. Odwrotna sytuacja zachodził w przypadku wydatków na świadczenia dla osób fizycznych, których wyższy poziom w kurczących się miastach potwierdził potrzebę większego zaangażowania miast w finansowanie polityki społecznej.

Słowa kluczowe: finanse lokalne; demografia; kryzys demograficzny; starzenie się społeczeństwa; kurczące się miasta
JEL: H72, J11, R51

I. INTRODUCTION

Among the many determinants of the financial processes of local government units, one of the most important is the condition of their economies. Each unit of administrative division is a specific system of connected vessels in which interdependent social, economic and financial processes take place. Due to the determinants of the basic macroeconomic issue, namely the national income, it can be concluded from an analysis of the literature on the subject that today the state of the economy is affected by, among other things, demographic processes (especially through changes in the level of human capital), and these are reflected in city budgets through economic processes.

The transformations that cities around the world have been undergoing for several decades can be reduced to a few basic economic phenomena which have resulted in demographic problems. The most important of them are globalization, deindustrialization, suburbanization and systemic transformation (besides these, social and environmental problems can also be indicated). These problems, especially from the end of the twentieth century, began to strongly affect cities on a previously unprecedented scale. The concept of the city life cycle and the classic stages of urbanization indicated by Klassen in the 1980s (Klassen et al., 1981) have become insufficient to describe the population changes that have begun to appear in many cities around the world. Some cities recorded a rapid increase in population, becoming centres of social, economic and cultural life – places where capital, knowledge and information were located, while others began to experience a population decline accompanied by negative economic effects and a crisis. Negative changes in some cities came to be described as their shrinking. As many authors indicate, this problem is multidimensional, complex and difficult to measure, despite the fact that it is common (Bontje & Musterd, 2012, p. 153).

Assuming that demographic processes affect the economy, and the state of the economy is visible in financial flows, the article addresses the problem of the financial consequences of the shrinking processes of cities in Poland in their budgets. The available sources indicate that the process of shrinking has real effects on cities' finances, but this impact is indirect, very complex and methodologically difficult to measure. Therefore, the undertaken research was theoretical and empirical. The first objective was to characterize how the loss of inhabitants in shrinking cities might affect their economies and thus their budgets. The second objective concerned the identification and assessment of potential differences between selected budget categories in cities that were shrinking and those that did not experience the problem of depopulation.

To achieve the above goals, first the method of literature review was used to analyse the potential effects of shrinking cities on economies and their finances. In the empirical part, shrinking cities in Poland in 2018–2022 were identified on the basis of an analysis of population numbers and their changes, and then a financial analysis of budgets for selected budget indicators was performed, which was supplemented with a comparative analysis of the results in the group of shrinking cities and other cities in Poland. The research period (2018–2022) was dictated by the adopted definition of a shrinking city, according to which a decrease in the number of inhabitants must occur for a period of five consecutive years, and the degree of loss in the number of inhabitants must be greater than 0.15% per year. The upper limit of the research period was determined by the availability of data at the Central Statistical Office of Poland.

The problem discussed in the article is rather rarely discussed in the Polish literature on the subject. These analyses have most often been conducted in the field of sociological changes, including demographic ones, as well as for the needs of urban planning. The process of shrinking cities has rarely been analysed from the point of view of the economy and cities' financial problems. The relationship between demographic processes and economic development is justified by the theory of exogenous economic growth. This can be achieved in two ways: either by increasing the inputs of production factors, including human capital resources, or by reducing the inputs of production factors per unit of product. The second type of economic growth depends on the quality and efficiency of combining production factors, which result from technical progress and an increase in the overall productivity of production factors. They also depend to a great extent on the human factor, such as the way of organizing work, the level of education, and the motivation of employees. Demographic changes may therefore affect human capital, which is currently considered one of the most important factors of production. The above problems are difficult to measure in cities due to their multidimensional nature (Kucharčíková, 2011, pp. 64–65). In this respect, the article attempts to fill the indicated research gap. In turn, due to the fact that in Poland the problem of shrinking cities has been increasing in recent years, addressing this issue has a practical dimension. This problem should first be signalled and then taken into account in the long-term strategies of the cities affected by it. This applies

both to activities at the local and national levels. The article consists of several related parts that resulted from the adopted research goals. In the first part, the literature on the relationship between demographic and economic phenomena in the city is reviewed. Then, in the next two parts, starting with the systemic concept of the city and the role of human capital in the economy, the potential effects of demographic changes for economies, which are visible in the budgets of their cities, are indicated. The next part presents the results of the author's own research. The article ends with conclusions from the research supplemented with proposals for further research directions.

II. THE TRANSMISSION OF DEMOGRAPHIC CHANGES TO THE ECONOMY OF SHRINKING CITIES

Each city creates a specific territorial social system. This system consists of two layers: social (inhabitants; the economic, cultural and political sphere) and material (the natural and anthropogenic sphere). These layers form the structure of the system, in which there are social, transformational, natural and ecological relations and activities, as well as the economic, cultural and political activities of the inhabitants. In addition, in the structure of the city there are dependencies between individual units, subsystems and systems that can be primary or secondary. The city system operates in an environment: external (outside the structures of the city) and internal, which is the environment of the material, natural and anthropogenic base of the city (Parysek, 2015, pp. 34–35).

In terms of the system, the social layer comes to the fore as the basic part of the city. In particular, the main role is played by the inhabitants and their activities, relations and interactions, to which the elements of the material layer are subject. The level of accumulation of the above elements in urban units is important for the growth and economic efficiency of cities. In organizational theories, it is currently indicated that human capital is more important than material assets. The situation is similar on the macroeconomic scale: economic growth depends on the level of human capital (Pasban & Nojehdeh, 2016, p. 250).

Human capital in cities is created by their inhabitants. According to contemporary economists, human capital is a factor on which socio-economic development depends (Kucharčíková, 2011, pp. 64–65). This approach began to be emphasized in the literature with the shift from production-based economies to knowledge-based economies. Both in practice and in economic theory, since the 1980s, the concept of a knowledge-based economy began to gain traction in the public debate (Laroche et al., 1999, pp. 87–88). In this concept, human capital, as a factor of production, but also a carrier of knowledge and information, has become a key determinant of economic growth. It is indicated that the possibilities of increasing production efficiency, more effective distribution and lower operating costs, due to the greater involvement of human

knowledge and creativity, may overtake the effects of producing goods and services with the involvement of more financial capital, tangible assets and natural resources (Kefela, 2010, p. 160).

Human capital consists of human abilities, both inborn and acquired. It refers to knowledge, education, professional competences, skills, creativity and also health (Becker, 2002). One of the key features of human capital, important from the point of view of cities, is that by appropriately combining people representing its high level, synergy effects can occur and inhabitants have a positive impact on each other, which further increases the efficiency and competitiveness of cities (Kwaśny et al., 2022, p. 233; Mroczek et al., 2019, p. 67). This also results in the occurrence of positive social effects (e.g. increased democratization of life, freedom of thought, social trust), which leads to the creation of social capital (Laroche et al., 1999, p. 90).

In the light of the above, when analysing the urban economy, it can be concluded that the transformations that resulted in the depopulation of many cities have had negative economic effects. This is due to the fact that many categories describing the condition of the city economy depend on the quantity and quality of human capital. The first area affected by the loss of human capital is the labour market. This concerns both quantity and performance. The flight of human capital due to migration, known as brain drain, means a loss of skilled workers for the city (Docquier & Rapoport, 2012). Shrinking cities are those which people have moved away from, towards the central parts of a country or towards global cities in other countries. This results in negative consequences for their economies and, on the other hand, improves economic growth in the host cities, thus deepening the differences between them. These flows are dictated by the rational behaviour of people who are looking for, among other things, higher return (payment) for their skills, knowledge and experience (Seto, 2011; Neumann et al., 2015). These decisions are also stimulated by the economy of a given city, because, succumbing to crisis, these cities are unable to provide jobs for highly qualified specialists or an attractive place for personal development. Thus, there is a mismatch between labour supply and labour demand (Wolff & Wiechmann, 2014, p. 7).

Shrinking cities are also experiencing an increase in the proportion of older people in the total population, which may result in the burden of post-working age people being placed on working-age people. The time and commitment that people in their prime have to devote to caring for the elderly may limit the full use of human capital. This situation may be further aggravated by caring for minor family members. People who are forced to take care of two generations in the family (children and older parents or grandparents) are nowadays called the 'sandwich generation' (Lei et al., 2023). When considering the impact of the growing proportion of older people in the shrinking city community on the labour market, new challenges should also be noted. The appearance of older employees may (but does not have to) mean their lower productivity. On the other hand, it is noticed that older workers are characterized by greater experience and better education (Marois et al., 2020, p. 7692).

Another economic effect of the process of shrinking cities may be changes in supply and demand in local product and service markets (Coppola, 2019). With the increase in the share of post-working age people, new consumption patterns may appear in shrinking cities (decrease in the consumption of some goods, e.g. educational services, and increase in the consumption of others, e.g. in the field of health care). As a result of these changes and processes that globally caused the shrinking of cities (e.g. increased international trade), small, native entrepreneurs may be eliminated from local markets. Local entrepreneurship may be displaced by large transnational corporations and international chain stores. This may have consequences in the decreasing demand for training and various forms of further education and further deepen the problems of the unemployed. In turn, this may lead to the release of further human capital resources (usually with entrepreneurial skills, but also less qualified) and to people looking for work in other cities (Wichowska, 2021b; Wolff & Wiechmann, 2014, p. 7).

The outflow of qualified workers and the declining economic activity in shrinking cities may lead to a loss of competitiveness and innovativeness of the city. This, in turn, may cause further outflows of human capital and lower effectiveness (Rieniets, 2009, p. 235). Such a situation was particularly noticeable in the cities of Eastern Europe after the systemic changes, when these cities initially lost the competitive struggle with developed economies entering the markets of this part of Europe (Großmann et al., 2013, p. 222; Gurrutxaga, 2020, p. 733).

Many researchers indicate that the shrinking of cities affects the level of urban infrastructure (Faust et al., 2016, 2018), as well as the housing stock (Mallach et al., 2017). The shrinking of cities may result in a reduction in the quality and quantity of infrastructure and a shrinking supply of flats on the real estate market. Residential buildings and flats in depopulated cities may become of lower and lower quality due to the lack of funds for their renovation. This may result in a reduction in housing prices and emerging vacancies or, in extreme cases, demolition of buildings (Haase et al., 2016, pp. 95–96). Rents may also be reduced. This situation may have negative consequences for the local market of construction goods and services. Low housing prices could also result in a lack of incentive to build new housing without state subsidies (Hartt & Hackworth, 2020, p. 1087). Changes in the real estate market may also intensify the already existing migration processes and further outflow of human capital.

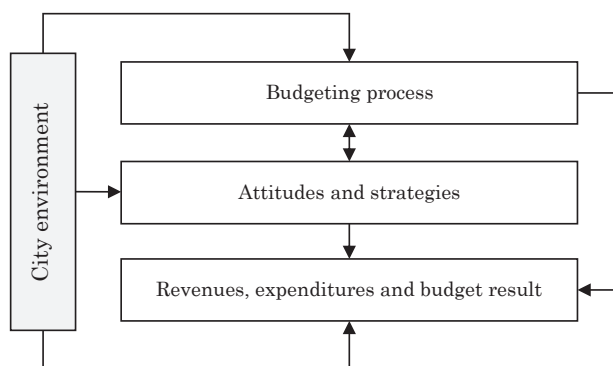
III. THE FINANCIAL CONSEQUENCES OF SHRINKING CITIES

Each city, as noted earlier, while creating a territorial system, operates in an environment (external and internal conditions) which is the source of needs and problems, development opportunities and threats. This environment affects the city's finances, because it is correlated with the resources of

inhabitants, business entities, the material background, and the structures of relations and activities. Rubin (Rubin, 2019, p. 33) notes that the city's environment affects the budgeting process, attitudes and strategies of city authorities, and budget results. This is due to the level of wealth of inhabitants and the profitability of economic activity, which determine the degree of centralization of power, because the worse the situation in the city, the greater the dependence of the budget on external transfers. The budgeting process also depends on the economic situation of the city, because if increasing budget revenues are expected, the city authorities can undertake planning and long-term goals. With low revenues, it may be impossible to set new development directions or set ambitious goals. The stability of budget revenues and the availability of external sources for financing the city's tasks are of particular importance here. In this approach, the budget is also affected by earlier decisions resulting in liabilities being incurred for the implementation of already historic tasks, but also by the preferences of the authorities seeking re-election, and assuming greater participation of inhabitants in the budgeting process – the preferences and attitudes of inhabitants (Fig. 1).

Figure 1

The system of dependence of the city's budget on its environment



Source: the author's elaboration based on Rubin (2019, p. 33).

In connection with the above remarks, it is possible to indicate potential channels for the impact of the economic effects of shrinking on cities' budgets. This impact is usually indirect, resulting primarily from the previously described depletion of human capital (the city's social layer). Budget areas where the effects of city shrinkage may become apparent include:

- a reduction of the city's own revenues due to reduced economic potential (tax base) from: the city's share in the state budget revenues from personal and corporate income tax; property tax; from the tax on means of transport; civil law transactions and stamp duty (Dziekański et al., 2020, pp. 874–875; Wichowska, 2021a);

– decreasing financial independence: an increase in the share of government transfers in total revenue (general subsidies and targeted subsidies) as a result of greater financial needs of shrinking cities and a lower level of the city's own revenue per capita (Gornowicz & Wichowska, 2017, pp. 66–67; Jemna et al., 2013, p. 52);

– an increase in budget expenditure on health care, social security and care for the disabled and the elderly, which may generate even greater dependence of the city on government transfers (Marois et al., 2020);

– increase in expenditure on environmental protection: resulting from the need to incur expenditure, for example on the green investments related to reducing the growing environmental pollution (Bernt, 2009, pp. 759–760);

– an increase in the rates of taxes and fees: resulting from the insufficient amount of funds and the growing needs of shrinking cities (Rink, 2012, p. 20);

– reduction or increase in investment expenditures: on the one hand, there may be no need to make new investments, on the other hand, it may be necessary to increase expenditures on the revitalization of the city, and to maintain the existing infrastructure, which once served a larger number of people (Bernt, 2009, pp. 759–760; Rink et al., 2012, pp. 19–20);

– reduction of certain expenses: for example in the field of education or expenditure on transport and road infrastructure (Rink et al., 2012, pp. 19–20);

– increase in debt: as a result of growing expenses and the need to seek external funds (Qiang et al., 2021, p. 7).

The above financial effects of shrinking cities, which have become visible in many cities around the world, may also result in a deterioration of the quality of public services for the city. As a consequence, the above phenomena may deepen the low attractiveness of the city in terms of investments and settlement of inhabitants, and lead to an increase in the outflow of inhabitants.

IV. METHODS AND RESEARCH MATERIALS

In order to identify shrinking cities, the Shrinking Cities International Research Network methodology was used, in which a shrinking city was defined as a city in which the decrease in the number of inhabitants reached a minimum of 0.15% per year for five consecutive years (Wichowska, 2023). In 2018–2022, there were 202 such cities out of 302 urban municipalities in Poland. The most numerous group were cities located in the following voivodships: Śląskie (Silesia) – 32 cities, Dolnośląskie (Lower Silesia) – 29 cities, Lubelskie (Lublin) – 17 cities, Łódzkie (Łodzkie) – 16 cities, Kujawsko-Pomorskie (Kuyavia-Pomerania) and Mazowieckie (Masovia) – 14 cities each. In total, 60% of all shrinking cities in Poland were located in the area of these 6 voivodships. The exact number of shrinking cities in voivodeships in Poland in 2018–2022 is illustrated in Figure 2.

Figure 2

Number of shrinking cities in Polish voivodeships in 2018–2022



Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023, P2137).

Assuming that the shrinking of cities results in changes in their budgets, indicators describing revenues, expenditures, and revenues independence were selected for the analyses. With regard to these variables, an analysis of the dynamics of their changes and a comparative analysis of the averaged results between the group of cities undergoing the shrinking process and the group of cities not subject to shrinkage in the years 2018–2022 were carried out. Data from Statistic Poland – Local Data Bank (2023): *Revenue of gminas and cities with powiat status budgets (G423)*, *Expenditure of gminas and cities with powiat status budgets (G425)* and *Population by sex and age group (P2137)* were used. It should be noted that the financial data per capita used in the study for 66 of the 302 analysed cities that serve as powiat (county) may be slightly overestimated. Their revenues and expenditures include a part typical of the higher level of administrative division in Poland (powiat). Other cities do not have this part in their budget. In Statistic Poland – Local Data Bank data, revenues and expenditures for the mentioned cities are included in total. The following indicators were used in the study:

- revenue per capita (PLN): total; own; due to participation in personal income tax; due to participation in corporate income tax; from property tax; from the tax on means of transport; from the tax on civil law transactions; property; targeted subsidies; general subsidies;
- revenue independence: share of the city's own revenue in total revenues (%);
- expenditure per capita (PLN): total; property; current; benefits for natural persons; for debt servicing.

The selection of the above-mentioned indicators was, on the one hand, dictated by the aspects of the city budget identified in the second subsection that are potentially sensitive to population changes. On the other hand, it resulted from the availability of statistical data. Moreover, data presented per capita provide an opportunity to conduct comparative analysis between cities, because they eliminate the problem of differences in the size of cities, and therefore the size of their revenues and expenditures.

V. SHRINKING CITIES IN POLAND AND THEIR FINANCIAL SITUATION COMPARED TO NON-SHRINKING CITIES

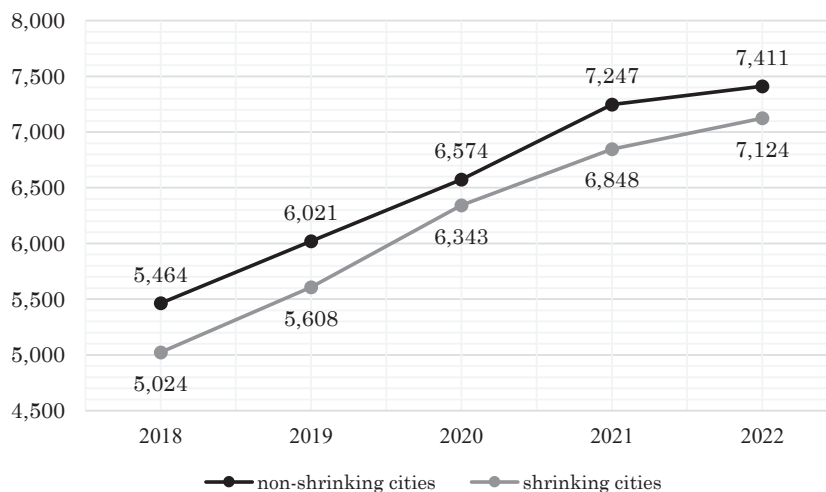
The analysis of the averaged indicators for 100 cities which, in accordance with the presented approach, were not classified as shrinking cities, and 202 cities which were shrinking, shows that these groups differed significantly in terms of the levels of the above-mentioned indicators. In the group of cities that did not shrink, most of the revenue indicators were higher than in the case of shrinking cities. Figure 3 shows the average total revenue per capita in both groups of cities in 2018–2022. In shrinking cities, this indicator was on average several hundred zlotys lower than in cities not undergoing shrinkage. This result confirms the previously cited conclusions from research by other authors (Dziekaski et al., 2020, pp. 874–875; Wichowska, 2021a).

An even greater discrepancy appeared in the case of the city's average revenue per capita. The difference between these ratios was on average almost PLN1,700, their lower level was characteristic of shrinking cities (Fig. 4). It can therefore be concluded that the reduction in the number of inhabitants primarily affects the local tax base, an important element of which is the social layer of the city (its inhabitants). They undertake professional or business activities in a given city, generating city budget revenue. The loss of inhabitants, demographic changes or deterioration of the quality of human capital may lead to a reduction in the city's own revenue (Wichowska, 2019, pp. 424–425).

A similar trend persisted in the case of revenue independence. Cities that did not shrink were characterized by a much higher level of revenue independence than shrinking cities. This difference was on average almost 10 percentage points in favour of cities that did not shrink (Fig. 5).

Figure 3

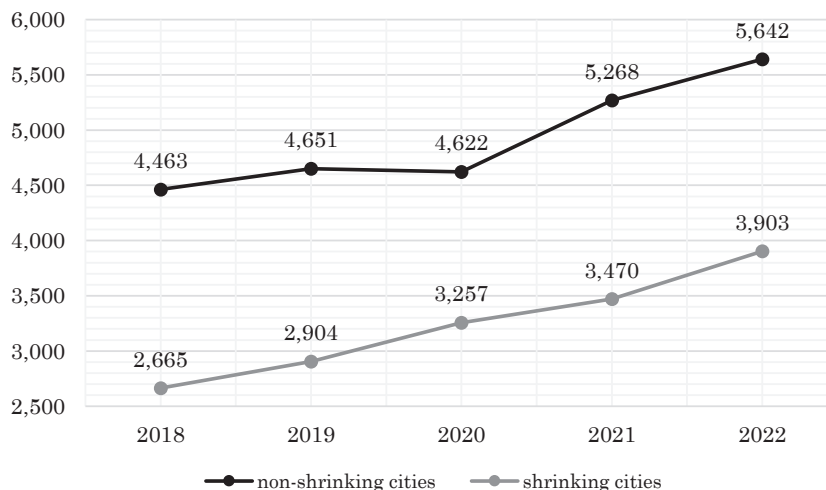
Average total revenue per capita (PLN) in the group of shrinking cities and in the group of cities not shrinking in Poland in 2018–2022



Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023).

Figure 4

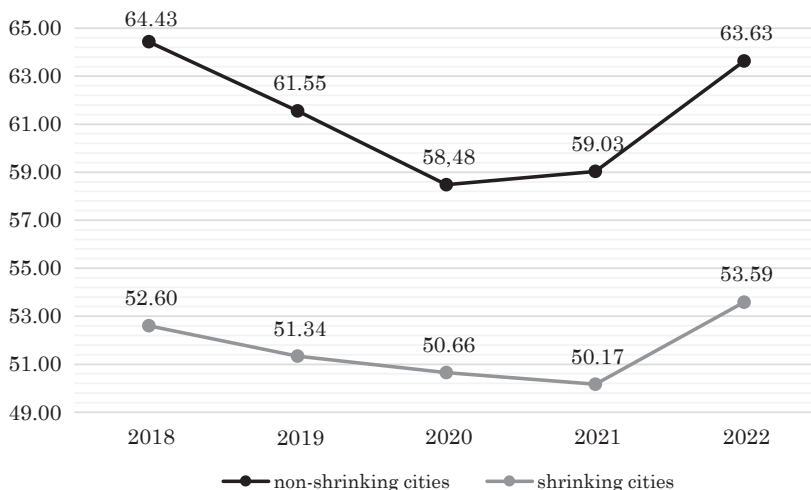
The city's average revenue per capita (PLN) in the group of shrinking cities and in the group of cities not shrinking in Poland in 2018–2022



Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023).

Figure 5

Average share of the city's own revenue in total revenues (%) in the group of shrinking cities and in the group of cities not undergoing the shrinking process in Poland in 2018–2022



Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023).

In the case of budget revenues from the city's share in personal and corporate income taxes, the average revenues in shrinking cities in the analysed period were much lower. For PIT revenue, receipts in shrinking cities amounted to PLN1,206.56 per capita, and PLN2,162.61 in cities not subject to shrinking. In the case of CIT revenue, the difference was even higher – in shrinking cities, the average revenue on this account was PLN88.21 per capita, while in cities not undergoing shrinkage it was PLN253.87.

In the case of two selected local taxes related to entrepreneurship and the economic activity of residents: the tax on means of transport and the tax on civil law transactions, a similar trend can be observed. Cities undergoing shrinking recorded lower average revenues from the tax on means of transport per inhabitant: PLN25.67 compared to PLN29.28 in other cities. In the case of the tax on civil law transactions, the difference was even greater (PLN70 per capita in shrinking cities compared to PLN180.99 in other cities). The above results may confirm the impact of the decline in economic activity in shrinking cities on their local revenues.

The above differences between cities that were subject to the shrinking process and those that were not, in terms of budget revenues related to the labour market and economic activity, may confirm the previously cited conclusions from other studies. In shrinking cities, the labour market is undergoing transformation – on the one hand, there is a lack of quality and quantity of human capital, on the other hand, economic activity is limited (demand for labour is decreasing) due to lower demand for goods and services (Docquier & Rapoport, 2012; Wolff & Wiechmann, 2014).

The situation was slightly different in the case of average real estate tax revenues per capita. In cities undergoing shrinkage, the average revenue per capita was higher and amounted to PLN746.73, while in cities that did not

shrink it was PLN752.78. The explanation for this state of affairs requires more detailed analyses, but it can be assumed that shrinking cities used higher real estate tax rates to compensate for the lack of funds from other revenues.

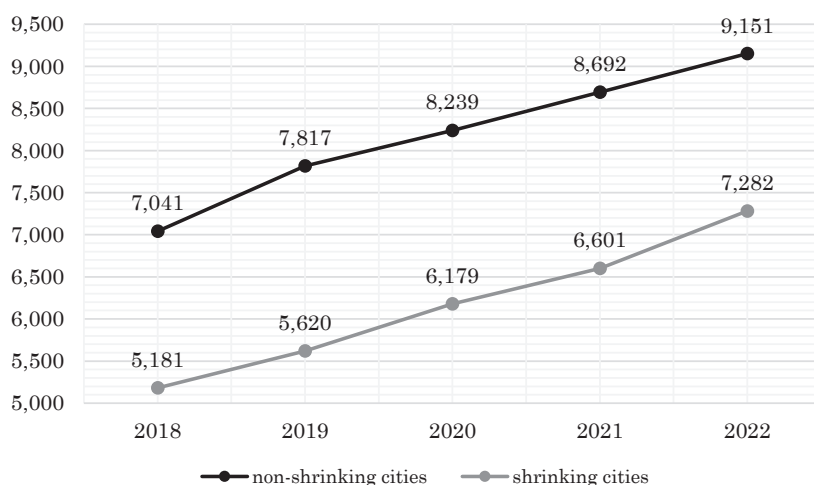
Analysing the last selected category of the cities' own revenue: property revenue, it can be seen that their average level per capita was lower in cities subject to shrinkage, where it amounted to PLN122 per capita, compared to other cities, where their level was PLN180.43.

The last group of revenue analysed was transfer revenue from the state budget: target subsidies and general subsidies. In the case of the first group, their average level per capita in shrinking cities was slightly higher than in other cities and amounted to an average of PLN1,796.53 against PLN1,748.20 in cities not shrinking. This may suggest greater support and greater dependence on central funds, which is related to the city's own revenue being lower in the group of shrinking cities. In the case of the general subsidy, the situation was the opposite: the lower average level of revenue from the general subsidy per capita was found in the cities undergoing a contraction of PLN1,152.87 against the background of other cities, where this indicator amounted to PLN1,358.23. This relationship was also noticed by Großmann et al. (2013, p. 223) who stated that cities' own-source revenues are most sensitive to adverse demographic changes, which could increase their dependence on state subsidies in the future.

In the case of budget expenditures selected for the analyses: total, current and capital expenditure per capita, the group of cities that did not shrink was characterized by a higher average. The average level of total expenditure per capita amounted to PLN8,187.96, while in shrinking cities it amounted to PLN6,172.85 (Fig. 6).

Figure 6

Average total expenditure per capita (PLN) in the group of shrinking cities and the group of cities not shrinking in Poland in 2018–2022



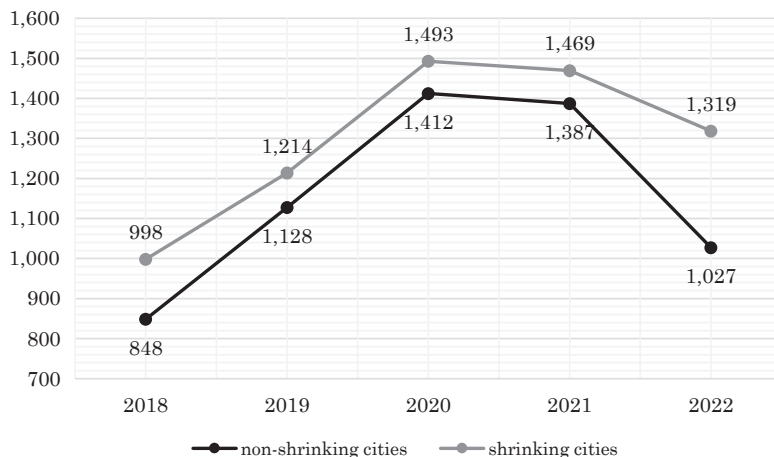
Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023).

The average capital expenditure per capita amounted to PLN1,160.89 in cities not subject to shrinkage, and PLN893.26 in the group of shrinking cities. A similar tendency concerned current expenditures – their average level per capita in the group of cities not shrinking was PLN6,918.45, while in the group of shrinking cities it was PLN5,216.00.

Particularly noteworthy are the average per capita expenditures on benefits for natural persons. In the case of shrinking cities, the average level was PLN1,298.56 compared to other cities, where it was PLN1,160.63 (Fig. 7). This result confirms the observations presented in the theoretical part regarding the need for greater involvement of shrinking cities in the area of social policy (Marois et al., 2020).

Figure 7

Average expenditure on benefits for natural persons per capita (PLN) in the group of shrinking cities and in the group of cities not shrinking in Poland in 2018–2022



Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023).

In the case of expenditures on debt servicing, their average per capita level was higher in the cities that did not shrink – PLN44.85 more than in the shrinking cities, where it amounted to PLN33.38. These results did not confirm the view present in the literature about the greater debt of shrinking cities. The results of Polish non-shrinking cities may mean their increased financial needs due to the implementation of more investments. This may also suggest underinvestment in the activities of Polish shrinking cities (Wichowska, 2021b), but this issue requires more in-depth analysis.

Table 1 presents the exact results of averaged budget indicators for Polish cities that did not shrink and for shrinking cities in 2018–2022.

Table 1

Average levels of budget indicators in cities undergoing shrinking and in other cities in Poland in 2018–2022

	Budget indicator	Category of city	2018	2019	2020	2021	2022	Average
Revenues	Total per capita (PLN)	Non-shrinking cities	5,464.14	6,021.09	6,574.38	7,246.84	7,411.37	6,543.56
		Shrinking cities	5,023.70	5,607.94	6,342.79	6,847.53	7,123.80	6,189.15
	Own per capita (PLN)	Non-shrinking cities	4,462.87	4,650.85	4,621.78	5,267.71	5,641.79	4,929.00
		Shrinking cities	2,664.64	2,903.71	3,256.99	3,470.38	3,903.06	3,239.76
	From property tax per capita (PLN)	Non-shrinking cities	679.68	695.15	693.00	757.05	803.99	725.78
		Shrinking cities	667.67	682.41	728.55	792.45	862.60	746.73
	From the tax on means of transport per capita (PLN)	Non-shrinking cities	29.52	29.70	28.95	28.10	30.12	29.28
		Shrinking cities	23.82	24.36	24.85	26.73	28.57	25.67
	From the tax on means of transport per capita (PLN)	Non-shrinking cities	153.14	154.71	150.64	241.90	204.54	180.99
		Shrinking cities	54.31	57.70	59.05	90.40	88.55	70.00
	From participation in PIT per capita (PLN)	Non-shrinking cities	1,954.61	2,135.73	2,051.86	2,332.58	2,338.26	2,162.61
		Shrinking cities	1,064.01	1,160.03	1,156.84	1,305.66	1,356.24	1,208.56
	From the participation in CIT per capita (PLN)	Non-shrinking cities	208.47	234.23	236.01	272.15	318.50	253.87
		Shrinking cities	68.18	77.11	79.80	105.05	110.90	88.21
	Property per capita (PLN)	Non-shrinking cities	175.35	179.75	164.21	181.26	201.60	180.43
		Shrinking cities	107.80	112.04	116.49	129.39	144.27	122.00
	Target subsidies <i>per capita</i> (PLN)	Non-shrinking cities	1,360.38	1,683.82	1,967.35	2,010.91	1,718.52	1,748.20
		Shrinking cities	1,425.81	1,670.24	1,968.48	1,996.89	1,921.21	1,796.53
	General subsidy per capita (PLN)	Non-shrinking cities	1,103.45	1,221.78	1,313.89	1,645.39	1,506.65	1,358.23
		Shrinking cities	933.24	1,033.99	1,117.33	1,380.26	1,299.53	1,152.87
	Revenue independence (%)	Non-shrinking cities	64.43	61.55	58.48	59.03	63.63	61.42
		Shrinking cities	52.60	51.34	50.66	50.17	53.59	51.67

Table 1 (continued)

	Budget indicator	Category of city	2018	2019	2020	2021	2022	Average
Expenditures	Total per capita (PLN)	Non-shrinking cities	7,041.39	7,816.52	8,239.30	8,691.51	9,151.06	8,187.96
		Shrinking cities	5,181.18	5,620.47	6,179.09	6,601.15	7,282.37	6,172.85
	Property per capita (PLN)	Non-shrinking cities	1,167.89	1,198.89	1,125.27	1,162.39	1,150.02	1,160.89
		Shrinking cities	903.77	839.63	809.23	827.73	1,085.95	893.26
	Current expenditures per capita (PLN)	Non-shrinking cities	5,802.50	6,545.85	7,050.01	7,408.76	7,785.15	6,918.45
		Shrinking cities	4,244.49	4,738.94	5,319.89	5,686.57	6,090.12	5,216.00
	Benefits for individuals per capita (PLN)	Non-shrinking cities	848.44	1,127.86	1,412.27	1,387.28	1,027.32	1,160.63
		Shrinking cities	998.19	1,213.96	1,492.62	1,469.48	1,318.55	1,298.56
	For debt servicing per capita (PLN)	Non-shrinking cities	33.93	38.67	33.39	24.14	94.13	44.85
		Shrinking cities	34.30	35.42	40.43	33.29	23.42	33.38

Source: the author's elaboration based on Statistic Poland – Local Data Bank (2023).

VI. CONCLUSIONS

The article deals with the problem of the financial consequences associated with shrinking cities. Due to the fact that this issue has not been sufficiently researched so far, the study began with a review of the literature on the subject, focusing on the way in which demographic processes impact the city's economy and, consequently, their budgets. Starting from a systemic approach to cities, in which special attention is paid to the social component, as well as the manifestations of socio-economic life, it was indicated that the depletion of human capital as a result of the shrinking of cities may have multidimensional effects on the economies of cities. The social and economic layer of each local government unit is their revenue base. The existence and size of tax bases or the calculation of local fees affecting the state of revenue depend on the activities undertaken by inhabitants and enterprises located in cities. The larger the tax base, the greater the city's own revenue and the smaller the external revenue. The depletion of the tax base as a result of the loss of human capital in shrinking cities can lead to lower revenues and an increase in spending needs.

The financial analyses presented in the article show that the majority of budgetary revenue per capita was lower in the case of shrinking cities, compared to cities that are not shrinking. These cities also had lower revenue independence. On the other hand, these cities, having smaller financial resources at their disposal, spent significantly less on their tasks compared to cities that are not shrinking – both in terms of capital expenditure (including investment) and their current tasks. However, the shrinking cities recorded higher expenditure on benefits for individuals per capita than in the case of other cities. This confirmed the views presented in the literature that shrinking cities have greater needs in the field of social policy.

The research results presented in the article have theoretical and practical value. In a theoretical sense, the research was an attempt to fill the research gap concerning the economic and financial effects associated with shrinking cities in Poland. Thus far, this issue has been rather rarely addressed in the Polish scholarly literature, and it still constitutes an important research challenge due to the intensifying process of city shrinkage. The practical importance of the research results from the fact that the effects of the shrinkage process affect many important areas of the social and economic life of the inhabitants of Polish cities. And in the future they must be taken into consideration in long-term city strategies. The research results may therefore constitute a suggestion for local authorities as to which areas of city functioning should be particularly important in their local policy, in order to ensure an appropriate level of revenues, including their own revenues, and thus continuity in the quantity and quality of public services provided (expenditures).

Particular emphasis should be placed on the following issues: the labour market, socio-economic development, and social assistance. Actions that shrinking cities can undertake in this respect may include investments in technical infrastructure (e.g. roads) and social infrastructure (social care and

health care facilities), as well as in the development of human capital (training, social initiatives, education). However, these activities should also be coordinated with proper fiscal policy (optimal rates of taxes and local fees, transparent rules for granting relief and exemptions, etc.).

This research is the first step for further in-depth research on the financial impact of shrinking cities. It should be noted that the results of the presented research may be subject to a margin of error due to the fact that some of the analysed cities (66 of the 302 cities), in addition to the function of a city, also serve as a poviát (county) and fulfil more tasks, which may be associated with slightly higher financial indicators and their better financial situation per capita compared to other cities in Poland. However, even in this group of cities, most of them (45 out of 66) were undergoing a process of shrinking. Therefore, future research, especially taking the form of case studies, should distinguish between the city and county parts of the budget. Finally, some research limitations in this area should also be pointed out. The impact of demographic changes on the city's budget is quantitatively and logically demonstrable, but the impact of the external environment on local government in Poland is so large that it is methodically difficult to measure. Perhaps it requires in-depth qualitative analysis. This is due to the current problems of the local government in connection with the changing external environment, especially the macroeconomic and legal conditions of its functioning.

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