

Large Housing Estates in Germany's Major Cities: A Last Bastion of Affordable Housing?

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Abstract

The affordable housing crisis in many major German cities has sparked a new wave of suburbanization. In thriving cities such as Berlin, Cologne, Munich, Frankfurt, and Hamburg, rental prices in central locations have reached unprecedented highs. Amid this situation, large housing estates (LHEs) built between the 1950s and 1980s on city outskirts are often regarded as the last strongholds of affordable housing. The sharp rise in housing prices within Germany's major cities has reshaped the traditional perception of these residential areas as centers of social disadvantage and conflict. Nevertheless, rents within these LHEs have also been increasing over the years due to neoliberal policies promoting financialization and privatization. In this context, this article analyzes rent levels in LHEs across major German cities and compares them to the average rents within their respective urban areas. Using a geodata-based methodology, we first identify LHEs that were built between 1949 and 1990 and that meet a minimum threshold of 1,000 inhabitants. Our study covers all German cities with populations exceeding 100,000 residents. Subsequently, fine-grained raster data from the 2022 census is employed to calculate average rent levels at settlement scale. Our analysis revealed statistically significant differences between the average rent levels in LHEs and the overall citywide average. The article concludes with reflections on strategies to preserve affordable housing in the affected urban areas.

Keywords

Germany; housing affordability; housing rents; large housing estates; post-war planning

1. Introduction

Large housing estates (LHEs) built between the 1950s and 1980s form a distinctive legacy of modernist urban planning. In many European cities, they remain among the most visible manifestations of post-war planning and continue to shape the character of urban peripheries (Wassenberg et al., 2004). It is estimated that around 40 million Europeans live in such estates, including roughly 34 million in Central and Eastern Europe, excluding the former Soviet Union (Wassenberg et al., 2004). Their development was motivated not only by the desire to alleviate the acute housing shortage caused by rapid population growth and economic expansion in the post-war era. Large-scale estates also embodied a social reform agenda; they stand as material expressions of built societal utopias.

The construction of these kinds of settlements—in the literature also referred to as mass housing or high-rise housing—was guided, on the one hand, by the objective of producing housing on a large scale, and on the other hand, by the ambition to provide high residential quality for lower- and middle-income groups (Jessen, 2000; Musterd et al., 2009). The planning concept emphasized modern, well-lit apartments with high density and ample green spaces—reflecting the modernist ideal of “spacious, green, light”—alongside strong infrastructural connections to the city center and a mix of functions within neighborhoods (Dekker & van Kempen, 2005, p. 21; Reicher et al., 2023). LHEs continue to constitute an important component of national and metropolitan housing stocks, even though their significance varies considerably among European countries (Hess et al., 2018, p. 7). Due to substantial public subsidies and the application of principles of rational and serial construction, it was possible to significantly expand the stock of affordable rental housing—a development that continues to shape urban housing markets to this day.

However, the initial enthusiasm among urban planners during the planning and development phases of these estates soon gave way to a certain disillusionment. On the one hand, serious planning deficiencies became apparent, such as their spatial isolation within the urban fabric, the mono-functional orientation toward residential use, uniform building typologies, and undifferentiated green spaces (Reicher et al., 2023). On the other hand, low levels of management and maintenance investment often resulted in poor physical conditions and a negative image of the estates (Dekker & van Kempen, 2005, p. 25). Consequently, many developments experienced significant vacancy rates and socially selective in-migration patterns, which further reinforced processes of concentrated poverty and stigmatization affecting both the estates themselves and their residents (Dekker & van Kempen, 2005, pp. 36–37). Moreover, their often peripheral location and limited access to public transport—in contrast to planning aims—have created major obstacles to employment integration and contributed to social exclusion (Dekker & van Kempen, 2005). Musterd et al. (2009) note that the political and societal debate on the condition and future of LHEs was for a long time characterized by a predominantly negative tone.

Since the 2000s, scholarly and policy discourses have adopted a more nuanced perspective on LHEs. This shift is partly attributable to empirical research demonstrating the considerable heterogeneity of their physical configurations and social compositions (Hess et al., 2018; Musterd et al., 2009). Evidence indicates that residents frequently report high levels of satisfaction with their dwellings, neighborhood environments, and the overall living conditions within these estates (Breuer, 2015; Reicher et al., 2023). At the same time, the deepening crisis of housing affordability across many European metropolises has renewed attention to one of the core attributes of LHEs—their capacity to provide comparatively low-cost accommodation within

the public rental sector. Although successive waves of housing market financialization and privatization since the 1970s have contributed to rising rent levels and to the conversion of rental units into owner-occupied dwellings (Bernt et al., 2017; Kabisch & Grossmann, 2013; Murie et al., 2005), LHEs continue in many contexts to function as vital reservoirs of affordable housing for lower- and middle-income households. The price differentials between housing in large estates and the open market are significant. Dekker and van Kempen (2005, p. 26) found that rents in 30 LHEs across various European cities were between 30% and 70% below the respective citywide average levels. However, to our best knowledge, no studies have yet systematically analyzed rental price differentials between LHEs and other segments of the housing market beyond individual case studies, in order to assess the specific market position of large estates.

Against this background, in this article we analyze rent levels in LHEs across major German cities and compare them to the average rents within their respective urban areas. Using a geodata-based methodology, we first identify LHEs built between 1949 and 1990 that meet a minimum threshold of 1,000 inhabitants. Our study covers all German cities with populations exceeding 100,000 residents in 2022. Subsequently, fine-grained raster data from the 2022 census is employed to calculate average rent levels within these estates. This approach enables us to assess the relative appeal of high-density living in LHEs for individuals with lower incomes.

We are expanding knowledge in this topical area in two ways: First, we are developing a novel geodata- and census-based approach for the systematic spatial delineation of LHEs in Germany. This is of particular significance, as there is no official national inventory of LHEs in Germany that an empirical study on rental prices could draw upon. Our concept enables classification by estate size, density, population structure and change, as well as rent level. Second, we show whether and in what ways LHEs from the 1950s to 1980s exhibit contrasting housing costs compared to other residential areas, which enables new assessments of their significance in terms of housing policy in the context of tight housing markets.

The article proceeds as follows. Section 2 outlines the development trajectories of LHEs in Germany, distinguishing between the contexts of West and East Germany. Section 3 presents the methodological framework, centered on a geodata-based spatial filtering approach that enables the spatial identification of housing estates exceeding a defined minimum size threshold. The empirical results are then discussed in Section 4, followed by an examination of policy implications in Section 5. Finally, Section 6 offers concluding reflections on strategies for preserving affordable housing within the affected urban areas.

2. LHEs in Germany

LHEs represent a significant component of Germany's national housing stock. In 2015, approximately eight million people lived in four million dwellings classified as part of LHEs (Hunger, 2015). A government report published in 1994 identified a nationwide total of 240 estates with a size of more than 2,500 housing units respectively and around 1.6 million dwellings (Bundesministerium für Raumordnung, Bauwesen und Städtebau [BMBau], 1994). However, due to the country's 40-year division and the markedly divergent housing policies pursued in the Federal Republic of Germany (West Germany) and the German Democratic Republic (East Germany), the significance of LHEs varies considerably between both parts of the country (Knorr-Siedow, 2004). In 1994, one in four residents in East Germany lived in an LHE, compared to only 1 in 60 in West Germany (BMBau, 1994).

Pronounced East–West differences can be observed not only in quantitative terms but also in the planning approaches, locational patterns, and current housing policy relevance of LHEs (Grunze, 2017; Jessen & Willnauer, 2020; Reicher et al., 2023). Whereas housing policy in the German Democratic Republic was almost exclusively oriented toward large-scale, state-organized construction of prefabricated estates and primarily focused on quantitative building output (Hannemann, 2000), the development of LHEs in West Germany was economically less significant and characterized by far greater heterogeneity in terms of actors, financing models, and construction types (BMBau, 1994).

With regard to the developments that have taken place since their construction in the 1950s, 1960s, and 1970s—and in East Germany also throughout the 1980s—similar trends can be observed. Periods of population decline, strong competition from revitalized inner-city housing and single-family homes (Hannemann, 2000; Simons, 2012), as well as the aforementioned image problems, led to high vacancy rates during the 1990s and early 2000s. Around the turn of the millennium, several 100,000 housing units stood vacant in East German LHEs (Grunze, 2018), prompting federal and state governments to launch large-scale demolition programs. In East Germany alone, more than 330,000 dwellings were demolished (Milstrey, 2017).

Today, hardly any significant vacancies can be observed in LHEs (Krüger, 2019)—a development attributable not only to urban renewal and upgrading efforts but also to the increasing pressure on housing markets in metropolitan regions. On the contrary, many of these neighborhoods have undergone densification in the past (Hunziker, 2016; Kompetenzzentrum Großsiedlungen, 2021). The long-standing deficit-oriented perspective of policy, society, and academia on LHEs has in recent years given way to a more pragmatic view that acknowledges their importance as providers of moderately priced housing (Loeser, 2014). Numerous studies have demonstrated that average rents in these settlements remain considerably below citywide levels (Hunger, 2015; Kompetenzzentrum Großsiedlungen, 2021), though their residents often face higher rent-to-income burdens than the national average (Kompetenzzentrum Großsiedlungen, 2015).

However, as noted in the introduction, Germany also experienced a wave of housing privatization during the 1990s (Neugebauer et al., 2011), which had tangible effects on rent levels and reduced the stock of rental housing through the conversion and sale of owner-occupied units. In East Germany in particular, large portfolios previously held by municipal or cooperative housing providers were acquired by national and international financial investors. This trend was further intensified by the low-interest environment following the global financial crisis, which triggered a veritable boom in property acquisitions (Bernt, 2021; Bundesinstitut für Bau-, Stadt- und Raumforschung, 2025a). Due to the massive rise in real estate prices since the 2000s, these investments turned out to be extremely lucrative.

This relatively high profitability for investors can be partly attributed to a so-called “Hartz IV” business model (Bernt, 2021; Krüger, 2019, pp. 37–39; Milstrey, 2017), where dwellings are offered at comparatively low rents while expenditures for maintenance and modernization of the housing stock remain minimal (Bernt et al., 2017). This particular strategy primarily targets welfare recipients whose housing costs are covered through transfer payments, thereby providing landlords with a stable, state-backed rental income. Empirical studies on modernization levels in LHEs accordingly point to persistent underinvestment across substantial parts of the stock (Hunger, 2015). At the same time, Hunger (2015) notes that, despite an estimated annual investment requirement of €3.3 billion, the quality of living conditions in large German housing estates remains comparatively high in international perspective.

In West Germany, former social housing stocks were likewise subject to privatization. In addition, the specific model of public subsidy in the social housing sector contributed to a gradual decline in the supply of affordable dwellings. Public funding schemes typically included a time-limited rent control period after which rents could be adjusted to prevailing market levels (Kofner, 2017). A federal government report published in 1994 observes the following:

At the time of first occupancy, rents in large housing estates were substantially below market levels for comparable new dwellings due to public subsidies within the social housing framework. The subsidy regime, however, was structured on a degressive basis, premised on expectations of rising household incomes and permitting relatively rapid increases in the legally regulated cost rents. Over a reduction period of roughly ten to fifteen years, net rents were thus projected to rise to two or three times their initial level, ultimately reaching—and frequently surpassing—market rates for comparable units. (BMBau, 1994, p. 15, translation by the authors)

In political and public debates, the shrinking stock of social housing is widely regarded as a major concern. This development is commonly attributed to the expiration of rent and occupancy controls, the large-scale privatization and sale of formerly subsidized dwellings since the 1990s, and persistently insufficient levels of new social housing construction. As a result, it is estimated that around 900,000 social housing units are currently missing, and at least two million will be needed by 2030 to cope with the housing crisis, since the existing stock has fallen to only about one million units (Verbändebündnis Soziales-Wohnen, 2024).

The worsening housing supply crisis in German major cities is not only due to the decline in affordable social housing, but is also driven by rising rents in non-subsidized housing stocks and the construction of high-priced new apartments. This has led to accelerated suburbanization in all major urban regions of Germany in recent years (Siedentop, 2024; Stawarz et al., 2022). In particular, families with greater space requirements, as well as elderly people and low-income earners, are population groups driving suburbanization processes—accompanied by urban sprawl in surrounding areas and increasing traffic burdens.

In response to tight housing markets and to mitigate gentrification dynamics, the German government introduced a rent control instrument in 2015, allowing municipalities in designated high-pressure housing markets to regulate rent increases. However, this regulation does not apply to dwellings that have undergone extensive refurbishment (Baye & Dinger, 2024, p. 844). Consequently, in the context of large-scale renewal processes, legal regulation can only limit rent increases to a certain extent. The overall effectiveness of this instrument therefore remains subject to ongoing debate (Deschermeier et al., 2017). In addition, municipalities can issue so-called social preservation ordinances pursuant to § 172 (1) BauGB (Federal Building Code). These are intended to counteract social upgrading and displacement. Social preservation ordinances are not an instrument of active tenant protection, but rather an urban planning tool aimed at preserving established sociodemographic structures. In social preservation areas, both demolition as well as structural alterations and changes of use on a property require a permit. In this way, for example, luxury renovations can be actively counteracted.

Against this background, we hypothesize that rent levels in LHEs are lower than in other segments of the housing market, although this price differential has likely decreased over time. To the best of our knowledge, however, there are currently no studies that allow for a systematic quantitative analysis of such rental price

differentials. While some local case studies exist—such as a study for Berlin conducted in 2021, which found that average rents in large estates amounted to approximately 75–80% of the citywide asking rents (Kompetenzzentrum Großsiedlungen, 2021)—a comprehensive analysis at the national level in Germany is still lacking. This is partly due to the absence of a national inventory of LHEs and the limited availability of high-resolution data on existing rents, which only became accessible with the 2022 census. The government report *Großsiedlungsbericht* from 1994 provided a comprehensive survey listing 240 estates across Germany; however, it applied a comparatively high size threshold of 2,500 housing units, meaning that many smaller settlements were not included (BMBau, 1994). In addition, a list maintained by a private association contains 204 entries, but the available data do not have official status (see Section 3).

To conclude, LHEs have gained renewed attention in recent years as an important component of affordable housing provision for low-income households within increasingly tight urban housing markets across Germany. Nevertheless, a comprehensive and geodata-based inventory of currently existing LHEs remains absent. Consequently, systematic analyses comparing rent levels within these estates to average rents within their respective urban areas have not yet been undertaken—a gap that the methodological approach outlined in the following section seeks to fill.

3. Data and Methods

In this study, LHEs are defined as extensive complexes of apartment buildings built from the 1950s until the 1980s, conceived as a single planned development, situated on greenfield land at mostly peripheral urban sites, and accommodating more than 1,000 residents. We have deliberately chosen an intentionally broad definition, as LHEs in Germany display considerable heterogeneity—for example, regarding the size of the settlements, the number of building floors, or their functional structures (mono- or multifunctional).

The identification procedure is based on German census data from 2011 and 2022. The census provides—among many other indicators—information on population, housing units, and buildings below the municipal level. Since 2011, census data have also been published nationwide in a georeferenced format at the level of 100-meter grid cells, enabling detailed spatial analyses and temporal comparisons. The data used in this study stem from a special evaluation conducted by the Statistical Office of North Rhine-Westphalia, ensuring that identical confidentiality procedures were applied for both 2011 and 2022, and that housing unit data are fully available at the 100-meter resolution. In addition to data on housing units and population, the net cold rent (indicating the total rent minus utilities and service charges) and the year of construction are particularly relevant for this study. However, rent information is not available for all rented dwellings in the national dataset. This forced us to use a threshold to ensure that only those LHEs were included in the analysis for which at least 75% of their constituent grid cells contain rent price information. This explains why some well-known German LHEs, such as Nürnberg-Langwasser, were not captured in our study (see Section 4 and Figure 2).

Since LHEs were built during a specific period in planning history, information on the date of construction of residential buildings is required. These data were obtained from the 2011 census, in which construction years are categorized according to the relevant German census periods. This makes it impossible to establish an exact, year-based delineation of the study period. As an approximation, the period from 1949 to 1990 was defined as a historical phase characterized by the construction of LHEs. Construction year data are available

for about 90% of inhabited cells in 2011. Due to these dataset-related limitations, the methodology presented cannot fully capture all LHEs in Germany.

The identification of LHEs follows a multi-step procedure. First, grid cells were filtered based on a minimum density threshold of 50 housing units per cell (with each cell covering an area of one hectare). This threshold is based on the literature regarding the urban densities typically found in LHEs. To assign cells to the relevant construction period, a further threshold was applied requiring that at least 90% of the housing units in a cell were built between 1949 and 1990. To exclude inner-city post-war reconstruction areas, all cells within a radius of 3 km from the city center were excluded. We assume that LHEs were typically developed in outer areas.

The filtered grid cells were then aggregated into estates if at least four adjacent cells met the specified criteria. Adjacency was defined to include both edge- and corner-sharing neighbors. The resulting estates were required to have a minimum size of 4 hectares and a minimum population of 1,000 residents. As mentioned above, rent information had to be available for at least 75% of the cells that compose an LHE. This approach allows for the possibility that major infrastructure elements may spatially separate LHEs while still forming a functionally coherent settlement. Consequently, fragmented LHEs located less than 200 m apart were merged and treated as a single LHE. Figure 1 shows two examples for the delineation of LHEs according to the above-described filtering process.



Figure 1. Grid-based spatial boundaries of the LHEs: (a) Cologne Chorweiler; (b) Dresden Gorbitz. Source: Based on data from the 2022 census and aerial images (DOP) from GDI.NRW and GeoSN.

Since no comprehensive inventory of LHEs in Germany exists, validating the identification approach remains challenging. As a reference, a citizen-science dataset from the website grosswohnsiedlungen.de was used. This inventory, characterized by its strong bottom-up nature, includes housing estates constructed after 1945 that are dense, homogeneous, and functionally self-contained. Each listed estate comprises at least 1,000 housing units and predominantly consists of social housing. However, the operators of this website do not claim that the list is complete. Comparison with this reference yields a true-positive rate of 81%. When the analysis is restricted to LHEs for which sufficient rent data are available, the true-positive rate decreases to 64%. The false-positive rate is approximately 70%, indicating that our approach identifies significantly more settlements than those listed in the reference database. This discrepancy can be attributed to the fact

that smaller estates are largely underrepresented in the grosswohnsiedlungen.de collection. Overall, however, the approach presented here offers a sufficient level of accuracy in identifying LHEs.

For rent level analysis, a housing-unit-weighted average rent was calculated for each LHE and for spatial aggregates such as West or East German LHEs (see Section 4). Weighting by the number of housing units ensures that the values of LHEs contribute to the overall averages in proportion to their size. This approach prevents small LHEs from being overrepresented in the analysis. The rent price ratio (Q_{LHE}) between the average rent of estates and the citywide normalized average rent indicates whether LHEs fall below ($0 < Q_{LHE} < 1$) or exceed the overall urban rent level ($Q_{LHE} > 1$). This leads to the following formula, which calculates the weighted rent price ratio for cities that contain LHEs within their boundaries. The ratio is obtained by dividing the sum of housing-unit-weighted rents of all associated LHEs by the weighted rents of all corresponding cities. In this context, w_i and w_j denote the number of residential units in a grid cell, while m_i and m_j represent the respective residential rent values:

$$Q_{LHE} = \frac{\sum_{i \in LHE} m_i \times w_i / \sum_{i \in LHE} w_i}{\sum_{j \in city} m_j \times w_j / \sum_{j \in city} w_j}$$

4. Empirical Findings

4.1. Number of LHEs and Morphological Features

Using the approach presented above, 353 LHEs were identified in the 80 major cities included in our analysis, representing a housing stock of 790,000 dwellings and a population of 1.38 million inhabitants (Figure 2). Table 1 provides an overview of key characteristics of these estates. On average, an estate covers roughly 20 hectares and includes about 2,200 housing units with around 3,900 inhabitants. As expected, the population density—at around 180 inhabitants per hectare as a mean value of all 353 estates—is significantly higher than the citywide average. Moreover, the calculated number of housing units per residential building allows conclusions to be drawn about the size of the structures. On average, we calculated 13.8 housing units per building, indicating that German LHEs are predominantly composed of medium-sized building types.

When distinguishing between West and East Germany, as well as by city size or estate size, significant morphological differences become apparent: LHEs in East Germany are considerably larger than those in West Germany, and their population density is also higher (Table 1). A similar pattern applies to large estates in metropolitan areas with populations exceeding one million and to large estates with more than 5,000 housing units. Population density is significantly higher here than in smaller cities or smaller estates. The relatively high population number of LHEs in smaller cities can be explained by the fact that East German cities (with LHEs in their territory) are overrepresented in this population size category. In these East German cities, there are numerous large LHEs such as Halle-Neustadt or Rostock-Lichtenhagen.

It is remarkable that, despite the widespread negative image of LHEs, population development in the 2010s was slightly positive. On average, the 353 estates recorded a population increase of 2.1% between 2011 and 2022, highlighting the importance of this type of settlement for providing housing to lower-income

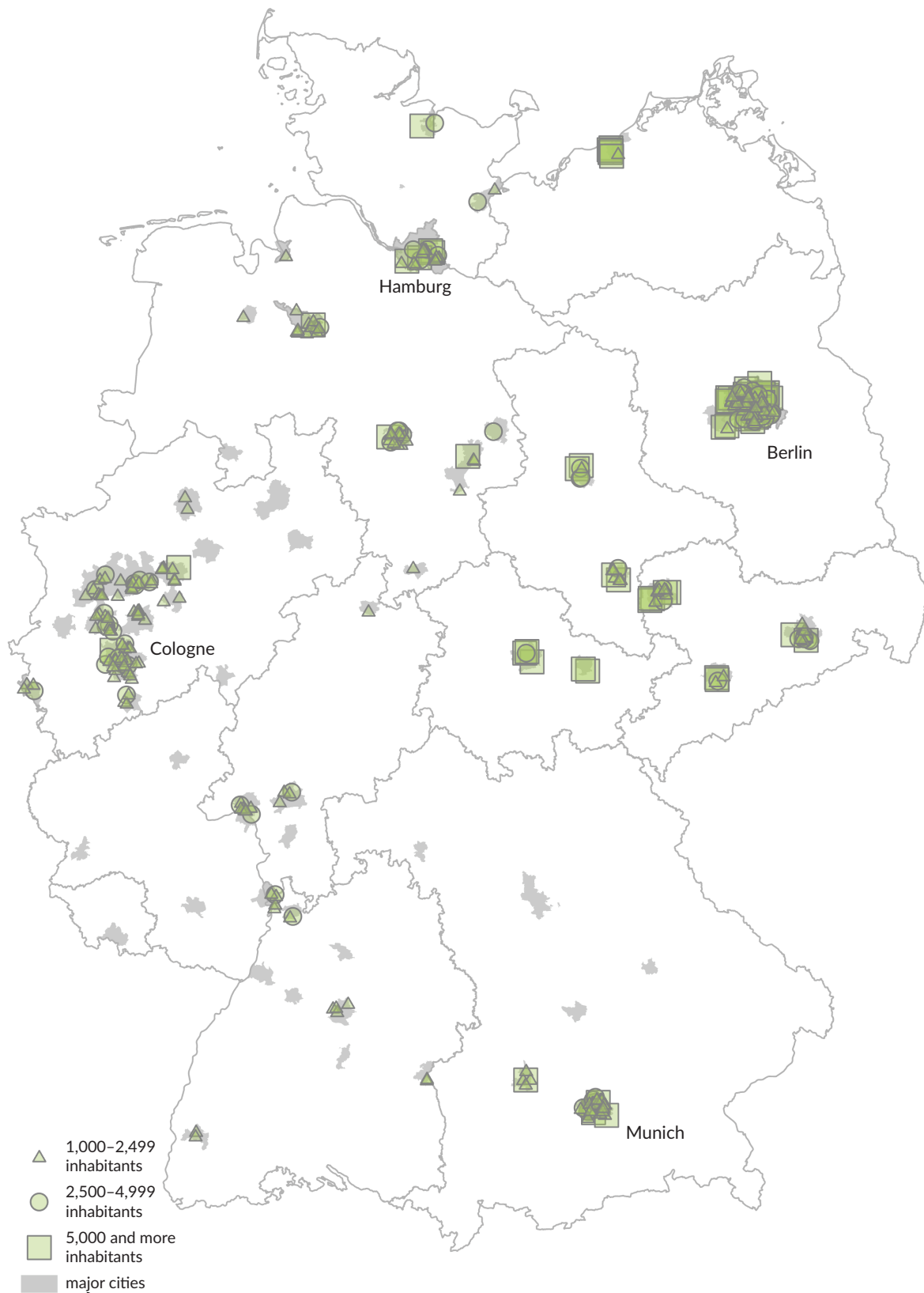


Figure 2. Location of all identified LHEs in German major cities by population size (2022, $n = 353$). Source: Based on data from the 2022 census.

households. Only in LHEs of smaller large cities (100,000–250,000 inhabitants) was a slight population decline observed (–0.6%). Moreover, we found significant West–East differences in the average age of LHE residents. In eastern German settlements, the average age is 47.5 years, whereas in western German LHEs it is 43.2 years. This indicates that residents of eastern German settlements are, on average, considerably older, while those in western German settlements are slightly younger than the national average (44.5 years). This pattern suggests that western German LHEs have experienced increased immigration of younger migrants in recent years. Location-specific dynamics of immigration from abroad can also be seen in the pronounced West–East differences in the shares of the foreign population in LHEs. While in West German LHEs an average of 25.3% of the population does not have German citizenship, in East German LHEs the figure is only 15.2% (see Table 1).

Table 1. Descriptive statistics for the identified LHEs (values for 2022).

LHEs	Mean area size (ha)	Mean population number (inh.)	Mean population density (inh./ha)	Mean number of housing units	Mean number of housing units per building	Share of foreigners
All LHEs (n = 353)	21.9	3,912	178.6	2,242	13.8	20.6
LHEs in West Germany (n = 263)	15.9	2,787	175.1	1,489	12.1	25.3
LHEs in East Germany (n = 90)	39.4	7,197	182.8	4,442	15.9	15.2
LHEs in cities 1 M inh. and more (n = 154)	24.5	4,709	192.5	2,650	15.1	19.6
LHEs in cities 0.5–< 1 M inh. (n = 96)	17.4	2,887	165.9	1,638	11.4	25.1
LHEs in cities 0.25–< 0.5 M inh. (n = 44)	11.9	2,091	176.0	1,050	11.5	25.7
LHEs in cities 0.1–< 0.25 M inh. (n = 59)	30.0	4,853	161.9	3,047	14.2	16.9
LHEs with 5,000 inh. and more (n = 64)	65.2	12,403	190.1	7,211	16.0	18.8
LHEs with 2,500–< 5,000 inh. (n = 78)	19.3	3,420	177.6	1,902	13.5	22.7
LHEs with 1,000–< 2,500 inh. (n = 211)	9.7	1,517	156.0	860	10.4	23.1

Note: The share of foreigners is a population-weighted mean. Source: Own calculation based on data from the 2022 census.

4.2. Rental Price Differentials

In line with the literature, our data (see Table 2) show that in the census year 2022, average cold rents in LHEs were about €1.50 per square meter of living space lower than the citywide average. This corresponds to a price advantage of approximately 19%. In East Germany, the average difference between rents in LHEs and the urban average is significantly higher—€1.68 (23%)—than in West Germany (€1.00; 13%). This can be explained by the differences in the financing of large-scale housing construction (see Section 2), particularly by the expiration of rent control regulations.

Table 2. Rent differences of LHEs and city means.

Indicator	LHEs	Cities	Rent price ratio
All LHEs ($n = 353$)			
Mean rent (€/m ²)	6.27	7.77	0.81
Share of owner-occupied units (%)	13.3	28.0	—
LHEs in West Germany ($n = 263$)			
Mean rent (€/m ²)	6.92	7.92	0.87
Share of owner-occupied units (%)	17.3	30.9	—
LHEs in East Germany ($n = 90$)			
Mean rent (€/m ²)	5.77	7.45	0.77
Share of owner-occupied units (%)	1.6	19.6	—

Source: Own calculation based on data from the 2022 census.

This corresponds to rent price ratios (Q_{LHE}) of 0.81 (all estates), 0.87 (estates in West Germany), and 0.77 (estates in East Germany). If the median is considered instead of the average value, the ratios are lower for Germany (0.78) and East Germany (0.74), which suggests that the distribution of values is right-skewed, meaning that average values are distorted by areas with high rents. The median for West German LHEs is slightly higher than the average value (0.89).

The comparison of rent levels categorized by city size shows no significant differences. The price variations—ranging between 13% and 19%—fall within a relatively narrow corridor (Table 3). However, Table 3 indicates that price differences for LHEs with populations exceeding 5,000 residents are greater than those observed in smaller settlements. While the price advantage in LHEs with more than 5,000 inhabitants amounts to 22%, it is only 12% in smaller areas (with less than 2,500 inhabitants). This could be due to the fact that larger LHEs have struggled more with image problems and vacancies than smaller areas have.

Contrary to the assumption that the rent price gap is positively correlated with the share of foreigners due to stigmatization effects, our data suggest a negative relationship (Table 3). In LHEs with the highest share of foreigners (measured by the top quartile), the gap relative to the citywide average rent is the smallest. This pattern is largely driven by the markedly different degrees of demographic internationalization in West and East Germany. The findings may indicate that potential stigmatization effects play only a limited role in shaping rent price dynamics. At the same time, they suggest that potentially marginalized groups, such as the foreign population in West German LHEs, do not strongly benefit from the price effects associated with living in an LHE. However, further studies should be conducted on the specific relationships between international migration, image effects, and rent levels.

Table 3. Rent differences of LHEs and city means according to city and estate size.

LHEs	LHEs	Cities	Rent price ratio
LHEs in cities 1 M inh. and more ($n = 154$)	6.53	7.82	0.83
LHEs in cities 0.5–< 1 M inh. ($n = 96$)	6.22	7.3	0.85
LHEs in cities 0.25–< 0.5 M inh. ($n = 44$)	7.25	8.99	0.81
LHEs in cities 0.1–< 0.25 M inh. ($n = 59$)	5.58	6.45	0.87
LHEs with 5,000 inh. and more ($n = 64$)	5.99	7.64	0.78
LHEs with 2,500–< 5,000 inh. ($n = 78$)	6.53	7.77	0.84
LHEs with 1,000–< 2,500 inh. ($n = 211$)	6.89	7.83	0.88
LHEs with a high share of foreigners ($n = 78$)	6.70	7.83	0.86
LHEs with a rather high share of foreigners ($n = 78$)	6.77	7.87	0.86
LHEs with a rather low share of foreigners ($n = 78$)	6.15	7.79	0.79
LHEs with a low share of foreigners ($n = 78$)	5.88	7.55	0.78

Source: Own calculation based on data from the 2022 census.

The boxplots of the rent price ratio (calculated as the quotient of the weighted LHE rent and the city-wide rent, Figure 3) furthermore show a considerable range of values for individual settlements, which suggests the influence of strongly context-dependent factors such as ownership structures, local housing market policies, and relative attractiveness assessments with regard to rent levels. The remarkable outliers—with rent price ratios well above 1.0 in smaller LHEs—could be the result of revitalizing replacement constructions, which then turn out to be significantly more expensive.

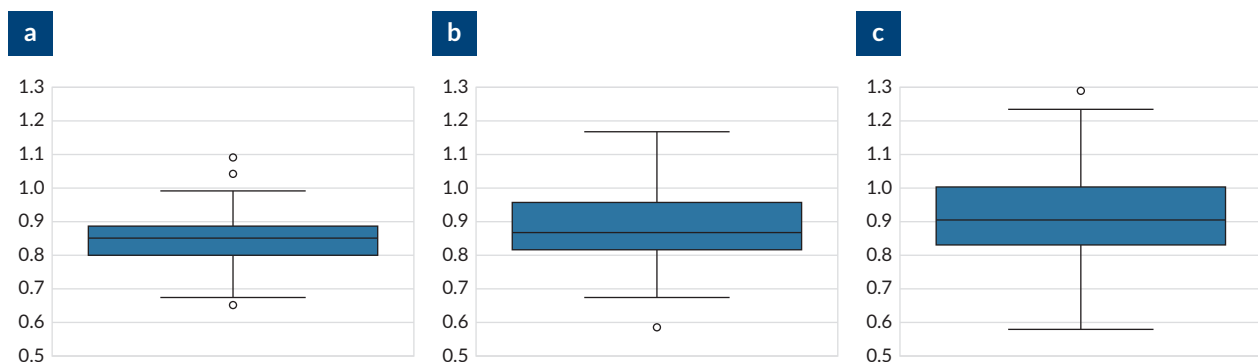


Figure 3. Boxplots of rent price ratios according to estate size (values for 2022): (a) large LHEs ($n = 64$); (b) medium-sized LHEs ($n = 78$); (c) small LHEs ($n = 211$). Source: Own calculation based on data from the 2022 census.

Our data also show that the ownership rate in LHEs is very low (Table 2). For all estates combined, the average is 13.3%, which is clearly below the citywide average of about 28%. The East–West differences observed here are also noteworthy: In 2022, the ownership rate in West German LHEs was 17.3%, whereas in East German areas it was only 1.6%. This reveals different—and strongly path-dependent—strategies of stock management, with varying importance placed on privatization measures.

5. Discussion

5.1. Relevance of LHEs in the Context of National and Local Housing Policy

Over the past 15 years, the crisis of affordable housing has intensified in almost all major German cities. High levels of immigration—particularly from abroad—combined with insufficient new construction activity and liberal housing market policies have led to a sharp increase in asking rents. Since 2010, these have grown nationwide by roughly 83% in nominal terms; in prosperous cities such as Berlin, Frankfurt a.M., Munich, or Stuttgart, asking rents in 2024 were at €14 per square meter or higher (Bundesinstitut für Bau-, Stadt- und Raumforschung, 2025b). This development has caused an increased suburbanization in favor of lower-cost housing regions like suburban areas or even rural regions (Siedentop, 2024). In particular, low-income households and families with greater housing space requirements are increasingly struggling to find affordable accommodation in large cities. This corresponds with debates on a novel suburbanization of poverty (Weck et al., 2023)—a phenomenon that has so far received little attention in Germany—and a dynamic pattern of migration from metropolitan areas into peripheral suburban or even rural regions (Steinführer et al., 2024).

In this context, our findings highlight the renewed importance of LHEs within German housing markets. Although rent levels in LHEs have also increased over time (Kompetenzzentrum Großsiedlungen, 2015), they have remained significantly below the respective citywide averages. In combination with previous research on rent levels in LHEs, this supports the view that these estates continue to serve as key providers of affordable housing for low-income households (Kompetenzzentrum Großsiedlungen, 2015). In contrast, newly developed urban areas built since the 1990s—where rising land and construction costs have predominantly produced housing in higher rent segments—have offered limited affordable options (Bundesinstitut für Bau-, Stadt- und Raumforschung, 2021). LHEs therefore function as counterweights to ongoing market-driven exclusion processes affecting low-income households in urban housing markets.

Our findings show that rent levels and ownership structures reveal significant differences between LHEs in eastern and western Germany. Due to less tense housing markets in eastern Germany, rents are generally lower than in western cities. Moreover, the relative gap between LHE rent levels and the city-wide rent average is more pronounced in East Germany. These patterns can be traced back to distinct historical trajectories shaped by divergent political frameworks before and after reunification. In West Germany, many LHEs were subsidized under social housing programs with rent controls that have largely expired since the early 2000s, whereas in East Germany such estates were state-built and managed before reunification and later transferred into private ownership rather than classified as social housing. Although extensive privatization was pursued during the 1990s and early 2000s, ownership remains highly concentrated among a small number of commercial or cooperative actors (Grunze, 2017, pp. 76–77), resulting in a low proportion of owner-occupied units (see Table 2).

Pronounced West–East disparities are also evident in the differing intensity of international immigration and the resulting increase in demand for affordable housing. While migration has long been part of the history of West German estates, East German estates have followed more discontinuous trajectories, shifting from state-built housing to phases of shrinkage and vacancy, and later to renewed demand driven by migration (Helbig, 2022). Despite persistent public narratives that associate these neighborhoods with stigmatization

and social problems, research such as the long-term case study of Leipzig-Grünau LHE suggests that such interpretations are often overly simplistic and do not necessarily reflect residents' levels of satisfaction or identification with their neighborhoods (Kabisch & Pössneck, 2022).

With the given structural deficits and high vacancy rates during periods of demographic decline, many LHEs have become the subject of urban redevelopment projects and have benefited from public funding programs in recent decades. A nationwide survey among housing companies found that around 40% of responding companies had participated in such programs or utilized related funding instruments (Deutsches Institut für Urbanistik & Kompetenzzentrum Großsiedlungen, 2015, pp. 7–8). Within the framework of the program *Stadtumbau Ost*, several areas in LHEs were formally designated as restructuring zones to manage oversupply through selective demolition while preserving the functional core for future use. Between 2002 and 2013 alone, more than 330,000 housing units were demolished using funds provided through this program (Milstrey, 2017). These interventions were primarily aimed at stabilizing neighborhoods and responding to long-standing vacancies. Although this figure illustrates the extensive scale of demolition activities, many LHEs were only partially demolished (Altrock et al., 2018, p. 1)—an outcome that has proved advantageous under current housing market conditions. Extended periods of vacancy and persistent structural deficiencies within LHEs have meanwhile generated considerable investment backlogs. Nationwide estimates assume a total investment requirement of around 90 billion euros for LHEs by 2030—a figure that significantly exceeds the estimated total investment of around 67 billion euros (Hunger, 2015). The modernization of properties that is therefore to be expected could lead to significant rent increases in the near future.

The resurgence of investment interest and public interest—as mentioned in Section 2—indicates that LHEs are increasingly recognized not only as physical assets but also as socially relevant components within urban development strategies. Given their critical role in accommodating lower-income households, research has indicated potential pathways for densification and qualitative improvements in neighborhood environments (Böger, 2014; Grunze, 2017; Hunziker, 2016; Loeser, 2014). However, modernization must proceed under socially responsible conditions. Excessive rent increases would undermine affordability goals and risk triggering gentrification processes.

A negatively connoted point of reference in this context is the privatization and sell-off of council estates in London undertaken in the name of renewal, which has been associated with processes of social cleansing and described as a “new accumulative form of (state-led) gentrification” (Lees & White, 2020, p. 1717). Similarly, the qualitative study by Baeten et al. (2017) demonstrates that housing estate renewal measures accompanied by substantial, profit-driven rent increases may lead to the actual or potential displacement of existing tenants. Similar experiences have been observed in the Netherlands, where the conversion of former social rental housing into owner-occupied dwellings has led to significant changes in the social and ethnic composition of the population. However, the extent of these socio-demographic changes varies considerably depending on the location of the estates, particularly between inner-city and peripheral areas (Boterman & van Gent, 2014). In contrast, our data show that a far-reaching wave of privatization in LHEs has not occurred so far (see Table 2). Germany therefore provides a certain counterpoint to experiences in other European countries with more liberal housing policies.

5.2. Limitations of the Employed Geostatistical Method

At this point, we explicitly point out the limitations of our methodological approach. Using the multi-criteria, census-based method presented here, LHEs can only be identified approximately. This is due, first of all, to the ambiguity of the term “large housing estate,” which is not legally defined and therefore lacks any official listing at the national level. Secondly, it results from the use of threshold values (such as minimum density and population size), whose setting has a significant influence on the final outcome. A particular difficulty lies in distinguishing LHEs from post-war reconstructions of late 19th-century urban quarters, since both types of settlements exhibit similar building densities.

Moreover, a grid-based approach means that LHEs cannot be represented in their precise settlement boundaries. Although the resolution of the data used here—with a 100-meter grid—is very high, it cannot be ruled out that some grid cells classified as belonging to LHEs may also capture non-estate areas (such as adjacent single-family home neighborhoods). Conversely, parts of LHEs may fall within grid cells not interpreted as LHEs because their population or density falls below the set thresholds. Owing to the incomplete rent price information in the census, not all identified LHEs could be included in the analysis. Nevertheless, we consider our method’s overall identification of LHEs in German cities to be sufficiently accurate for answering the research question posed.

It should also be acknowledged that, with the research approach used here, we are not able to assess in detail the specific effects or relative influence of the factors shaping rent developments in LHEs—such as ownership structures, infrastructure provision, or local stigmatization. This should be the subject of future research in this field.

6. Conclusions

We were able to show, using a novel methodological approach, that LHEs play a significant role in providing affordable housing in large German cities. On average, cold rents paid in these areas are about 19% below the average rents in the cities studied. This price effect is especially pronounced in large LHEs and in LHEs situated in East Germany. For low-income earners, such areas therefore often represent the last bastions of affordable housing within city limits. However, the developments outlined in Section 2 in the context of neoliberal urban and housing policies—particularly the privatization of former social housing—pose enormous challenges for urban housing and social policy aimed at preserving affordable living space.

The German experience suggests that LHEs require targeted rent protection and development strategies to preserve their original function of providing affordable housing for broad segments of the population. To maintain their integrative role in increasingly polarized urban housing markets, policies should promote socially balanced regeneration that combines modernization with safeguards for affordability and explores cross-subsidization models integrating lower- and higher-priced segments within the same developments. Such approaches can support social diversity while maintaining accessibility for economically disadvantaged households. At the same time, many estates are marked by concentrations of poverty, social disadvantage, and stigmatization. While our study highlights the positive role of LHEs in metropolitan housing markets, it does not overlook the presence of significant social challenges in some estates. Future housing and urban

policy must therefore strike a careful balance: improving living conditions without triggering processes of upgrading and displacement.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The employed data are publicly available under the following source: <https://ergebnisse.zensus2022.de/datenbank/online>

LLMs Disclosure

We used ChatGPT in the TU Dortmund University Campus KI Environment for language polishing.

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