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Economic motives of *homo economicus* location decisions in the context of shrinking cities in Poland

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Abstract

Motivation: Currently, two trends are observed in the development of cities worldwide. There is a group of cities that have been systematically growing in population and a group of cities that have been rapidly losing their inhabitants in recent years (this is the so-called process of urban shrinkage). Many factors condition decisions to leave one's city and choose another. Therefore, this article addresses the problem of identifying economic factors that may influence decisions about the choice of the place of life and work of the economic man (homo economic – h.e.). The concept of h.e. is based on the assumption of the rationality of economic decisions (in terms of consumption and economic activity) made by the economic man. It may also allow us to understand his location decisions. This man is guided by the desire to achieve the maximum return on all his actions.
Aim: The research aimed to identify factors that differentiate shrinking cities from cities that are not undergoing this process in the context of the decision of the homo economicus to change the place of residence and choose his new place of residence.
Results: The conducted research shows that h.e. when deciding whether and where to leave in search of a better place to live and work, may take into account factors that differenti-

ate shrinking cities from cities that are not experiencing a loss of inhabitants. These factors include, in particular, local investment expenditure, expenditure on education and social welfare, housing situation, city innovation manifested in the development of higher-order services, and unemployment level. The values of indicators describing these features indicate a better situation of growth cities compared to shrinking cities. In shrinking cities, a worse situation may affect migration decisions h.e., while in growth cities, their favorable levels may attract h.e.

Keywords: homo economicus; shrinking cities; demography
JEL: H72; J11; R51

1. Introduction

The evolution of the *homo economicus* (in short, h.e.) paradigm in terms of his preferences and criteria for making choices can contribute to a better understanding of the location decisions of modern man looking for an optimal place to live and work. This problem is part of a growing dichotomy that has begun to appear in many cities worldwide. There are cities that, thanks to their good conditions, constantly attract new residents and those that are characterized by an increased outflow. The latter cities are called shrinking cities. In addition to the deteriorating demographic situation, they are also experiencing an economic crisis, which, without the appropriate approach of city authorities, may mean a vicious circle and the outflow of subsequent residents.

The article assumes that the concept of h.e. can contribute to explaining the location decisions of city dwellers who make two types of decisions based on their benefits: whether and, if so, where to move. It was assumed that these decisions, like most decisions of an economic man, are primarily conditioned by economic factors and aim to maximize utility and minimize the costs of his choices. However, it should be remembered that these factors, in the case of such important life decisions, are not always dictated solely by economic conditions. The above problem was related to the unfavorable depopulation processes in cities, which have been significantly intensified in Poland in recent years. However, it is also important to note that one of the reasons for the shrinkage of cities in Poland over the last dozen or so years has been suburbanization, which is not always associated with an economic justification for moving out of the city but especially with a different quality of life on the suburban outskirts.

In connection with the above, the research undertaken in this article aimed to identify factors that differentiate shrinking cities from cities that are not undergoing this process in the context of *homo economicus* decisions about changing residence and choosing a new place of residence. The following research hypothesis was adopted in the study: shrinking cities differ

significantly from cities that are not undergoing shrinking in terms of economic factors determining the location of h.e.

The first research method adopted was the population size analysis to identify Poland's shrinking cities. To assess the differentiation of shrinking cities from non-shrinking ones and to identify economic factors that differentiate the aforementioned cities in a statistically significant way, the Kruskal-Wallis nonparametric test was used, which is an equivalent of the one-way ANOVA analysis of variance, but is based on ranks, not means. It is used when the variables do not have a normal distribution. The research's time scope covered 2019–2023, and the territorial scope covered all 302 urban municipalities in Poland.

The article consists of several parts. The first part critically reviews the literature relating to the concept of *homo economicus* and to urban conditions that may constitute the basis for decisions on the location of h.e. Then, the methodological aspects of the research are presented. The next part presents the results of the research with elements of discussion. The whole article ends with conclusions summarizing the results of the study.

2. Literature review

The concept of *homo economicus* was created in the classical economy and is attributed to Adam Smith or John Mill. J. Mill pointed to the rules that govern human behavior. According to him, as an economic entity, man strives to multiply and consume his wealth. Man is not subject to any other limiting factors in his choices apart from those that oppose the striving to multiply wealth, and these are "aversion to work" and "the striving for momentary indulgence in expensive pleasures" (Urbina & Ruiz-Villaverde, 2019, p. 65; Dzionek-Kozłowska, 2018, pp. 21, 32).

This concept was also developed by later marginalists, who decided to replace the purpose of management with more general categories: maximizing pleasure, satisfaction, benefits, and the level of satisfaction of needs (utility). These concepts referred to subjective categories instead of Mill's objective wealth category. In the context of factors inhibiting wealth, marginalists introduced the assumption that h.e. avoids effort, pain, or unpleasantness, which they defined as a negative utility (Dzionek-Kozłowska, 2017). What connects Mill's concept and the marginalists is the rationality of *homo economicus*'s action. Vilfredo Pareto associated rationality with purposefulness and consideration of all means leading to it, also considering the consumer's tastes and preferences, which can be arranged on indifference curves. Max Weber assumed that h.e. is perfectly rational and his entrepreneurial actions are purposefully rational, that is, aimed at achieving a goal while considering the possible means and side effects of choosing the means and achieving that goal (Dzionek-Kozłowska, 2018, p. 71).

The next step in the evolution of the concept of *homo economicus* was formulating the rational choice theory, the foundations of which were defined by Paul Samuelson. His approach defines rationality as internal coherence concerning the subject's preferences. The representatives of his theory departed from the principle of utility maximization in favor of choosing the option located highest on the scale of preferences and, therefore, the most accessible to the individual (Dzionek-Kozłowska, 2018, p. 87).

In the second half of the 20th century, there was a growing interest in the concept of rational choice and, indirectly, in the earlier concept of *homo economicus*. This theory also became present in other sciences explaining various human behaviors (e.g., procreative decisions, combating crime, and the effectiveness of punishment). Currently, however, the *homo economicus* theory is subject to verification, e.g., in behavioral economics, which postulates taking into account non-rational factors in the decisions made (Brzezicka & Wiśniewski, 2014; Meyer, 2016).

To sum up the historical development of the concept of homo economicus, we can distinguish five of its basic features (Urbina & Ruiz-Villaverde, 2019, pp. 65–67):

- h.e. thinks, decides, and acts following one's own interests (individualism);
- h.e. optimizes behavior: calculates costs and benefits and strives to achieve the best result, taking into account available means (the consumer maximizes utility within a limited budget, and the entrepreneur maximizes profits within given production possibilities and costs);
- h.e. processes available information fully and correctly (full rationality);
- the process of shaping h.e. preferences goes beyond the scope of economics, and *homo economicus* can organize them (exogeneity of preferences);
- the concept of h.e. was to be universal in all times and places and to all human behaviors.

Homo economicus' decisions regarding acts of consumption and the multiplication of his resources also refer to actions related to the choice of his place of residence, which is often identical to the place of work and the place of realization of his life goals. In this case, h.e. may consider the choice of a settlement unit in which he will maximize his wealth and achieve these goals while considering various factors. The choice of a city to settle in is a choice between a finite number of alternatives, but it is, in fact, twofold – h.e. considers whether to move and then what direction to take. The first choice depends on the economic equilibrium level occurring in *homo economicus*'s current situation and the available migration opportunities. The second choice is dependent on the positive consideration of the first choice. Then, it involves balancing a number of variables to achieve the desired level of utility while considering other factors, such as transaction and opportunity

costs (Keunen, 2020, p. 217). Accordingly, assuming that h.e. can change his place of living, he considers his current economic equilibrium and the level of future utility of the decision concerning its costs.

Economic factors of *homo economicus* location decisions refer primarily to the possibilities offered by the target local government unit in comparison with the current place of residence. According to Simpson (2022), the factors considered when choosing h.e. for the first time may be low wages and poverty, high taxes, high unemployment, and overpopulation. When choosing h.e. for the second time, these factors will affect the final utility of the decision: demand for labor, high wages, high social benefits and low living costs, adequate medical care, education system, economic growth, innovation, and competitiveness of the city. These possibilities are inscribed in the socio-economic system created by local government units. They are considered a set of economic and political solutions established and internalized in society (Czempas, 2011, p. 5). According to Parysek (2015), each local government unit, which is a complex system of various relationships, is defined by three groups of elements:

- composition – as a set of elements that create a whole, which are residents, economic entities, and other objects;
- environment – as elements that are not part of the unit but are in relation to these elements (external environment), as well as internal elements, which consist of the social and material background ensuring its coherence;
- structure – i.e., relations between the components that make up a unit (internal structure) and between the components of a unit and the elements of the external environment (external structure), causing mutual changes in individual elements' behavior, trajectory and history.

To sum up the above considerations, it can be stated that *homo economicus* location decisions are dictated by the situation on the labor market, the state of the economy, public finances, education, health care, social welfare, infrastructure, as well as housing conditions (Wichowska, 2020). However, Poland's cities are diverse regarding the above-mentioned conditions, which h.e. decisions may follow. A significant group of cities (so-called shrinking cities) are experiencing a systematic loss of their inhabitants and cities that are not undergoing this process. Shrinking cities, apart from population loss, may also be characterized by a deteriorating economic situation, which is visible in the longer term – most often, a horizon of at least 5 years is assumed (Fernandez & Hartt, 2022; Stryjakiewicz & Jaroszewska, 2016, p. 28). This situation entails, among others, a deteriorating situation in the labor market in terms of labor demand and supply (Wolff & Wiechmann 2014, p. 7; Szalanska et al., 2023; Van Dalen & Henkens, 2011, p. 446), falling demand and supply of some goods (Haartsen & Van Wissen, 2012, pp. 495–496), falling entrepreneurship (Nelle, 2016; Herrmann et al., 2016, p. 968), competitive-

ness and innovativeness of the city (Kwaśny et al., 2022, p. 233), as well as municipal finances (Wichowska 2021; Carbonaro et al., 2018; Rios & Cabases, 2017). Urban shrinkage is also associated with social phenomena, such as population aging, negative natural increase, industry structural problems, and public infrastructure deterioration. Therefore, it is assumed that *homo economicus* will leave these cities heading for growth units.

3. Methods

The main objective of this article is to identify factors that differentiate shrinking cities from cities that are not undergoing this process in the context of *homo economicus*, decisions to change the place of residence, and choose a new place of residence. The following research hypothesis was adopted in the study: shrinking cities differ significantly from non-shrinking cities in terms of economic factors that determine the location of *homo economicus*.

The territorial scope of the study covered all urban municipalities in Poland, including cities with county rights, which were divided into two groups: those undergoing the process of shrinking and those not experiencing it. The demographic criterion was adopted for classifying cities as shrinking cities, indicating that shrinking cities are those in which the number of inhabitants decreases by 0.15% each year over 5 years (Wichowska, 2023; Wichowska, 2024). In connection with the above, the study adopted a five-year research period: 2019–2023. The territorial scope of the study covered all 302 urban municipalities in Poland.

The first research method adopted was the population size analysis to identify Poland's shrinking cities. To assess the differentiation of two groups of cities and identify economic factors that differentiate the above-mentioned cities in a statistically significant way, the Kruskal-Wallis nonparametric test was used, which is a nonparametric equivalent of the one-way ANOVA analysis of variance, but is based on ranks, not means. It is used when the variables do not have a normal distribution. The distribution was assessed using the Shaphiro-Wilk test for each variable in the subsequent years of the research period. The Kruskal-Wallis test allows us to assess whether independent samples come from the same population (Stanisz, 2006, p. 386). This test is based on the ranks of observations. If all samples come from one population, the mean ranks in the individual groups will be similar (SPSS Statistics, 2021). The test hypotheses have the following form:

H_0: $F_1=\cdots=F_k$ (all samples come from one population);
H_1:$\exists i,j\in\{1,\ldots,k\}$ $F_i\neq F_j$ (not all samples come from the same populations).

The study adopted a set of 32 variables, mainly economic, which were used to determine the differentiation of shrinking and non-shrinking cities in terms of the prevailing conditions. Thus, their potential usefulness in terms of h.e. location decisions. The scope of variables was dictated by data availability at the commune level in the Statistic Poland database (2024). These variables were factors from the following categories:

- Public finances – variables per capita: x1 – total revenue; x2 – own revenue; x3 – revenue from the city's share in PIT; x4 – revenue from the city's share in CIT; x5 – local taxes; x6 – earmarked subsidies; x7 – general subsidy; x8 – funds for financing and co-financing EU projects; x9 – total expenditure; x10 – investment expenditure; x11 – expenditure on health care; x12 – expenditure on social assistance; x13 – expenditure on education and upbringing;
- Infrastructure – share of residents in the total number of residents (%) using: x14 – water supply; x15 – sewage system; x16 – gas;
- Housing resources – x17 – average usable area of an apartment (m2); x18 – average usable area of an apartment per 1 person; x19 – number of apartments per 1,000 inhabitants;
- Trade and gastronomy – number of facilities per 1,000 inhabitants – x20 – hypermarkets; x21 – supermarkets.
- Outpatient health care – x22 – medical consultations per 100 residents;
- Beneficiaries of community social assistance – x23 – beneficiaries of community social assistance per 10,000 inhabitants;
- Family benefits – x24 – amount of family benefits per 1 resident;
- Entities of the national economy – x25 – economic entities entered into the register per 1,000 inhabitants of working age; x26 – newly registered entities per 1,000 inhabitants; x27 – natural persons conducting economic activity per 100 inhabitants of working age; x28 – economic entities in higher-order services per 1,000 inhabitants;
- Construction – x29 – apartments put into use per 1,000 inhabitants;
- Labor market – x30 – share of registered unemployed in the working-age population (%);
- Education – x31 – gross enrolment ratio (primary schools);
- Public transport – x32 – bus and tram stops per 1 resident.

In the course of the study, variables that did not differentiate shrinking cities from those that were not shrinking statistically significantly were eliminated. Then, using the r-Pearson correlation, variables that carried the same information were eliminated. Variables most correlated with the others in individual years were rejected, and the threshold level of the correlation coefficient was set at $r=|0.5|$. The variables that remained were considered factors that the *homo economicus* can consider when making two types of decisions: whether to leave and to which city. These factors were then cor-

related with the internal migration balance to examine their relationship with the actual population flows.

4. Results

As a result of the population analysis in Poland's urban municipalities, 217 units were considered shrinking cities in 2023. Eighty-five cities did not undergo this process. This means that 72% of urban municipalities experienced a long-term decrease in inhabitants. Table 1, due to the smaller number of cities not undergoing shrinkage, presents their list.

The differentiation between shrinking and non-shrinking cities was assessed in the next step using the nonparametric Kruskal-Wallis test. The distribution was assessed using the Shaphiro-Wilk test for each variable in the subsequent years of the research period. For 32 variables, it was other than normal.

The results of the analysis conducted using the Kruskal-Wallis test indicate that the variables that statistically significantly differentiated shrinking and non-shrinking cities for at least 3 out of 5 years of the study were variables from the following categories:

- Public finances – variables per capita: x1 – total revenue; x2 – own revenue; x3 – revenue from the city's share in the state budget revenue from PIT; x9 – total expenditure; x10 – investment expenditure; x13 – expenditure on education and upbringing;
- Housing resources – x17 – average usable area of an apartment (m2); x18 – average usable area of an apartment per 1 person; x29 – apartments put into use per 1,000 inhabitants;
- Social assistance and family benefits; x12 – expenditure on social assistance per capita; x23 – beneficiaries of community social assistance per 10,000 inhabitants; x24 – amount of family benefits per capita;
- Entities of the national economy – x25 – economic entities entered into the register per 1,000 inhabitants of working age; x26 – newly registered entities per 1,000 inhabitants; x27 – natural persons conducting business activity per 100 inhabitants of working age; x28 – economic entities in higher-order services per 1,000 inhabitants;
- Labor market – x30 – share of registered unemployed in the working-age population (%).

For the 17 variables listed above, the H0 hypothesis had to be rejected in favor of the H1 hypothesis, which meant that not all samples came from the same populations. The exact results of the analysis using the Kurskal-Wallis test are presented in Table 2. It can therefore be stated that the above variables differentiate shrinking cities compared to non-shrinking cities, and therefore these factors can potentially influence the location decisions of *homo economicus*.

Table 3 presents the median level for the above variables for the entire study period, divided into shrinking and non-shrinking cities. These data clearly show that the group of non-shrinking cities was in a much better situation. These cities recorded higher total budget revenues, own revenues, and income from personal income tax per capita (the most significant difference in the medians concerned the latter – they were 17% higher in non-shrinking cities). These revenues were also associated with higher total and investment expenditures per capita, in which case the difference in favor of non-shrinking cities was almost 20%. In terms of expenditures on social assistance, non-shrinking cities incurred lower expenditures per capita by as much as 23%, which could be dictated by a lower demand for such benefits than in the case of shrinking cities. The situation was similar also in the case of the number of family benefits per capita and the number of beneficiaries of community social assistance per 10,000 inhabitants (in shrinking cities, the medians were higher by 14% and 25%, respectively). Moreover, cities that were not shrinking were characterized by higher expenditure on education and upbringing per capita and thus implemented a wider range of tasks in the area of education (by 16%). The inhabitants of these cities could also enjoy a better housing situation, which was associated with an average higher usable area of apartments per 1 person and a higher number of apartments put into use per 1,000 inhabitants (more by 9%, 7%, 47%, respectively). Also, in the case of variables concerning entities of the national economy, the situation was much better in the case of non-shrinking cities (in most cases, the difference was a dozen or so percent), which certainly had an impact on the level of unemployment, in which case the non-shrinking cities again fared more favorably (the difference in favor of the non-shrinking cities was as much as 32%).

When analyzing the list of the above variables, it was assumed that they could be correlated, i.e., some variables carry the same information. Therefore, in the last step of the analysis, it was decided to eliminate correlated variables above the value of the correlation coefficient $r=|0.5|$. After this procedure, the following variables remained in the subsequent analyzed years:

- 2019: x10, x11, x12, x13, x17, x24, x25, x29 and x30;
- 2020: x10, x12, x13, x17, x24, x28, x29 and x30;
- 2021: x10, x12, x13, x17, x24, x27, x29 and x30;
- 2022: x10, x12, x13, x17, x24, x28, x29 and x30;
- 2023: x10, x12, x13, x17, x24, x28, x29 and x30.

It follows from the above that *homo economicus*, deciding whether and where to live in search of a place to live and work, may consider these choices in the context of the most frequently occurring variables in recent years. In connection with this, investment expenditure per capita may prove crucial for him, indicating the city's development. These expenditures may translate primarily into the improvement and better availability of technical and

social infrastructure and, consequently, into an increase in entrepreneurship and new jobs, as well as an improvement in residents' quality of life. Higher expenditures on education may also be important, as they may indicate a broader fulfillment of educational tasks by the city, and for h.e. may constitute an important motive for h.e. to leave shrinking cities in the context of searching for educational opportunities for him or his family. Analyses also show that the higher the per capita expenditures on social assistance in a city and the lower the amount of family benefits per capita, the better the economic situation of its residents may mean for the city. In shrinking cities, these results may indicate growing social problems. They may also be a reason for the migration of h.e., who perceives these cities as less conducive to realizing his needs and life goals. From the point of view of h.e., the housing situation in the city may also be important. This is currently a significant challenge for many local government units in Poland and a criterion for choosing a place to live and work for h.e. The appropriate quality of housing resources is one of the key factors influencing the choice of the target place of residence by *homo economicus*. This is especially true for the supply and price of apartments. In addition to housing conditions, the innovativeness of the urban economy is also important, which can be manifested by numerous entities operating in higher-order services (e.g., in the field of information and communication, financial and insurance activities, real estate services, professional, scientific and technical activities, education, culture, entertainment, and recreation). The level of unemployment will also be significant, which confirms that the availability of jobs is one of the fundamental motivators of *homo economicus* migration.

The above-mentioned findings also confirmed the levels of the correlation coefficient of the indicated variables with the migration balance per 1,000 inhabitants in the analyzed cities. These results in most years of the analyzed period indicated a statistically significant relationship between the above variables and the migration balance per 1,000 inhabitants and favorable relationships for variables that are stimulants (factors attracting h.e. to the city) and unfavorable for factors that are destimulants in decisions about the departure of h.e. from a given city.

The above observations confirmed the conclusions from the studies cited in the literature review. On the one hand, unfavorable levels of the identified features may constitute motives for deciding on whether *homo economicus* will decide to change its location. On the other hand, in growth cities, favorable levels of these features may constitute attractants for migration of h.e. The studies also confirmed that socio-economic indicators in shrinking Polish cities are at a lower level than those not undergoing this process. These results are quite unambiguous about the disadvantage of shrinking cities in terms of all the analyzed variables.

5. Conclusion

Based on the research presented in this article, it can be stated that the differences observed in the literature on the subject between shrinking and non-shrinking cities were confirmed. It also turned out that economic variables were related to decisions about changing and choosing the place of living and working of *homo economicus*. It can therefore be stated that the assumptions of the *homo economicus* paradigm, indicating that his decisions are based on a rational choice that maximizes benefits and minimizes costs, are significant factors influencing the location decisions of *homo economicus*. It should also be noted that these differences, and especially the worsening economic situation of shrinking cities in comparison to developing cities, may be a cause - a factor pushing homo economicus out of the shrinking city; on the other hand, the negative situation may be the result of migration processes. These decisions may depend on the differences observed in shrinking cities compared to cities that do not experience the effects of depopulation.

The above differences referred to several areas: local expenditure on investments, education, and social assistance, as well as the housing situation, economic innovation, and the labor market. These areas may also be key in the context of cities' future social and economic development. The better conditions are created in these areas, the more attractive cities become for h.e., considering the economic conditions of the individual to whom he wants to move.

The theoretical concept of *homo economicus* allows for a better understanding not only of migration mechanisms but also to direct the actions of local authorities, which should strive to improve the socio-economic conditions in cities affected by depopulation. Therefore, the analyses conducted in this article may reveal Polish cities' challenges because, as noted at the beginning, the process of shrinking Polish cities is intensifying yearly. Therefore, the authorities of shrinking cities must be aware of the areas that can attract new residents and conduct appropriate local policies in these areas. In particular, this concerns phenomena such as unemployment, the excessive economic dependence of residents on social assistance, and limited investment opportunities, which may lead to even greater migration of residents towards growth cities. In this respect, city authorities should strive to improve the innovativeness of the economy (especially higher-order services), support entrepreneurs, e.g., by using a stable tax policy, and create an appropriate investment climate and new jobs. An important area requiring action, especially in post-industrial cities, may be the revitalization of urban space and pro-ecological activities.

Finally, it is worth adding that the h.e. concept does not cover all the motivations underlying a person's location decisions. In practice, the choice of residence is more complex and does not depend solely on the number of

operating companies or well-functioning hospitals and schools. Many non-economic reasons influence location decisions. Among them, the culture, sports, and entertainment offered by the city, the proximity of family and friends, sentimental attachment to the place or lower housing prices, and proximity to infrastructure may be particularly important. It can also be noted that economic factors do not have to be so important when choosing a place of residence due to the possibility of remote work.

The conducted research may constitute a starting point for further research in the field of identifying the decision-making factors of *homo economicus* that affect his choice of place and life. Such research may take the form of quantitative or qualitative. In particular, it may include an analysis of the individual migration motives of h.e. It could take the form of questionnaire studies conducted among people who have already decided to migrate and those who are considering it soon. In addition, an interesting research direction may be assessing cities' strategies for attracting new residents.

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Appendix

Table 1. Cities in Poland by voivodeship that did not shrink in 2019–2023

Voivodeship	Cities	Number
Dolnośląskie	Szklarska Poręba, Świeradów-Zdrój, Oława, Szczawno-Zdrój, Wojcieszów, Wrocław	6
Kujawsko-Pomorskie	Ciechocinek, Brodnica, Kowal	3
Lubelskie	Terespol, Lublin	2
Lubuskie	Kostrzyn nad Odrą, Zielona Góra	2
Łódzkie	Konstantynów Łódzki	1
Małopolskie	Limanowa, Mszana Dolna, Grybów, Nowy Targ, Jordanów, Sucha Beskidzka, Kraków, Nowy Sącz	8

Voivodeship	Cities	Number
Mazowieckie	Garwolin, Milanówek, Podkowa Leśna, Mińsk Mazowiecki, Sulejówek, Mława, Nowy Dwór Mazowiecki, Józefów, Piastów, Pruszków, Sokołów Podlaski, Węgrów, Kobyłka, Marki, Ząbki, Zielonka, Siedlce, M. st. Warszawa	18
Opolskie	Opole	1
Podlaskie	Wysokie Mazowiecki, Białystok, Łomża, Suwałki	4
Podkarpackie	Łańcut, Rzeszów	2
Pomorskie	Pruszcz Gdański, Kościerzyna, Krynica Morska, Puck, Skórcz, Reda, Rumia, Gdańsk, Gdynia	9
Świętokrzyskie	brak	0
Śląskie	Wojkowice, Szczyrk, Ustroń, Pyskowice, Mikołów, Orzesze, Kalety, Miasteczko Śląskie, Radzionków, Tarnowskie Góry, Imielin, Lędziny, Mysłowice, Żory	14
Warmińsko-Mazurskie	Działdowo, Ełk, Iława, Lubawa	4
Wielkopolskie	Kościan, Sulmierzyce, Luboń, Obrzycko, Wągrowiec, Złotów, Poznań	7
Zachodniopomorskie	Stargard, Koszalin, Szczecin, Świnoujście	4
	Suma	85

Source: Own preparation based on Statistic Poland (2024)

Table 2. Results of the Kruskal-Wallis test analysis: H statistic (1, N=302) and the level of the *p* coefficient in the assessment of the differentiation of shrinking cities from non-shrinking cities in 2019–2023

Variables	2019	2020	2021	2022	2023
X1	H=18,1 p=0,00	H=11,77 p=0,00	H=14,10 p=0,00	H=7,31 p=0,0	H=7,30 p=0,01
X2	H=15,49 p=0,00	H=11,33 p=0,00	H=8,18 p=0,00	H=9,18 p=0,0	H=6,08 p=0,01
X3	H=21,58 p=0,00	H=19,02 p=0,00	H=17,94 p=0,00	H=33,63 p=0,00	H=18,14 p=0,00
X4	H=1,89 p=0,17	H=0,47 p=0,50	H=0,88 p=0,35	H=0,41 p=0,52	H=0,22 p=0,64
X5	H=1,49 p=0,22	H=0,66 p=0,98	H=0,63 p=0,43	H=0,00 p=0,96	H=0,01 p=0,94
X6	H=3,10 p=0,08	H=1,46 p=0,23	H=4,25 p=0,04	H=0,03 p=0,86	H=0,19 p=0,67
X7	H=1,48 p=0,22	H=0,20 p=0,66	H=2,39 p=0,12	H=0,05 p=0,83	H=0,74 p=0,3
X8	H=0,34 p=0,56	H=0,00 p=0,96	H=0,08 p=0,78	H=0,08 p=0,78	H=4,83 p=0,03
X9	H=20,09 p=0,00	H=12,72 p=0,00	H=11,22 p=0,00	H=6,86 p=0,01	H=8,58 p=0,00
X10	H=7,48 p=0,01	H=4,15 p=0,04	H=8,46 p=0,00	H=5,94 p=0,02	H=14,08 p=0,00
X11	H=2,82 p=0,09	H=0,43 p=0,51	H=1,25 p=0,26	H=0,68 p=0,41	H=1,21 p=0,27
X12	H=23,79 p=0,00	H=26,45 p=0,00	H=25,2 p=0,00	H=12,30 p=0,00	H=23,38 p=0,00

Variables	2019	2020	2021	2022	2023
X13	H=25,82 p=0,00	H=16,86 p=0,00	H=17,96 p=0,00	H=18,38 p=0,00	H=24,77 p=0,00
X14	H=2,63 p=0,11	H=2,49 p=0,11	H=2,47 p=0,12	H=2,43 p=0,12	H=2,38 p=0,12
X15	H=0,21 p=0,65	H=0,22 p=0,64	H=0,24 p=0,63	H=0,22 p=0,64	H=0,20 p=0,66
X16	H=0,11 p=0,74	H=0,23 p=0,63	H=0,09 p=0,77	H=0,16 p=0,69	H=0,07 p=0,80
X17	H=37,95 p=0,00	H=29,51 p=0,00	H=28,95 p=0,00	H=28,43 p=0,00	H=28,08 p=0,00
X18	H=40,19 p=0,00	H=33,40 p=0,00	H=31,12 p=0,00	H=30,82 p=0,00	H=28,61 p=0,00
X19	H=1,00 p=0,32	H=3,62 p=0,06	H=4,22 p=0,04	H=4,17 p=0,05	H=4,66 p=0,03
X20	H=0,82 p=0,37	H=0,81 p=0,37	H=1,88 p=0,17	H=2,41 p=0,12	H=2,99 p=0,08
X21	H=1,82 p=0,18	H=4,33 p=0,05	H=5,26 p=0,02	H=7,23 p=0,01	H=5,32 p=0,05
X22	H=2,78 p=0,10	H=4,27 p=0,04	H=4,52 p=0,03	H=3,19 p=0,07	H=3,68 p=0,06
X23	H=17,32 p=0,00	H=21,05 p=0,00	H=19,31 p=0,00	H=22,13 p=0,00	H=24,87 p=0,00
X24	H=7,69 p=0,01	H=11,60 p=0,00	H=13,73 p=0,00	H=18,84 p=0,00	H=21,93 p=0,00
X25	H=15,82 p=0,00	H=10,31 p=0,00	H=10,08 p=0,00	H=10,39 p=0,00	H=11,67 p=0,00
X26	H=40,78 p=0,00	H=26,25 p=0,00	H=33,37 p=0,00	H=34,23 p=0,00	H=39,53 p=0,00
X27	H=26,71 p=0,00	H=20,22 p=0,00	H=21,30 p=0,00	H=22,60 p=0,00	H=23,90 p=0,00
X28	H=10,89 p=0,00	H=8,34 p=0,00	H=9,42 p=0,00	H=10,82 p=0,00	H=12,29 p=0,00
X29	H=58,69 p=0,00	H=52,17 p=0,00	H=50,48 p=0,00	H=43,88 p=0,00	H=23,39 p=0,00
X30	H=22,33 p=0,00	H=24,64 p=0,00	H=23,51 p=0,00	H=22,73 p=0,00	H=26,07 p=0,00
X31	H=0,35 p=0,56	H=0,71 p=0,40	H=0,68 p=0,41	H=0,12 p=0,73	H=0,05 p=0,82
X32	H=0,12 p=0,73	H=0,02 p=0,89	H=0,13 p=0,72	H=0,22 p=0,64	H=0,24 p=0,62

Source: Own preparation.

Table 3. The median of variables characterizing shrinking and non-shrinking cities and the percentage difference between them

Variables	Shrinking cities	Non-shrinking cities	Difference (%)
X1	6 248.90	6 902.22	9.47
X2	3 125.21	3 479.96	10.19

Variables	Shrinking cities	Non-shrinking cities	Difference (%)
X3	1 038.08	1 253.44	17.18
X9	5 959.65	6 555.31	9.09
X10	748.56	935.18	19.96
X12	371.69	301.62	-23.23
X13	1 705.14	2 039.00	16.37
X17	66.20	73.00	9.32
X18	28.20	30.30	6.93
X23	372.00	296.00	-25.68
X24	0.30	0.2	-14.38
X25	205.80	226.20	9.02
X26	7.83	9.64	18.78
X27	14.73	16.87	12.69
X28	44.30	50.70	12.62
X29	3.10	5.80	46.55
X30	4.10	3.10	-32.26

Source: Own preparation based on Statistic Poland (2024).