

A WINDOW INTO THE EUROPEAN CITY: EXPLORING SOCIOECONOMIC RESIDENTIAL SEGREGATION IN URBAN POLAND

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ABSTRACT

In this paper, we build on a long research effort aimed at identifying the specific conditions, functional and structural characteristics of urban areas, that produce different levels of residential segregation across cities. We explore segregation levels in Poland's 87 largest cities, cities with more than 50,000 residents, by measuring indices of dissimilarity relating to socio-professional status. We then proceed by examining core structural determinants of the revealed segregation levels, including city size, and housing market characteristics. The results suggests that the structural characteristics of urban regions are indeed significant predictors of the level of socio-spatial disparities in urban Poland. As expected, larger cities are more segregated than the smaller ones; higher shares of public housing also appear to contribute to more pronounced socioeconomic spatial divisions. Intriguingly, the share of new housing stock alone is not related to strong residential segregation.

Key words: socioeconomic inequality; segregation; cities; Poland

INTRODUCTION

Socioeconomic inequalities have risen worldwide over the past few decades, and this trend is reflected in increasing socioeconomic residential segregation (Reardon & Bischoff 2011; Maloutas & Fujita 2012; Piekut *et al.* 2018; Musterd 2020). Similar to previous studies on socio-spatial divisions in Europe and elsewhere (see Morgan 1975; Musterd 2005; Tammaru *et al.* 2020; He *et al.* 2022), we define such segregation as the uneven geographic distribution of social (socio-professional) groups within a certain area. In Europe, the most notable surge in socioeconomic inequality, measured as income disparities, took place in the former socialist countries (Blanchet *et al.* 2019), and recent studies provide abundant evidence

that the segregation of the higher social status residents from the lower social status groups has also grown in East Europe (Marciniczak *et al.* 2016). Against this background, this paper studies the correlates of social residential segregation using data from Poland's 87 largest cities to inform the analysis.

Income inequality is considered to be the main determinant of segregation in North America and Europe (Musterd 2005; Watson 2009), but its effect on the intensity of social spatial divisions is complex and mediated by certain structural characteristics of national contexts, such as the welfare and housing regimes (Musterd & Ostendorf 1998), the dynamics of the housing market, employment within business services (especially finance and insurance), demographic traits and trends,

and the characteristics of individual cities, including population size, and the racial/ethnic composition (Watson *et al.* 2006; Marcińczak *et al.* 2015; Musterd 2020; Tammaru *et al.* 2020; Wessel 2022). Furthermore, the effect of income inequality on segregation can be different at the opposite ends of the social hierarchy (Reardon & Bischoff 2011).

Most studies on segregation in Europe target the largest cities, focusing on the effects of (macro)structural factors on the degree of segregation between the higher and the lower social (professional or income) categories (e.g. Musterd *et al.* 2017; Tammaru *et al.* 2020; Haandrikman *et al.* 2021). While this literature provides important insights into the effects of income inequality, welfare and housing regimes, globalization and the restructuring of labour markets on segregation, it is nevertheless hamstrung by three limitations. First, it mainly concerns a set of large cities, confining most of the urban hierarchy to the academic penumbra while drawing conclusions of implicit universal theoretical validity. More mundanely, the reliance of theory on empirical inputs from globally prominent cities derails our ability to draw accurate theoretical conclusions: we know, for example, that the relationship between inequality and segregation differs between booming and declining urban regions (Burgers & Musterd 2002); we also know that residential preferences change over time, and that they vary across cultural contexts.

Second, with the exception of studies associating city size or global/world city status with segregation (e.g. Marcińczak *et al.* 2015; Tammaru *et al.* 2020; He *et al.* 2022), most research on the correlates/determinants of segregation in Europe shies away from studying the effect of important metropolitan characteristics on the intensity of segregation (e.g. Massey & Eggers 1993). Particularly missing are the degree of income inequality within cities (as opposed to nationwide statistics), demographics, and the rates of new housing construction (Watson 2009; Reardon & Bischoff 2011).

Third, the available results from comparative studies on the nexus between city/metropolitan characteristics and segregation in Europe, with some exceptions (e.g. Haandrikman *et al.* 2021), are limited to a single dimension of social segregation: the segregation of the

higher from the lower social categories (e.g. Tammaru *et al.* 2020).

This paper addresses all three of these limitations by exploring the relationship between metropolitan (city) characteristics and the intensity of segregation in Poland's 87 cities with a population of more than 50,000. We highlight three dimensions of socioeconomic segregation: the intensity of spatial divisions of the high status vs the low status social groups, the segregation of the high social status population, and the segregation of the low social status population. Then, we explicitly analyse the joint effect of income inequality, population size and housing structure, which are baseline determinants of segregation (Watson 2009; Musterd *et al.* 2017), on the uneven spatial distribution of socioeconomic groups. We answer the following research questions:

1. What are the effects of income inequality, and demographic and housing characteristics on the level of socioeconomic segregation in Polish cities?
2. Are these effects consistent across the three dimensions of socioeconomic segregation?

The following section briefly summarizes the current debate on the causes of segregation. Next, we chart the development of income inequality and social segregation patterns in Poland after socialism and describe our data and methods. This will be followed by our results on the correlates of the intensity of social residential segregation. Finally, we present our key findings.

SOCIOECONOMIC SEGREGATION: THEORY AND EXISTING EMPIRICAL EVIDENCE

Among the possible causes of segregation, income inequality stands out, but this factor alone does not suffice to explain the phenomenon's diverse expressions (Musterd 2005; Reardon & Bischoff 2011; Wessel 2022). Indeed, there is a growing understanding among scholars that the effect of inequality on segregation is mediated by several general factors: (1) individual/household characteristics, behaviour and preferences; (2) macro-structural factors including the evolution of labour markets, and the type

of welfare and housing regimes; (3) the local context of a city's economic, social and demographic history, as well as its morphology and topography (Maloutas & Fujita 2012; Marcińczak *et al.* 2015; Musterd 2020; Tammaru *et al.* 2020; Haandrikman *et al.* 2021). Certainly, these factors are interrelated and codetermined, and it is not always possible or feasible to extrapolate their individual contributions.

The ethnic and racial characteristics of population strongly influence the patterns of socioeconomic segregation (Jargowsky 2020). With ethnic/racial minorities often overrepresented among lower socioeconomic groups (Scott 2019), ethnic/racial divisions often mirror social divisions. Moreover, prejudice against particular ethnic/racial groups on the one hand, and preferences to live in ethnic concentrations on the other hand, may actually disrupt the relationship between income and segregation, as even higher social status minority households may either face problems with leaving ethnic/racial concentrations (Rothstein 2017), or simply cherish contacts with co-ethnics and living in mixed-income tracts (Li 2009). Also, preferences for neighbourhood amenities such as proximity to public transit or schools differ among households and can further complicate the relationship between inequality and segregation (Boterman 2020), as do the patterns of residential mobility among different socioeconomic groups and age cohorts. However, *in situ* changes (i.e. changes in income or socio-professional status unaccompanied by residential mobility events) can be equally important in shaping the patterns of segregation (Galster & Booza 2007; Marcińczak *et al.* 2015).

Because the housing market's main principle is price rationing (Hulchansky 2010), higher status households will be able to satisfy their residential location preferences to a greater extent than households with lower socioeconomic status. Consequently, the mobility of the higher social categories will affect segregation patterns the most (Harvey 1985). Even so, the segregation effect of the mobility of the higher social status groups can be mixed, hinging on the overall pace and scale of urban growth as well as on past and current preference trends. For example, gentrification typically has ambiguous effects (Freeman 2009;

Van Gent & Hochstenbach 2020), as it may imply a de-segregating trend in its earlier phases (unless it targets diverse areas to start with), followed by a re-segregation – unless the process is interrupted by market forces or through regulation.

Macro-structural factors not only set the preconditions for the development of inequality patterns, but also shape the effect of income disparities on spatial divisions. The first aspect relates to changes in labour force structure during the transition from Fordism to post-Fordism (Scott 2019). Such changes are assumed to drive up social inequality, and thus segregation, especially in those urban areas most exposed to globalization. Labour market restructuring involves the thinning out of the middle class and subsequent social/income polarization (Sassen 1991), which should exacerbate segregation (dualization) in cities (Mollenkopf and Castells 1991). While the dualization thesis has been criticized for its overly simplistic approach to explaining segregation in cities in the Global North (Marcuse 1989), and notwithstanding the fact that professionalization (Butler *et al.* 2008) rather than polarization has been the dominant trend in the restructuring of European labour markets, both social inequality and segregation have been on the rise in most of Europe in the new millennium (Musterd *et al.* 2017). The recent increase in income inequality is primarily driven by the higher income groups receiving a greater proportion of the total earnings (Blanchet *et al.* 2019), rather than by an expansion of the base of the income pyramid through proletarianization, as Marxist scholars would have expected (Hamnett 2021). This is important as Reardon and Bischoff (2011) clearly demonstrate that income disparities have a stronger effect on the segregation of higher socioeconomic categories than on the segregation of the less affluent.

The more straightforward effect of income stratification on segregation requires the presence of income-correlated residential preferences, the existence of an income-based housing market and/or housing policies that link income to residential location (Reardon & Bischoff 2011). Pan-European (Marcińczak *et al.* 2016) and cross-Atlantic/global (Maloutas & Fujita 2012; Musterd 2020)

comparative studies further show that the variety of welfare regimes, whose redistributive mechanisms benefit the poor and vulnerable to varying extents, can explain the differentiated effect of socioeconomic inequality on segregation across national contexts. The corporatist and social-democratic welfare systems characterized by greater income/wealth redistribution through welfare programmes and social or public-owned housing (Musterd & Ostendorf 1998; Arbaci 2007) are more successful in moderating the relationship between globalization, labour market segmentation with its concomitant social inequality, and segregation.

In liberal welfare systems not explicitly designed to curb inequality (Esping-Andersen 1990), residential real estate tends to be heavily commodified, leading to higher levels of segregation when compared with the corporatist and social-democratic models. Nonetheless, significant state intervention in the housing market may also lead to *higher* levels of segregation (Arbaci 2007). Findings suggest that policies that constrain housing options for low-income households to public stock, coupled with the volume of public housing stock itself (Haandrikman *et al.* 2021), directly affect the segregation of lower social groups, especially when the price-regulated housing is spatially clustered. The social/public housing stock in many European cities has lost most of its status as housing for (also) medium income households (wherever it had such status to start with) (Musterd 2014), in tandem with the overarching housing marketization and commodification trend across western societies (Kadi & Ronald 2014). The reduction in public housing and the increasing housing affordability crisis (Madden and Marcuse 2016) imply that the options available to lower income groups – and increasingly to middle-income groups – are fewer and fewer, being increasingly limited to public housing and/or the low-quality private rental sector. Moreover, the limited choices available to lower economic groups may manifest themselves in the suburbanization of poverty (Hochstenbach & Musterd 2018), or in the exclusion of the poor (and increasingly the not-so-poor) from metropolitan areas altogether – causing reduced access to jobs and

forcing long commutes on low- and (sometimes) middle-income earners who are effectively priced out of the city (see, e.g. Cao & Hickman 2018).

The third 'grand' factor codetermining the intensity of socioeconomic segregation concerns crucial effects of the local context, understood as the economic history and social and demographic development trajectory of a city and of its neighbourhoods (Maloutas & Fujita 2012). While the effects of the labour market restructuring caused by globalization and post-fordist economic transition on economic inequality hinge on the functional specialization of cities and on their position in the global and national urban hierarchy (Burgers & Musterd 2002), the housing structure and its geography and development over time, and the size and dynamics of the population, determine local patterns of segregation (Tamaru *et al.* 2020). Specifically, because the housing stock is durable, it reinforces the lingering effects of past segregating forces and processes on contemporary segregation levels (Reardon & Bischoff 2011). The overall demographics and new housing supply are equally important in affecting the patterns of segregation, and it appears that socioeconomic segregation in rapidly growing cities is particularly sensitive to changes in inequality (Watson *et al.* 2006); the housing stock in those cities adjusts more quickly to changing consumer preferences and demand (Glaeser *et al.* 2006). Interestingly, Watson (2009) demonstrates that the extent of new (non-social) housing construction influences the nexus between socioeconomic inequality and segregation, with even minor increases in inequality increasing segregation in cities where abundant new housing is being built.

RESEARCH DESIGN

Setting the scene – Poland has become Europe's most unequal country, at par with the United States (Blanchet *et al.* 2019). However, while recent decades of increased inequalities brought the country's Gini index value to 40 in 2015, inequalities were much lower during the years of state socialism (Gini of 22 in the mid-1980s), as was the case in most other

Soviet satellite states. Specifically, with the imposition of socialism in 1945, the pre-WWII class divisions and social inequality patterns were discontinued, and low levels of segregation followed once the socialist system was consolidated by the early 1970s (Węclawowicz 1975). Interestingly, its intensity in major Polish cities decreased even more during the 1980s (Marcinićzak *et al.* 2013). The dramatic increases in income inequality in East Central Europe (ECE) in the 1990s were not accompanied by the surmisable increase in social segregation. Instead, in line with the late-socialist trend, social segregation either *decreased* (Sýkora 2009) or remained stable at low levels (Marcinićzak *et al.* 2012). This rather counterintuitive condition was known as the “paradox of post-socialist segregation,” and it was largely attributed to the underdeveloped condition of the real estate and mortgage credit markets, which limited the residential mobility of higher-income groups in particular (Marcinićzak *et al.* 2015). In general, the socio-spatial structure of Polish cities during late socialism and the early post-socialist transition phase resembled a mosaic pattern.

By the 2000s, however, the institutional and regulatory frameworks needed for the functioning of a modern housing market had been established in the more prosperous countries of ECE, and, accordingly, socioeconomic segregation reclaimed its traditional association with income inequality (Marcinićzak *et al.* 2016). Against the background of Poland’s

particularly strong inequalities, the increase in the spatial separation of unskilled workers from managers, senior officials and legislators in the country’s three major cities (Cracow, Łódź, and Warsaw) in the 2000s was more profound than elsewhere in ECE, with the notable exception of Tallinn (Figure 1). Importantly, while the housing market and housing sector in general developed more rapidly after the country’s EU accession in 2004, housing affordability noticeably declined during the dramatic price hike of the mid-2000s, which was only interrupted by the global financial crisis that started in 2007 (Łaszek 2013). Meanwhile, the average share of public housing in urban Poland dropped from 14 per cent in 2002 to 9 per cent in 2011. Taken together, these factors prepared the ground for economic inequality to be more explicitly reflected in socioeconomic segregation patterns.

Data and key variables – We use data from the 20 per cent representative sample of the 2011 national census of Poland to measure the intensity of socioeconomic segregation. The data were supplied on a contractual basis by the Central Statistics Office of Poland. The reason we use this sample is that data on the occupational composition of the economically active population in the last census round were collected for this sample only (as part of the ‘extended’ version of the 2011 national census). With the exception of the data on income inequality in the selected

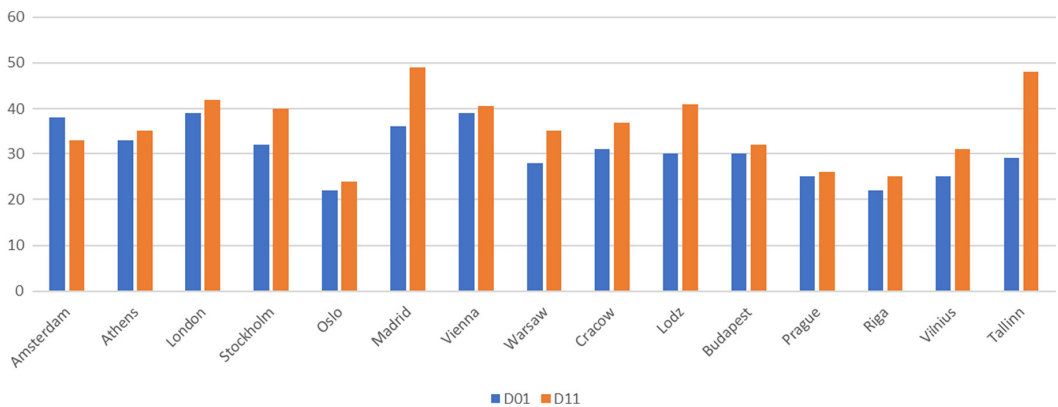


Figure 1. Spatial separation of the lowest socio-professional groups from the highest socio-professional categories in selected European cities in 2001/2002 and 2011 (measured using the Index of Dissimilarity [D]).

cities (measured using the Gini index), which was supplied by the Ministry of Finance, all dependent and independent variables were constructed by aggregating census micro-data (information on individuals) to *statistical units*, and by calculating summary measures for each city. Then, similar to other studies on the correlates/determinants of socioeconomic segregation (see Watson 2009; He *et al.* 2022), we use the city as our unit of analysis. *Statistical units* are small spatial units of approximately 1000 residents, which are commonly used to approximate residential neighbourhoods in Polish cities (Marcinićzak *et al.* 2013) and are the equivalent of the census tracts or bloc groups traditionally used in segregation studies (e.g. Reardon & Bischoff 2011). The number of residents in the statistical units is relatively homogenous, enabling us to compute comparable segregation indices across cities (see Marcinićzak *et al.* 2012).

As in previous studies on patterns of social/socioeconomic segregation (e.g. Morgan 1975; Musterd *et al.* 2017), we take socio-professional categories to approximate the main lines of socioeconomic division in Poland. Following Marcinićzak *et al.* (2015), we rely on the International Standard Classification of Occupations (ISCO) to divide the population into higher and lower social groups. The categories ‘managers’ and ‘professionals’ were merged into a new higher social group (HSG) category, whereas the ‘unskilled workers’, ‘sales and service workers’ and ‘industrial workers’ were aggregated into a lower social group (LSG) category, resulting in a generic classification that approximates socioeconomic stratification in Poland after socialism (see Słomczyński *et al.* 2007). Specifically, it mirrors socioeconomic stratification more accurately than the frequently adopted division into the highest versus the lowest social groups, as represented by managers and unskilled workers, respectively (Tammaru *et al.* 2020). This is because many professionals in Poland (IT specialists, medical doctors, lawyers, etc.) have similar, or even higher, earnings than the managers and senior officials (ISCO category 1). In the same vein, the average earnings of sales and service workers are similar to those of the unskilled workers. Put differently, the average income that the higher social status group

(HSG) receives is three times higher than that of the low social status group (LSG) (Central Statistical Office 2012).

Table 1 lists the dependent and explanatory variables included in the regression models and presents their descriptive statistics. As in earlier comparative studies on socioeconomic segregation in ECE (Marcinićzak *et al.* 2015), we analyse cities within their administrative boundaries. As our set of cities is relatively small ($N=87$), we limited the number of predictors included in the regression models to the ‘baseline’ determinants of segregation intensity. Bearing in mind the potential effects of structural and ecological factors on segregation intensity, and supported by the findings of recent comparative studies (Musterd 2020; Tammaru *et al.* 2020; Haandrikman *et al.* 2021), we advance the following propositions regarding the potential differences in segregation levels among Polish cities. First, as there is strong empirical evidence suggesting that the relationship between population size and segregation intensity is not an artefact of the data collection process (Marcinićzak *et al.* 2023), we expect larger cities to be more segregated, possibly because of greater labour market segmentation, tighter housing markets, and the greater presence of employment within business services (Wessel 2022). Second, with larger cities having developed more vigorously after socialism, accompanied by polarizing economic growth (Węclawowicz 1996), we assume that city size is inversely related to social and economic decline in Poland.

To assess the potential effects of housing structure and location on social segregation levels we rely on four variables: (1) share of new housing (2003–2011) in the total housing stock, (2) spatial concentration of new housing, (3) share of public housing and (4) spatial concentration of public housing. Accordingly, considering that Poland has a hyper-ownership housing system and that new housing is almost exclusively consumed by higher and middle social strata, and against the background of what is known from research on the relationship between the supply of new housing and urban growth and inequality/segregation (Glaeser *et al.* 2006; Watson *et al.* 2006; Watson 2009), we assume that higher social groups are more segregated in cities with a greater supply of

Table 1. *Descriptive statistics.*

Variables	Mean	Minimum	Maximum	Standard deviation
Dependent				
Dissimilarity index (HGS vs LGS)	0.225	0.152	0.333	0.040
Dissimilarity index (HGS vs remainder of population)	0.192	0.147	0.292	0.034
Dissimilarity index (LGS vs remainder of population)	0.195	0.135	0.291	0.033
Explanatory				
Population size – POP	161,068	50,002	1,753,977	223,725.4
Gini index – GINI (0–100)	38.54	34.38	44.26	1.932
Share of public housing – SPH	9.722	1.229	27.533	5.244
Share of new housing (2003–2011) – SNH	7.358	0.321	21.283	4.626
Spatial concentration of new housing – CNH	0.188	0.066	0.459	0.083
Spatial concentration of public housing – CPH	0.334	0.092	0.611	0.090

newly built housing. Importantly, new housing was a marker of neighbourhood prestige already under socialism and in the immediate aftermath of its collapse (Marcinićzak & Sagan 2011). However, new housing intensifies segregation only when it is constructed in already high (or middle) social status areas, or on greenfield sites (the latter often being the case in the United States). Otherwise, an inverse effect of new housing construction (or upgrading) may be expected (see Holm *et al.* 2015; Kovacs 2020). We also expect the spatial separation of the HSG to increase along with the spatial concentration of new housing; importantly, we believe that the effect of spatial concentration should be stronger in cities where new housing is more prominent.

As the share of public housing generally reflects the effect of housing policies, especially those linking low-income households to certain housing segments (Rex & Moore 1967; Arbaci 2007; Musterd 2014), we expect cities with higher shares of public housing to have higher levels of segregation, particularly among LSGs (e.g. Haandrikman *et al.* 2021). As elsewhere in ECE (Lux & Sunega 2014), the process of public housing residualization has been ongoing in Poland since the mid-1990s, and the remaining public housing stock tends to be located in low social status neighbourhoods (Ogrodowczyk & Marcinićzak 2021).

This should come as no surprise, as the presence of public housing was a pervasive characteristic of lower-status neighbourhoods already during late socialism and the following decade (Marcinićzak & Sagan 2011). We assume that the spatial concentration of public housing will translate into the greater segregation of lower social groups (e.g. Reardon & Bischoff 2011) and that this effect grows stronger as the share of public housing increases.

The city-level Gini index is used to capture income inequality. Based on results from previous studies conducted in Europe and North America (Musterd 2005; Reardon & Bischoff 2011; Tammaru *et al.* 2020; Watson 2009), we hypothesize that higher income inequality will increase the segregation of the HSG from the LSG, as well as the segregation of the HSG, but that income inequality need not show significant associations with the segregation of LSG.

Methods – Similar to most other studies comparing the patterns of socioeconomic segregation in European cities (e.g. Morgan 1980; Musterd *et al.* 2017; Haandrikman *et al.* 2021), we focus on the evenness dimension of segregation, which concerns the distribution of population groups across spatial units (Massey & Denton 1988). We use the index of dissimilarity (D) to measure

the intensity of segregation of the HSGs, of the LSGs, and of the HSGs from the LSGs. *D* is a measure of how different the population composition of residential neighbourhoods is, on average, from that of the population as a whole (Reardon & O'Sullivan 2004). The values of the index vary from zero (a completely even distribution of population groups) to one (complete segregation). We use the index of concentration *R* proposed by Hong and Sadahiro (2014) to measure spatial concentration of different forms housing. The values of *R* also range between 0 and 1 and are interpreted similar to the index of dissimilarity: the higher the index value, the higher the degree of residential concentration (*ibid.*).

Studies that model the intensity of segregation as a function of urban ecological characteristics usually rely on linear regression (Watson 2009; Reardon & Bischoff 2011). Accordingly, to clarify the effect of economic and demographic characteristics of cities on different dimensions of segregation, we estimated three separate regression models with the outcome variable being the *D* index values for the three population group pairings: the HSG vs the LSG, the LSG vs the rest of the population, and the HSG vs the rest of the population. Finally, to probe into the effects of housing structure and location on segregation intensity, we also estimate regression models with interaction terms and conduct simple slope analysis along with the Johnson-Neyman procedure (McCabe *et al.* 2018). To facilitate comparisons between models with and without interactions, and to avoid the problem of multicollinearity in regression models including interactions, the four housing-related variables were mean-centred.

RESULTS

The intensity of socioeconomic segregation in the three dimensions in urban Poland is illustrated in Figure 2. In most cases, the segregation between the higher and the lower social groups is stronger than the segregation

of the HSGs or the segregation of the LSGs. Considering that the HSGs are generally more spatially separated from the remainder of the population than are the LSGs, it appears that the irregular U-shape of the segregation curves which characterized post-socialist cities in the early 2000s remains in place (see Marcinićzak *et al.* 2015). Within each dimension, the levels of segregation are low when compared internationally (below 0.35).¹

Table 2 presents the robust results of our models. All six models have strong explanatory power, although more variance is explained for the segregation of the HSG than for the other dimensions of segregation. The relationship between the characteristics of cities and the intensity of segregation in each domain generally follows the expected direction (sign), but there are some notable exceptions. As expected, the logged population size of a city is strongly related to segregation, and constant across all three studied dimensions of segregation. More specifically, a 0.1 unit increase in logged population size, corresponding to a 10 per cent increase in population, brings about 0.005 increase in the *D* index scores for each combination of socioeconomic groups. This means, by way of example, that a typical city of 250,000 inhabitants will have a *D* index that is almost 4.9 percentage points (0.049) higher than a city of 50,000.

The effect of income inequality on segregation also concurs with previous studies and theory. Essentially, income inequality is more significantly and strongly related to the spatial separation of the HSGs than to that of the other groups. A single-unit increase in the Gini index predicts a rise of 0.005 in the *D* index for the HSG versus the LSG; whereas the effect on the segregation of LSG drops to 0.0025, while shedding some statistical significance.

The share of public housing is also a significant determinant of the level of segregation. Although its effect is statistically significant in every dimension, it is noticeably stronger in predicting the level of spatial separation

Figure 2. Intensity of socioeconomic segregation in Poland, measured using *D* values between the low social status residents vs the rest (LOW), the high social status residents vs the rest (HIGH), and the high social status vs low social status residents (HIGH VS LOW).

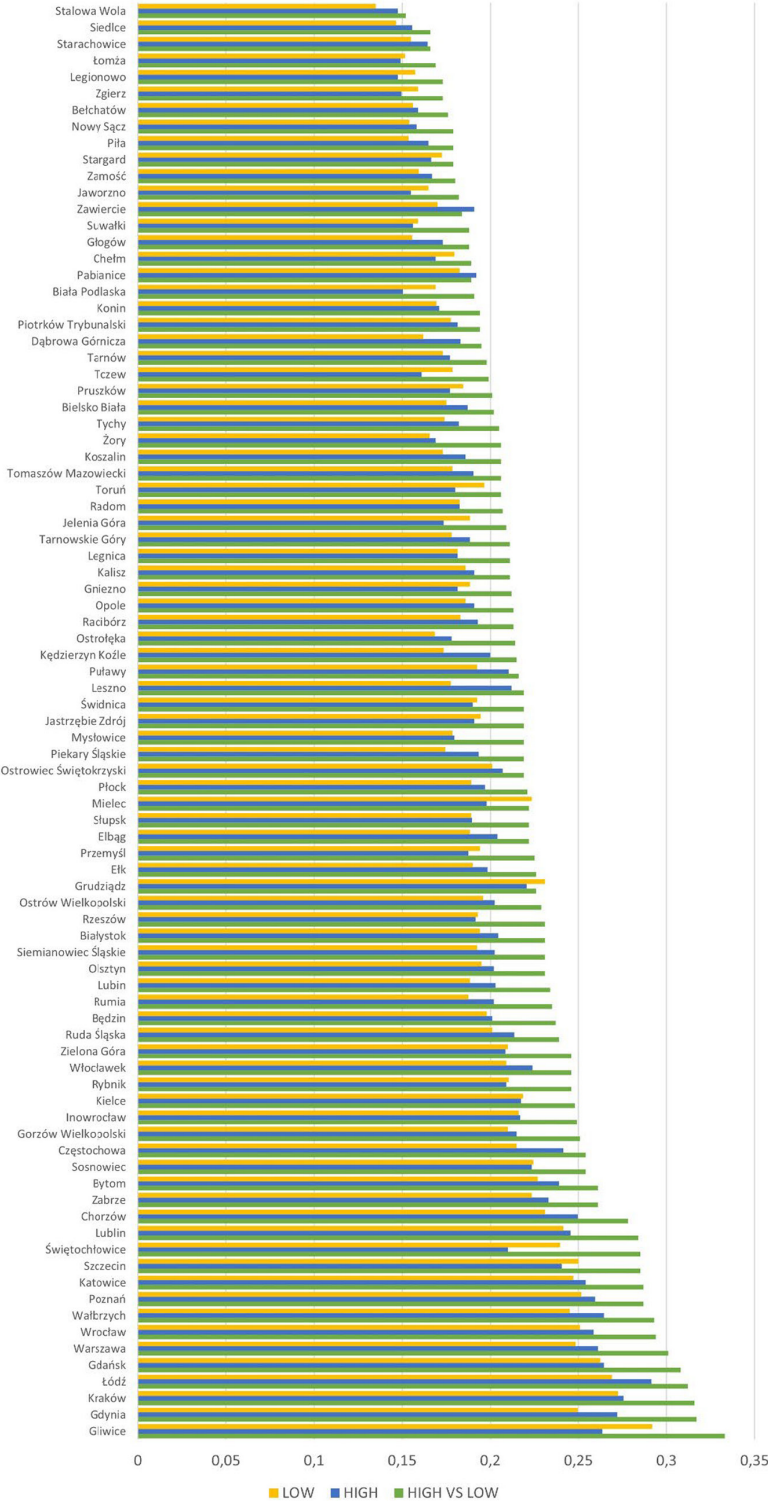


Table 2. Estimation results (OLS models).

Predictors	Dependent variables					
	HSG vs LSG		LSG vs remainder of population		HSG vs remainder of population	
	Model 1A	Model 1B	Model 2A	Model 2B	Model 3A	Model 3B
Constant	-0.2618***	-0.2845***	-0.1734**	-0.1804**	-0.2319***	-0.2521***
logPOP	0.0556***	0.0588***	0.0525***	0.0546***	0.0545***	0.0567***
GINI	0.0051**	0.0052**	0.0025'	0.0024'	0.0034**	0.0042**
SPH	0.0007*	0.0006*	0.0005'	0.0005'	0.0006*	0.0006*
SNH	-0.0017**	-0.0014*	-0.0013**	-0.0010*	-0.0018***	-0.0015***
CPH	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
CNH	0.1167**	0.0999*	0.0950**	0.0877*	0.0720*	0.0582*
SPH × CPH		n.s.		n.s.		n.s.
SNH × CNH		0.0121*		n.s.		0.0112*
Adjusted R ²	0.6223	0.6412	0.5890	0.5873	0.6901	0.7102
Breusch-Pagan test	5.583	4.151	7.031	6.334	2.410	1.267

Significances: ***0.001, **0.01, *0.05, '0.1; n.s. stands for "not significant."

of the HSGs from the LSGs, and from the remainder of population – *ceteris paribus*, a 1 per cent increase in the share of public housing contributes to an increase of 0.0007 in the D index, meaning that a city with 20 per cent public housing is likely to have a D index that is 2.7 percentage points higher than a city with only 10 per cent public housing. Nonetheless, the degree of spatial concentration of public housing seems to have no statistically significant effect on the intensity of segregation. The same applies to a possible synergy effect between supply of public housing and its spatial concentration.

As hypothesized, we identify a relationship between urban growth, reflected in the construction of new housing, and segregation, and the relationship “behaves” anomalously if judged from the perspective of the existing studies on metropolitan areas in the US (Kain 2000; Watson *et al.* 2006; Watson 2009): in fact, the greater the share of new housing, the lower the segregation of the HSGs. This suggests two possibly simultaneously occurring trends: (1) newbuild gentrification scatters the higher social status population throughout existing non-rich neighbourhoods (as per Holm *et al.* 2015; Kovacs 2020), and (2) greenfield housing development in the 2000s generally occurred within rural or semi-urban areas (under the city’s jurisdiction) characterized by established lower social status populations (Marcinićzak *et al.* 2012). Whereas the share of new housing generally reduces the intensity of segregation in each domain, the degree of spatial concentration of new housing has an opposite effect. Essentially, the more unevenly distributed (spatially concentrated) the new housing, the higher the levels of spatial separation of the LSGs, the HSGs, and of the LSGs from the HSGs. Importantly, the synergy effect between the supply of new housing and its spatial concentration is significant in determining the intensity of spatial separation of the HSGs from the remainder of the population, and from the LSGs. The results of the simple slope analysis shed additional light on the joint effect of these two variables (Table 3). More specifically, it appears that when the value of SNH is high (at the average value or higher), the slope of CNH

Table 3. *Simple slope analysis for selected models.*

	Value of SNH	Slope of CNH
Model 1B	Johnson-Neyman interval: -0.90 to 16.45	
	-5.12 (-1 standard deviation)	0.04
	0 (mean)	0.10*
	5.12 (+1 standard deviation)	0.16**
Model 3B	Johnson-Neyman interval: 0.51 to 18.29	
	-5.12 (-1 standard deviation)	0.00
	0 (mean)	0.06*
	5.12 (+1 standard deviation)	0.12**

Significances: **0.01, *0.05.

is positive and significantly different from zero. However, the Johnson-Neyman intervals further reveal that there are upper limits to the interaction effects. Then, the justifiable interpretation is that CNH has no statistically significant effect ($p > 0.05$) on the outcome variable except when the mean-centred SNH variable is higher than approximately 0 and lower than approximately 18.

CONCLUSIONS AND DISCUSSION

Using a full sample of Poland's 87 largest cities – a very diverse club – this study investigated the correlates of different dimensions of socio-economic segregation. Our paper produced four main findings.

First, although Poland has the most unequal income distribution in Europe (Blanchet *et al.* 2019), and income inequality in the country's cities clearly influences the intensity of the segregation within them, in absolute terms the phenomenon's intensity is moderate at worst. However, the observed level of spatial separation between the most distant social categories places Poland's three major cities among the most segregated in Europe. This means that the paradox of segregation after socialism, that is the mismatch between the levels of income inequality versus segregation that characterized large cities in Poland and elsewhere in ECE in the

1990s (Sýkora 2009; Marcińczak *et al.* 2013), was “resolved” during the subsequent decade through the maturation of the housing market along with the gradual residualization of public housing stock. Thus, the spatial separation between the LSGs and the HSGs increased during the 2000s, as it did elsewhere in Europe (Musterd *et al.* 2017). More importantly, our results illustrate that, twenty years after the demise of socialism, rising income inequality translated into rising segregation, and that this relationship is present in every dimension of segregation. Segregation in Poland's major cities may well continue increasing, but for the moment its intensity is comparable to that found elsewhere in Europe (Marcińczak *et al.* 2016; Tammaru *et al.* 2020; Haandrikman *et al.* 2021).

Second, city size matters for segregation, with larger cities being more segregated than smaller ones. We surmise that this finding is related to the more competitive nature of the housing market in big cities, as well as to its greater differentiation on both the supply and demand sides. Together, this produces more segregation than would be the case in smaller cities with similar levels of income inequality. Nevertheless, a closer look at the data reveals that the local context indeed plays an important role in determining the intensity of segregation. It is not just the bigger cities that tend to be more segregated, but also the cities that have been big for some time, particularly those which were not destroyed during WWII. “Old” cities such as Cracow and Łódź are more segregated than the cities having experienced most of their growth under socialism (including Warsaw, which had to be rebuilt).

Third, we find that (public/social) housing policy, as represented by the share of public housing stock, influences the level of segregation. Owing to the ongoing residualization of public housing in ECE (Lux & Sunega 2014), cities where this housing segment remains significant tend to be more segregated. Contrary to prior expectations (Reardon & Bischoff 2011; Haandrikman *et al.* 2021), we show that the effect of this factor is not limited to the segregation of the LSGs alone. Instead, the greater the “survival rate” of (residualized) public housing, the more the spatial

separation of the HSGs from the lower ones. This finding further emphasizes the need for any explanation of segregation patterns to be informed by an appropriate assessment of the characteristics of local context. In the Polish case, the presence of public housing, in contrast to cooperative and/or private housing, signalled low neighbourhood social status already under late socialism (Węclawowicz 1996; Marcińczak & Sagan 2011), and the depleted public housing stock was preserved predominantly in low (or low-to-middle) social status tracts (Ogrodowczyk & Marcińczak 2021).

Fourth, despite the increased commodification and income-orientation of the housing market, and even though a housing affordability crisis has been escalating since the early 2000s, the volume of new housing construction influences segregation in a way that contrasts with how these phenomena interact in the United States (Watson *et al.* 2006; Watson 2009). Indeed, our discovery of a negative relationship between the share of new housing and the segregation of the HSGs may seem counterintuitive at first, but it could be explained by the specificity of urban development after socialism. In fact, already in the 1990s (Marcińczak & Sagan 2011) and in the 2000s (Holm *et al.* 2015; Kovacs 2020), new housing developments in former socialist cities were often juxtaposed with lower-quality housing, especially in the inner-city – a good example of this trend being the recycling of centrally located pre-socialist industrial sites (some of which very small) that were in use until the very end of the socialist period (Bertaud & Renaud 1997). Such industrial sites were often surrounded by neighbourhoods with lower social status populations, and in many cases, these areas were marked for future demolition, meaning that they did not undergo necessary maintenance. The selective and scattered development of new housing in turn contributed to the rise of polarized neighbourhoods (Marcińczak *et al.* 2015) rather than to the formation of socially homogenous tracts. Nonetheless, the effect of housing developments on segregation after socialism may be (come) positive if and when new residential fabric is spatially concentrated. Viewed in this light, our results are

concurrent with the arguments advanced by Glaeser *et al.* (2006) and Watson *et al.* (2006), as it seems that the above-average shares of new housing production (more elastic housing supply), together with a higher degree of spatial concentration, are essential for driving up the levels of socioeconomic segregation.

Coda – Polish cities, like cities elsewhere across ECE, are often treated as – or with – a footnote in contemporary urban theory (Müller 2019), as “post-socialist cities” that deviate from the norm(s) of the empirical, theoretical and conceptual heartland of urban research, cases that require special (or no) treatment in view of their inherent Otherness (Sjöberg 2014; Gentile 2018). Our findings demonstrate that the socio-spatial legacy of state socialism has become largely eclipsed by the impact of consolidated capitalism, and understanding the causes of segregation in Polish cities does not require any special appreciation of their uniqueness, or at least no more than anywhere else. Many associations known from the literature – most notably that between income inequality and socioeconomic segregation – have been confirmed. But are the more “anomalous” findings sufficient to allow us to conclude that the ECE context represented by Poland is uniquely idiosyncratic and deserving of its lingering subcontinental “post-socialist” label? The answer is an unequivocal “no” for two reasons: (1) the divergence from the “norm” is mild and inconclusive, and (2) the norm in itself rests on a biased sample of major European or, as is often the case, American cities. For this reason, we submit that our findings offer straightforward empirical insights into the causes of residential segregation in the diverse array of European cities as seen from the heartland of theoretical relevance, and should be viewed as such rather than as a feeble voice from the periphery crying across the Elbe, hoping to be heard in the rimland’s bastions of urban thought.

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Endnote

¹Importantly, the results do not differ much if segregation is measured for the top (managers) and the bottom (unskilled workers) ISCO categories; the D values for these 'narrow' social categories are, on average, approximately 0.05 higher than are those for the 'grand' categories used in our study.

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