

“HARD” AND “SOFT” PRIVATIZATION OF MUNICIPAL HOUSING: A CASE STUDY OF THE WARMIA AND MAZURY PROVINCE IN POLAND

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Keywords: municipal housing, public-private condominiums, housing privatization, management privatization, Warmia and Mazury Province	Public housing privatization has changed the ownership and management patterns in Europe, leading to the emergence of many housing properties with a mixed (public-private) ownership structure. This study investigates the actual privatization degree of ownership and management in public-private housing condominiums (PPHCs) in Poland. In particular, the dependencies between these two types of housing privatization were identified. To achieve the aim of the study a multi-stage research methodology was applied, which was based on the triangulation of research methods such as questionnaire interviews, cluster analysis (using the agglomeration technique and Kohonen artificial neural network), and correlation analysis. Empirical research was conducted on the sample of the 30 largest municipalities from the Warmia and Mazury Province in Poland. The results showed different quantitative characterization and rather loose dependencies between the privatization of ownership and management of municipal housing in the sample of municipalities. This did not allow us to confirm the hypothesis that the privatization of ownership of municipal housing stock in PPHCs under study adequately drove the privatization of management in these properties. Therefore, the analysis of social, managerial, and institutional barriers to the privatization of property management services in PPHCs was recommended as a direction for further research.
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1. Introduction

The later part of the 20th century saw a turning point in the housing policies of Eastern and Western Europe, as well as other continents. Europe, Australasia, and the USA were characterized by a receding involvement of public authorities in public housing and a general instability within different housing systems in the 1980s, with this trend continuing through the 1990s and into the new century (Forrest & Lee 2003, p. 264). Under these changing policies, a significant portion of public housing stock has been sold to tenants in recent decades (Jones & Murie, 2006; Czischke & van Bortel, 2023). Public housing privatization has created a new class of homeowners and significantly affected the tenure structure in Western, Central, and Eastern European countries. As a result, mixed (condominium)

ownership spread in many countries, creating new challenges in housing management (Rabenhorst & Ignatova, 2009; Gruis et al., 2010). It is therefore believed that one of the most important impacts of privatization on the future development of the large post-Second World War housing estates in Europe was the change in the patterns of ownership and management of the estates (Kempen et al., 2005). In Western European (WE) countries, the general move away from public (social) housing since the mid-1970s was part of the wider neo-liberal policies that were motivated by an ideological turn to the right and by the effort to decrease public spending by reducing the welfare state. In parallel, the ideas of New Public Management (NPM) rooted in public choice theory and new institutional economics began to permeate

the housing sector (Ferlie et al., 1996; Walker, 2000; Laffin, 2019). Different pathways, forms, and effects of social housing privatization in Western Europe have been well documented (e.g. Harloe, 1995; Kleinman, 1996; Doling, 1997; Goodlad & Atkinson, 2004; Kempen et al., 2005; Jones & Murie, 2006; Aalbers & Holm, 2008; Elsinga et al., 2008; Holm, 2011; Ronald, 2013; Scanlon et al., 2015; Disney & Luo, 2017; Kitzmann, 2017; Lel  v  rier, 2023). By far the most important form of housing privatization was the sale of public (municipal) dwellings to individual households (mainly to sitting tenants) at discounted prices. However, the second form of privatization in WE countries consisted of large-scale transfers of publicly-owned housing assets (municipal housing stocks and entire housing companies) to private non-profit housing associations (such as in the UK or the Netherlands) or large commercial institutional investors (such as in Germany). Transferring the ownership and management of local authority housing to housing associations against the reduction in government financing for housing has put increasing pressure on these organizations to be more competitive (Boelhouwer et al., 1997; Priemus et al., 1999; Gruis & Niebour, 2004; Ronald, 2013). As a result, housing associations have been restructured and more rational management methods derived from the private sector have been adopted (Walker, 2000). Meanwhile, such housing management organizations have become more diversified, hybridized, and professionalized by ongoing restructuring processes and mergers (Czischke, 2009; Mullins et al., 2012; Manville & Greatbanks, 2020).

In Central and Eastern European (CEE) countries, the privatization of public (social) housing was introduced more than a decade later, around 1990, influenced by the changes in Western European housing policies, especially recommendations from international organizations (e.g. World Bank). As a multi-stage, complex process, it was part of a broader program of political and economic reforms, including a reduction in the role of central government and public spending on housing, as well as deregulation and decentralization of housing services associated with the transition to a market economy (e.g. Clapham et al., 1996; Heged  s et al., 1996, 2013; Struyk, 1996; Pichler-Milanovicz, 1999, 2001; Lux, 2003; Heged  s & Teller, 2007; Mandi  , 2010; Attwood, 2012; Lux & Sunega, 2014; Kucharska-Stasiak et al., 2014, Smr  kov  , 2017; Broul  kov   & Montag, 2020, Muczy  ski & Goraj, 2021). During the first phase of housing privatization, the emphasis was on ownership

transformation or tenure change. Moreover, in this phase, the decentralization or (re)allocation of state-owned housing stock to local authorities and/or, to a lesser degree, to other institutions, as legal owners, (e.g. companies, public institutions, organizations, etc.) became a common pattern across Central and Eastern Europe (Pichler-Milanovich, 1999). The predominant view was that the decentralization of responsibilities to the local governments would improve service provision according to local needs and consumer preferences and improve the efficiency of budget expenditure (Struyk, 1996). However, the transfer of state-owned housing to local authorities put enormous financial and management pressures on them because, with low rents, they could not afford, without state financial support, to adequately maintain the acquired housing stock, and much less to deal with outstanding repairs and renovations. Under these conditions, it was much easier for municipalities to sell this stock (Kempen et al., 2005), especially as such a sale was in line with the philosophy of the transition and the expectations of the people concerned. Therefore, in the second phase of housing privatization, large-scale sales of public (municipal) housing stock were carried out in most CEE countries. Regardless of the differences between individual countries, common features of such sales included the predominance of the sale of dwellings at heavily discounted prices (or even giving them away for free) to sitting tenants, a high proportion of low-income households, and the poor physical condition of the transferred housing stock, which consisted, to a great extent, of deteriorated multifamily buildings with neglected repairs and serious technical deficiencies (Muczy  ski, 2008, 2011). Sales of public (municipal) rental dwellings in many CEE countries have been linked to housing management reforms and the establishment of housing condominiums (Heged  s et al., 1996, Gruis et al., 2010; Pojani & Baar, 2016).

In this form of housing ownership, which has been promoted in countries in transition by the United Nations (UNECE, 2003, 2019), unit owners in privatized multi-owned housing (MOH) properties, most often operating within the framework of an owners' association, make independent decisions on the maintenance, renovation, and selection of management entities for these properties. Despite the common framework, the detailed principles and practical implementation of the discussed privatization varied considerably from one CEE country to another.

This paper focuses on the municipal housing stock (MHS) privatization in Poland. The scope of the

research includes the privatization (sale) of municipal dwelling ownership to sitting tenants (so-called "hard" privatization),

as well as the privatization (transfer) of management activities of MOH properties involved in privatization processes to private (non-municipal) property management entities (so-called "soft" privatization). In Poland, as in the Czech Republic, tenants of municipal rental dwellings did not receive the unrestricted right to buy, and local authorities were allowed to decide for themselves on the scale and conditions of the privatization of municipal dwellings (Lux, 2003, p. 249). As a result, the pace of MHS privatization was much slower than in most other CEE countries. With the development of the sale of municipal dwellings in Poland, legislative changes were introduced that provided a legal framework for establishing housing condominiums (HCs) created by law in privatizing MOH properties, including responsible bodies, decision-making rules, and models of common property management. The decision-making body in Polish HCs is an organization formed by all of the unit owners, with the membership of each unit owner in this organization being mandatory. This organization - referred to as the Homeowners Association (HOA) - is created automatically when separate ownership of the first unit in HC is established. This means that decisions on the selection of property management entities in individual HCs are made autonomously by a qualified majority of HOA members (i.e. unit owners jointly owning more than 50% shares of the common property). In addition to legislative changes, local markets for private housing management services have developed over time (Muczyński, 2023). There have been significant changes in the environment of the privatizing MHS (an increase in turnover in the housing sales and rental market, changes in the provision of utility services, contracting out of building works, etc.).

The main aim of the study was to identify the dependencies between the actual privatization degree of ownership and management in public-private housing condominiums in Poland. Public-private housing condominiums (PPHCs) are characterized by a hybrid structure of unit owners, meaning that they consist of dwellings owned by both public and private owners, who are simultaneously co-owners of the common property. In practice, the largest proportion of the housing market among all PPHCs in Poland are those in which the functions of public owners of dwellings are performed by local authorities (municipalities). Therefore, the proper subject of the

study was public-private housing condominiums with a share of municipal ownership. These PPHCs have been established as a result of the ongoing privatization (sale) of municipal dwellings to sitting tenants on preferential terms. Municipalities, while owning a portion of the housing units in such PPHCs, act as public co-owners, i.e. members of HOAs with certain rights and obligations over the common property. This means that they decide collectively, with private unit owners, on selecting a particular property management entity to perform common property management. Therefore, in PPHCs where relatively few dwellings have been sold and the majority of the common property shares belong to municipalities, they can effectively select (establish) their own (public) organizational units - municipal property management companies (MPMCs) - for common property management. In PPHCs, however, where the aggregate share of private unit owners in the common property has become dominant (as a result of progressive privatization), the said owners have the opportunity to change the common property management entity from a public (MPMC) one dependent on the municipality to a private property management firm (PPMF) operating in the marketplace. Observations of housing management practice and research suggest that municipal property management companies (MPMCs) - as public entities - are generally considered less efficient and effective than private entities (PPMFs) in providing property management services (e.g. Walker & Van der Zon, 2000; Becker et al. 2001; Nalepka, 2007; Tertelis, 2009; Muczyński, 2022). Boyne and Walker (1999), for example, argue that public entities tend to maximize budgets rather than deliver high-quality services to users and are too large and therefore inefficient. It is thus reasonable to assume that a rational group of private unit owners in a given PPHC, when gaining a dominant share in the HOA, will seek to engage (employ) a private entity (PPMF) to manage the common property. Therefore, in pursuit of the main aim of the study, the research hypothesis was that an increase in the number of PPHCs with a majority share of private unit owners in the common property in a municipality caused an adequate increase in the number of PPHCs in that municipality where property management services have been entrusted to PPMFs, meaning that the "hard" privatization of MHS adequately drove the "soft" one. This hypothesis needs to be verified by empirical research on a selected sample of urban municipalities.

This study is an attempt to fill a gap in the literature on the privatization of public (municipal) housing stock in public-private housing condominiums. This gap is because the privatization processes of ownership and management of the housing stock in question have so far been studied in isolation from each other, i.e. without exploring the relationships (or dependencies) between them. The novelty of the presented research thus lies in conducting a combined analysis of both types of housing privatization on the example of a selected set of Polish municipalities. It should be emphasized that investigating the degree of privatization of ownership and management in PPHCs was possible due to the slow pace of MHS privatization in Poland. The country provides a unique laboratory for studying the discussed type of PPHCs, as they still represent a significant part of the national housing market there. Following the Introduction, this paper contains four sections. The second section induces the material and methods used for achieving the aim of the study; the third section presents and discusses the obtained results of the empirical research; the fourth section concludes the results and formulates recommendations for further research.

2. Material and methods

The study area was the Warmia and Mazury Province (Voivodeship), located in north-eastern Poland (Fig. 1), with Olsztyn as its capital and largest city. It is one of the largest voivodeships in Poland in terms of area, as it covers an area of 24,173.47 km², or 7.7% of Poland's total area, ranking it fourth in this respect. The province has a population of around 1.36 million inhabitants (which is 3.61% of Poland's population) with an average population density of around 56 persons per km² (compared to Poland's average population density of 123 persons per km²). Approximately 60% of the province's population lives in urban areas (cities and towns). Altogether, there are 50 urban units in the province, including 2 cities (Olsztyn, Elbląg) and 48 towns, among which 20 are very small towns with a population of less than 5,000. Administratively, the Warmia and Mazury Province is divided into 21 counties, including 2 city counties and 19 land counties. Land counties consist of 116 municipalities: 16 urban, 34 urban-rural, and 66 rural. The total housing stock in the province at the end of 2022 was 541,836 dwellings (Statistical Office in Olsztyn, 2023), among which urban dwellings predominated (with a share of 64.8%). This equates to 396.5 dwellings per 1,000 inhabitants, with the

average useful floor area of a unit amounting to 69.6 m² (27.6 m² per person). The quantitative structure of the set of 243,200 dwellings located in the province in buildings under management (administration) was dominated in 2022 by dwellings of natural persons located in housing condominiums (62.6%), dwellings belonging to housing cooperatives accounted for 24.3%, while municipal dwellings comprised 10.4% of the set surveyed. Thus, the municipal housing stock in the province comprised a total of 25,317 dwellings, with an average usable floor area of the unit of 43.1 m². This is less than 4.7% of the total housing stock in the province. However, in urban municipalities, this share was much higher, ranging from 5.0 % in Olsztyn to as much as 10.6% in Elbląg.



Fig. 1. Location of the Warmia and Mazury Province. Source: own preparation.

The detailed subject of the study were public-private housing condominiums with a share of municipal ownership (PPHCs), located in the 30 largest urban municipalities (2 cities and 28 towns) in the Warmia and Mazury Province in Poland. The research sample therefore accounted for 60% of all urban municipalities in the province under study.

In selecting the municipalities for the research sample, it was assumed that all urban municipalities in the province with a population of more than 5,000 would be included in the research. Empirical data for achieving the main aim of the study were collected by questionnaire interview method using the formalized technique of access to public information. Thus, at the first stage, a formal letter (with a standardized questionnaire to be filled in) was submitted to all municipalities in the research sample, referring to the regulations contained in the Act on Access to Public Information (Act, 2001). In larger municipalities, the questionnaire was addressed to the separate organizational units in the city office responsible for

sales and management of the MHS, while in smaller municipalities, the questionnaire was sent directly to the executive bodies (city majors). In the second stage, a series of direct follow-up interviews were conducted to either clarify details or verify the content of the incoming questionnaires from the individual municipalities. The data collected concerned the status of the surveyed PPHCs at the end of 2021, and both stages of data collection were carried out in the period from February to October 2022.

To properly identify the dependencies between the actual privatization degree of ownership and management in PPHCs located in the sampled urban municipalities from the Warmia and Mazury region, an original, multi-stage research methodology was applied based on the triangulation of various research methods. The research procedure used to accomplish the main aim of the study involved the following stages:

1. Defining measures (analytical indicators) of the actual degree of the privatization of ownership and management in the PPHCs of a municipality. The first measure (W_1) was defined as the share of the number of PPHCs controlled by non-municipal (private) unit owners in the total number of PPHCs in a given municipality. In turn, the second measure (W_2) involves the share of the number of PPHCs managed by non-municipal (private) property management entities in the total number of PPHCs in a given municipality.
2. Determination of the empirical sizes of both analytical indicators defined above in all the sampled municipalities by processing the output data in appropriate algorithms and then positioning each of these municipalities in the plane coordinate system based on the calculated sizes of the proposed indicators.
3. Grouping of sampled municipalities based on empirical sizes of predefined indicators (as

clustering criteria) describing the actual privatization degree of ownership and management in PPHCs in these municipalities by the cluster analysis method using the classical agglomeration technique and the Kohonen artificial neural network (ANN).

4. Spatial visualization of homogeneous groups of municipalities separated according to similar empirical sizes of the proposed indicators (measures) synthetically expressing the actual privatization degree of ownership and management in PPHCs in the sampled municipalities.
5. Empirical verification of the research hypothesis based on the results obtained from the cluster analysis and the analysis of statistical relationships between the sizes of the predetermined synthetic indicators.

The applied research methodology, based on cluster analysis, leads to better recognition of the studied population of municipalities (as collections of PPHCs) from the perspective of "hard" and "soft" privatization of MHS, including the discovery of hidden dimensions or data structures, as well as finding regularities between objects and their attributes and formulating generalized conclusions. It therefore enables the verification of the research hypothesis and the achievement of the main aim of the study.

3. Research results and discussion

The study of the privatization degree of ownership and management in public-private housing condominiums in the Warmia and Mazury province in Poland began with collecting and verifying empirical input data. Significant quantitative characteristics of the sample of municipalities surveyed and selected detailed parameters of the collections of PPHCs in these municipalities are presented in Table 1.

Table 1

Quantitative characteristics of public-private housing condominiums (PPHCs) in sampled municipalities from the Warmia and Mazury Province						
Municipality	Population	Number of PPHCs	ND	SM	W_1	W_2
Olsztyn	170 622	634	17.8	0.257	0.912	0.300
Elbląg	117 952	735	19.3	0.273	0.882	1.000
Ełk	61 782	180	17.3	0.319	0.817	0.056
Ława	33 111	91	23.1	0.348	0.725	0.286
Ostróda	32 547	172	12.9	0.290	0.820	0.215
Giżycko	28 803	114	13.4	0.220	0.912	1.000
Kętrzyn	26 609	164	14.0	0.212	0.921	0.159
Bartoszyce	22 785	92	13.3	0.210	0.924	0.065
Szczytno	22 671	123	15.4	0.254	0.862	0.138
Mragowo	21 179	39	15.7	0.262	0.897	0.333

Działdowo	21 014	55	19.2	0.200	0.964	0.127
Pisz	18 890	87	19.5	0.223	0.897	0.000
Braniewo	16 907	137	10.0	0.313	0.803	1.000
Olecko	16 241	114	11.2	0.239	0.930	0.561
Lidzbark Warmiński	15 420	137	9.2	0.412	0.620	0.000
Gołdap	13 571	73	15.8	0.327	0.822	0.301
Nidzica	13 439	38	19.0	0.232	0.895	1.000
Morąg	13 325	70	14.0	0.256	0.871	0.271
Pasłęk	12 085	97	9.1	0.297	0.773	1.000
Węgorzewo	11 155	51	8.8	0.154	0.980	1.000
Nowe Miasto Lub.	10 657	25	11.9	0.251	0.880	0.120
Biskupiec	10 576	84	11.0	0.294	0.833	0.214
Lubawa	10 369	16	12.7	0.285	0.813	1.000
Dobre Miasto	9 943	53	8.2	0.276	0.811	0.943
Orneta	8 598	112	7.7	0.367	0.786	0.000
Lidzbark	7 596	18	12.9	0.354	0.667	0.000
Barczewo	7 478	69	12.8	0.274	0.884	1.000
Olsztynek	7 474	44	7.8	0.285	0.841	0.068
Susz	5 490	50	7.5	0.422	0.620	0.000
Orzysz	5 473	62	11.1	0.352	0.742	1.000
in total:	773 762	3 736	-	-	-	-
arithmetic mean:	-	-	13.4	0.282	0.837	0.439

Abbreviations:

ND –average number of dwellings in PPHCs of a given municipality;

SM –average share of municipal ownership in PPHCs (common property) of a given municipality;

W_1 – the share of the number of PPHCs controlled by non-municipal (private) unit owners in the total number of PPHCs in a given municipality;

W_2 – the share of the number of PPHCs managed by non-municipal (private) property management entities in the total number of PPHCs in a given municipality.

Source: own study.



Fig. 2. Positioning of municipalities according to the actual privatization degree of ownership and management in PPHCs. Source: own study.

The table shows that the 30 municipalities in the research sample had a total of 773,762 inhabitants, which accounted for 56.9% of the entire province's population. The surveyed municipalities varied widely both in terms of the total number of residents (from 170,622 in Olsztyn to 5,473 in Orzysz) and the number of PPHCs with the share of municipal ownership (from

735 such properties in Elbląg to just 16 in Lubawa). Of all the 3,736 PPHCs studied, the vast majority were multi-family buildings, with an average number of dwellings in such buildings varying by municipality from 7.5 in Susz to 23.1 in Iława (on average 13.4). As a result of the long-lasting privatization process, on average 71.8% of the floor area and 69.9% of the number of all dwellings in PPHCs in the studied

municipalities have been sold, and an average number of municipal dwellings in these MOH properties has fallen to 3.0. The average share of municipal ownership in individual PPHCs has successively decreased ranging from 0.422 in Susz to 0.154 in Węgorzewo (on average 0.282). The research also showed that, out of the entire population of PPHCs, only 540 (14.4%) were PPHCs with the dominant share of municipal ownership in the common property. The highest number of such PPHCs in absolute terms was in Elbląg (87 units) and Olsztyn (56 units), while in relative terms, the highest number of them was in Lidzbark Warmiński and Susz (38.0%), and also in Lidzbark (33.3%). The smallest share of PPHCs with a dominant municipal share was noted in Węgorzewo (2.0%), Działdowo (3.6%), and Olecko (7.0%). It was also found that, in the population surveyed, municipal property management companies (MPMCs) managed a total of 1,906 PPHCs (51.0%), while non-municipal (private) property management firms (PPMFs) operated 1,830 PPHCs (49.0%). This group also included a relatively small number of PPHCs managed by other entities (such as housing cooperatives or in-house management). In absolute terms, the highest number of PPHCs managed by MPMC was in Olsztyn (444 units), Ełk (170 units) and Kętrzyn (155 units), while in relative terms the highest number of such PPHCs was in Lidzbark, Lidzbark Warmiński, Orneta and Pisz, where MPMC managed all of them. In contrast, in municipalities such as Elbląg, Giżycko, Braniewo, Nidzica, Pasłęk, Węgorzewo, Lubawa, Barczewo, and Orzysz, MPMC did not operate PPHCs at all.

For a combined analysis of the actual degree of "hard" and "soft" privatization in municipalities (PPHCs) under study, the plane coordinate system was developed, in which the axes were respectively linked to the previously determined indicators - W_1 and W_2 . Due to the relative design of these indicators, the relevant axes have been scaled from 0.0 to 1.0. The beginning of this coordinate system therefore corresponds to the typical situation in the early phase of housing privatization, in which the municipality holds a majority (dominant) share in all PPHCs in its territory, and all these PPHCs are managed by municipal entities (MPMCs). An increase in the privatization degree of ownership and management in the PPHCs of a given municipality thus moves the position of that municipality away from the origin of the coordinate system along one axis and the other axis, respectively. The empirical positioning results of the sampled municipalities (PPHCs) in the designed

coordinate system obtained based on the determined sizes of the W_1 and W_2 indicators are shown in Fig. 2. Analysis of the position of the studied municipalities from the point of view of the criterion of the privatization degree of municipal ownership in PPHCs confirmed that the studied municipalities were generally at a very advanced phase of privatization of housing ownership. This is evidenced by the empirical sizes of the W_1 indicator expressing the share of PPHCs controlled by non-municipal (private) unit owners in the total number of PPHCs in each municipality. The obtained W_1 sizes, therefore, ranged from 0.667 (in Susz and Lidzbark Warmiński) to 0.964 (in Działdowo), with the sample arithmetic mean of 0.837 and the coefficient of variation (V) equal to 11.0%. In turn, an analysis of the position of municipalities from the point of view of the criterion of the privatization degree of management in PPHCs showed that the situation in this respect has varied considerably. This is reflected by the empirical sizes of the W_2 indicator expressing the share of the number of PPHCs managed by non-municipal property management entities in the total number of PPHCs in each municipality. The obtained W_2 sizes showed very broad variation (from 0.0 to 1.0), with the sample arithmetic mean of 0.439 and the coefficient of variation (V) equal to 95.2%. This indicates a significantly different quantitative characterization of the actual privatization degree of ownership and management in PPHCs located in the sample of municipalities. The studied degree of both types of privatization would be more comparable (balanced) between each other if the positions of the majority of municipalities in Fig. 2 were more concentrated along the bisector (symmetrical) of the right angle marked in the coordinate system by the dashed line. Thus, the municipality in which the degree of both types of privatization was the most balanced was Węgorzewo, while the greatest divergence of both privatization degrees was observed in Pisz, Bartoszyce, and Działdowo. The content of Fig. 2 was additionally extended by the results of the grouping of municipalities carried out in the next stage of the study.

The grouping of the studied municipalities was carried out based on the empirical sizes of the W_1 and W_2 indicators (as grouping criteria) expressing the actual privatization degree of ownership and management in the PPHCs in these municipalities. This was performed by the cluster analysis method using the classical agglomeration technique and the Kohonen artificial neural network. The methodology

used allowed for distinguishing groups (clusters) of municipalities in the research sample, which are characterized by a relatively homogeneous privatization degree of ownership and management in PPHCs located in their area. This means that PPHCs in municipalities included in one group (cluster) are maximally similar to each other, while PPHCs in municipalities belonging to different groups differ from each other to the greatest extent according to the adopted similarity measure. The detailed results of the grouping by individual techniques are shown in Figures 3 and 4 respectively. In the agglomeration technique, a distance function based on the Euclidean distance metric was used as a measure of the

similarity of the grouped municipalities (PPHCs). Due to the variation in cluster sizes, binding rules based on the weighted pair-group method using the centroid average were applied. The number of clusters (groups) was determined by analyzing the agglomeration graph. The intersection point of the graph was chosen at the point of its pronounced flattening, where the distance between successive clusters visibly increases. In turn, dividing the surveyed sample of municipalities into homogeneous groups from the adopted point of view using the Kohonen ANN was done automatically without external correction (without pattern) using an iterative algorithm with a built-in competition and neighborhood mechanism (Kohonen, 2013).

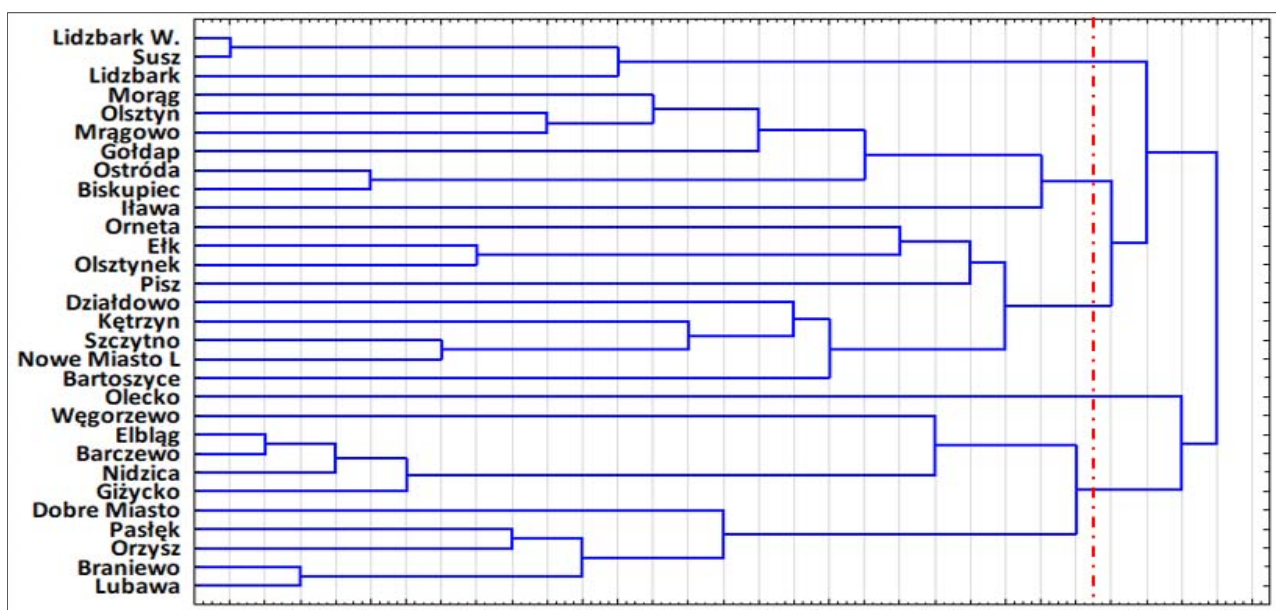


Fig. 3. Tree diagram of grouping the sampled municipalities according to the privatization degree of ownership and management in PPHCs. Source: own study.

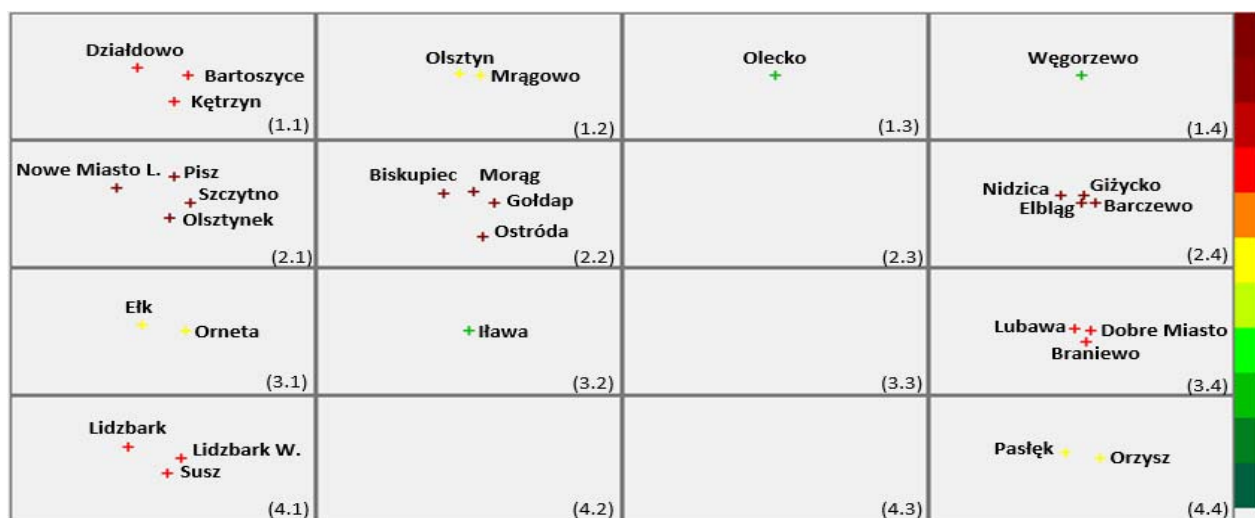


Fig. 4. The Kohonen self-organizing feature map (SOFM) presenting the results of grouping the sampled municipalities according to the privatization degree of ownership and management in PPHCs. Source: own study.

The conducted cluster analysis by the agglomeration technique led to the identification of four major homogenous groups (clusters) of

municipalities concerning the privatization degree of ownership and management in PPHCs and one atypical municipality in this respect. The distinguished clusters of municipalities are marked in different colours in Figures 2 and 5. Cluster 1 included 3 municipalities (10.0%), such as Lidzbark Warmiński, Susz, and Lidzbark, which had relatively the fewest number of PPHCs with a majority share of non-municipal (private) unit owners in the common property. Simultaneously, all PPHCs in these municipalities were managed by municipal property entities (MPMCs). This group of municipalities was identically identified using Kohonen's ANN. On the self-organizing feature map (SOFM), it took up segment 4.1 (Fig. 4). Cluster 2 comprised 9 municipalities (30.0%) with a relatively high share of PPHCs controlled by private unit owners and simultaneously a low or zero share of PPHCs managed by private property management firms (PPMFs). In this group of municipalities, the highest divergence was noted between the courses of ownership and management privatization processes of MHS in PPHCs as a result of the strong position of municipal entities (MPMCs) and the underdevelopment of private entities (PPMFs) in the local markets. The group consisted of the following municipalities: Orneta, Ełk, Olsztynek, Pisz, Działdowo, Kętrzyn, Szczytno, Nowe Miasto Lubawskie and Bartoszyce. Following the clustering carried out using ANN, the described group was further divided into three subgroups, which occupied segments 1.1, 2.1, and 3.1 of the SOFM (Fig. 4). Cluster 3 covered 7 municipalities (23.3%), including Morąg, Olsztyn, Mrągowo, Gołdap, Ostróda, Biskupiec and Iława. Compared to the previous group, the municipalities in this group were characterized, on the one hand, by a comparable or slightly lower share of PPHCs controlled by non-municipal (private) unit owners and, on the other hand, by a significantly higher share of PPMFs in the management of common properties owned by PPHCs. As before, this group, through a clustering process using ANN, was further divided into three subgroups that covered segments 1.2, 2.2, and 3.2 of the SOFM (Fig. 4). In Cluster 4 - the most numerous one - the following 10 municipalities (33.3%) were identified: Węgorzewo, Elbląg, Barczewo, Nidzica, Giżycko, Dobre Miasto, Pasłęk, Orzysz, Braniewo and Lubawa. A distinctive feature of this group was the full privatization of the management of properties owned by PPHCs, meaning that in all municipalities of this group (except Dobre Miasto) common property management in PPHCs was carried out exclusively by non-municipal entities,

mostly by PPMFs. On the SOFM, this group of municipalities was divided into four subgroups, which occupied segments 1.4, 2.4, 3.4, and 4.4. In light of the research carried out using both grouping techniques, the Olecko municipality was found to be an atypical municipality in comparison to the others. This municipality distinguished itself by the balanced participation of MPMC and PPMF in the management of common properties owned by PPHCs. It took up the separated segment 1.3 on the SOFM (Fig. 4).

In the next stage, spatial visualization of the homogeneous groups of municipalities distinguished according to similar empirical sizes of the proposed W_1 and W_2 indicators synthetically expressing the actual privatization degree of ownership and management in PPHCs located in these municipalities was developed. In addition, the number of PPHCs in the sampled municipalities was also symbolically visualized (Fig. 5). This figure shows that the number of PPHCs in a municipality was strongly positively correlated with the population size of the municipality, as Pearson's linear correlation coefficient describing this relationship in the research sample was as high as 92.9%. Thus, most PPHCs were located in the largest urban municipalities, such as Olsztyn, Elbląg, and Ełk, but relatively many of these MOH properties were situated in Kętrzyn and Ostróda. In the smaller municipalities, due to the ongoing privatization of municipal dwellings, this form of housing assets is slowly disappearing from the MHS. Furthermore, it should be stated that, in light of the results presented, no distinct regularities related to the geographic location of the four homogeneous groups (clusters) of municipalities distinguished by the actual privatization degree of ownership and management in the surveyed PPHCs were perceived.

In the last stage, empirical verification of the research hypothesis was carried out based on the results obtained from the cluster analysis and the analysis of statistical relationships between the sizes of the predetermined synthetic indicators W_1 and W_2 . Translating this hypothesis into statistical language, an attempt was made to show that there were statistically significant positive relationships in the sample of municipalities between the share of the number of PPHCs controlled by non-municipal (private) unit owners (W_1) and the share of the number of PPHCs managed by non-municipal (private) property managers (W_2). Pearson's linear correlation coefficient was determined between both indicators. This coefficient was estimated at the level of 0.212, which

was found to be statistically insignificant at a significance level of $p < 0.05$ (and even $p < 0.10$). It was therefore concluded, taking into account the results of the cluster and correlation analysis, based on empirical data for the selected sample of municipalities from the Warmia and Mazury Province, that the posited

research hypothesis was not confirmed. In other words, it was not confirmed that, despite rationales based on theory and practice, the "hard" privatization of municipal housing stock in public-private housing condominiums adequately drove the "soft" one.

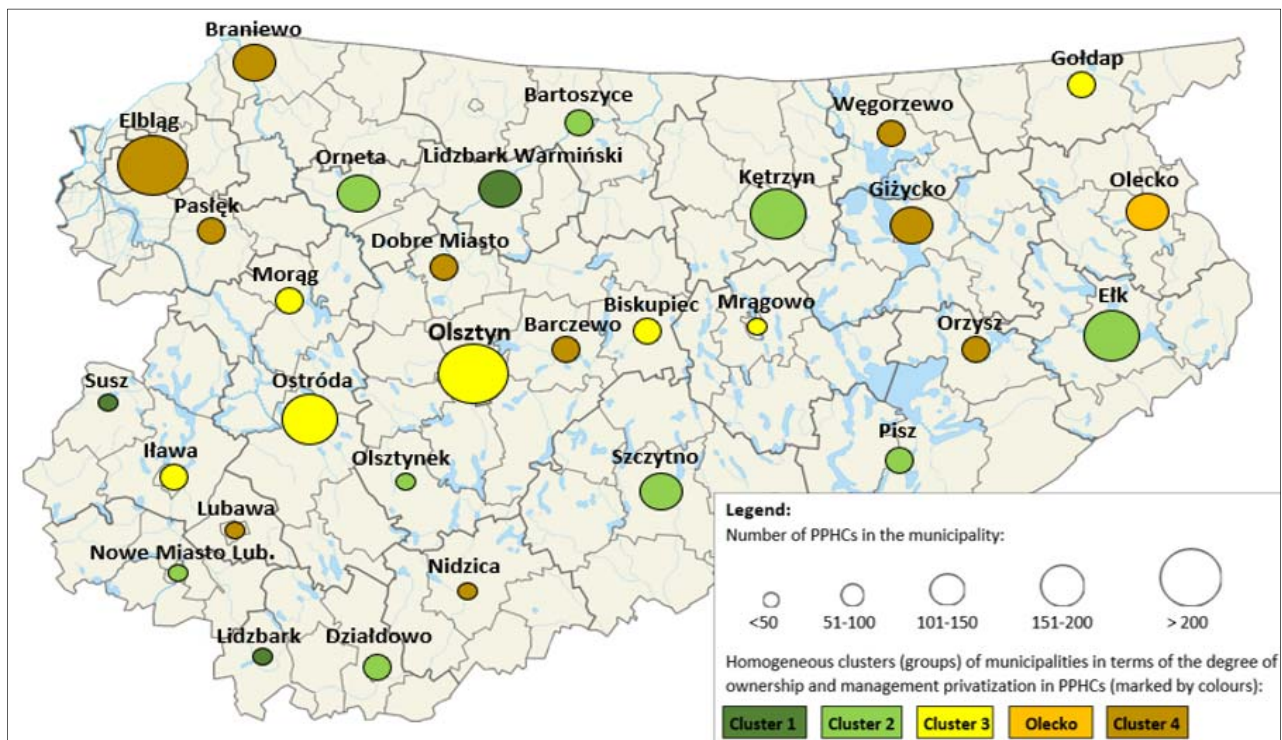


Fig. 5. Spatial visualization of grouping the sampled municipalities according to the privatization degree of ownership and management in PPHCs in the Warmia and Mazury Province in Poland. Source: own study.

4. Conclusions

Privatization of public (municipal) housing has been a global phenomenon that was triggered by changes in housing policies as a result of evolving housing markets and shifting perceptions of housing as an area of responsibility of public authorities towards citizens. In Western European countries, the general move away from public housing was part of the wider neo-liberal policies that were motivated by an ideological turn to the right and by the effort to decrease public spending by reducing the welfare state. In Central and Eastern European countries, privatization of public housing was part of a broader program of political and economic reforms, including a reduction in the role of central government and public spending on housing, as well as deregulation and decentralization of housing services associated with the transition to a market economy. Notwithstanding the differences between the CEE countries, common features of housing privatization included the sale of municipal dwellings at heavily

reduced prices (or even giving them away for free) to sitting tenants, a high proportion of low-income households (as dwelling buyers), and the poor physical condition of the transferred housing stock. The sale of public (municipal) dwellings in these countries was linked to housing reforms, including establishing housing condominiums. This has led to new challenges in the management of privatized MOH properties, especially in housing condominiums with mixed (public-private) ownership. Such challenges are particularly evident in Poland, where, due to the much slower pace of privatization of municipal housing than in other CEE countries, public-private housing condominiums (PPHCs) still represent a significant part of the national housing market.

This study presents an investigation of the actual privatization degree of ownership and management in public-private housing condominiums (PPHCs) in Poland. It has been assumed that the privatization of the ownership (sale) of municipal dwellings is referred to as "hard" privatization, while the privatization (transfer) of PPHCs property management services to

private (non-municipal) property managers is referred to as “soft” privatization. Public-private housing condominiums (PPHCs) are referred to as condominiums with a share of municipal ownership. In analyzing the degree of progress of the two types of municipal housing privatization in PPHCs in a sample of municipalities, an attempt was made to capture the dependencies between them. Therefore, starting from the premises of rational (efficient) operation, the research hypothesis was posited that an increase in the number of PPHCs with a majority share of private unit owners in the common property in a municipality caused an adequate increase in the number of PPHCs in that municipality where property management services have been entrusted to PPMFs, meaning that the “hard” privatization of MHS adequately drives the “soft” one. To achieve the main aim of the study and to verify the hypotheses, an original multi-stage research methodology, which was based on the triangulation of research methods such as questionnaire interviews, cluster analysis using the agglomeration technique and the Kohonen ANN as well as correlation analysis, was applied. The research area covered 3,736 PPHCs located in a sample of the 30 largest municipalities in the Warmia and Mazury Province in Poland. By synthesizing the findings obtained in the studied area, the following empirical conclusions can be drawn:

1. As a result of the long-lasting sales of municipal dwellings, the actual privatization degree of municipal ownership in PPHCs in the sampled municipalities has reached a very advanced level. This is evidenced by the fact that the share of municipal ownership in PPHCs has fallen well below 50% in all municipalities (reaching an average of 28.2%), while the proportion of the number of PPHCs with a dominant share of private unit owners (W_1) reached an average level of 0.837 with the variation coefficient (V) equal to 11.0%. Dispersed sales of municipal dwellings have thus not only led to a drastic reduction in public ownership in the sampled municipalities but also to its fragmentation into small shares in many PPHCs operating outside municipal control. The relatively low variability of measures of the “hard” privatization degree in the research sample showed that such privatization processes were marked by a similar course over time in all the municipalities studied.
2. When analyzing the actual privatization degree of management, it was noted that the

percentages of the number of such properties managed by municipal property management companies (MPMCs) and by non-municipal (private) property management companies (PPMFs) were at fairly similar levels (51.0% and 49.% respectively) in the total number of PPHCs surveyed. This general observation, however, does not properly reflect the actual situation in the sample, as the real degree of “soft” privatization in PPHCs varied considerably between municipalities. This is expressed in the obtained sizes of the W_2 indicator, which showed extremely broad variation, with the sample arithmetic mean of 0.439 and the variation coefficient (V) of 95.2%. The study found that, despite the acknowledged lower efficiency and quality of housing management services provided by public entities compared to private ones, the majority of PPHCs in two-thirds of all municipalities surveyed were still managed by municipal entities (MPMCs). This indicates the persistence of significant demand from private unit owners for the management services provided by MPMCs.

3. The study revealed significantly different (incomparable) quantitative characterization of the actual privatization degree of ownership and management in PPHCs located in the research sample of municipalities. This means that the dependencies between the degree of “hard” and “soft” privatization of municipal housing in the sample were rather loose. This was supported by both the results of the positioning study of municipalities and the cluster analysis, as well as the lack of statistically significant correlation between the measures of the degree of both types of housing privatization in the sample of municipalities. Consequently, the hypothesis that the “hard” privatization of municipal housing in PPHCs adequately drove the “soft” one was not confirmed.
4. The research showed that the number of PPHCs in a municipality was strongly positively correlated with the population and that the progressive privatization of municipal dwellings with relatively small investments by local governments in new municipal housing has led to the slow disappearance of PPHCs from the MHS, which is particularly evident in smaller municipalities. In contrast, no distinct regularities related to the geographical location

of the homogeneous groups (clusters) of municipalities distinguished by similar privatization degrees of ownership and management in PPHCs were perceived.

5. From the above, a more general conclusion can be drawn, i.e. that the privatization processes of ownership and management of municipal housing in Polish municipalities have proceeded in a predominantly autonomous (independent of each other) manner and that private unit owners, having obtained a dominant share in the common property in most PPHCs, have not consequently exercised their rights to change the property manager from municipal to private, despite the fact that such a change in management has proven to be more efficient. The reasons for this are complex, as they result, on the one hand, from the established habits of both private unit owners and municipalities of using management services provided by MPMCs and, on the other hand, from the relatively weak development and low competitiveness of local markets for private property managers in the municipalities surveyed. As a consequence, lower efficiency and quality of property management services persist in many PPHCs, and there is often a lack of adequate stimulation of private unit owners to actively engage in proper maintenance and repair of common properties, as confirmed by other publications in this area.

In conclusion, it should be noted that the limitations of this study include the lack of inclusion of quantitative data on those PPHCs in individual municipalities where all municipal dwellings were privatized before the date of the baseline data collection and conducting the study. However, as this limitation applied to all municipalities studied, it did not have a major impact on the positioning and grouping results. Recommendations for further research include, on the one hand, the analysis of social, managerial, and institutional barriers to "soft" privatization in PPHCs under different local conditions and, on the other hand, the development of dedicated information systems to monitor and support the studied MHS privatization processes.

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