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Original Article

Economic inequality and economic segregation: a systematic review of causal pathways

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Although economic inequality and economic segregation represent fundamental challenges of contemporary societies, their causal and empirical connections remain unclear. In particular, the direction of causality, causal pathways, and temporalities are not evident in the literature. This gap has two probable origins: (1) the discussion is dominated by a handful of studies from the United Stated published in the 2000s. This comes at the expense of a more plural and complex understanding of the phenomena in the rest of the world. (2) The literature on inequality and that of segregation are segmented by disciplines operating at different scales with corresponding theories, actors and mechanisms. To address these issues, I conduct an extensive systematic literature review of articles linking economic inequality to economic segregation across multiple languages and disciplines. Starting from 20,000+ references, I identify 80 relevant research articles to review. Most conclude that variations in economic segregation follow differences in economic inequality in the short term and that reverse causality is more probable in the longer term. The housing market is the most cited mediator between economic inequality and economic segregation, and a diversity of theories are mobilized to explain their empirical connections. Many articles are not presently comparable, but compatible definitions and measurements of inequality and segregation are rising.

Key words: systematic literature review; economic inequality; economic segregation; causality.

Introduction

Economic resources are distributed unevenly among members of society. Such inequality varies across countries, cities, and time periods, but scholarship has persistently demonstrated the long-tailed distribution of income, consumption, and wealth (Pareto 1896; Stiglitz 1969; Atkinson 1975). Simultaneously, individuals who possess these unequal shares of resources are not distributed randomly in space. The geographical locations of their residence and activities is itself uneven. This uneven spatial distribution becomes economic segregation when groups of individuals of

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similar economic levels are brought together in homogeneous residential areas, or maintained in them, through social and spatial segregation mechanisms. In this article, we focus on economic **inequality**—understood as the dissymmetric distribution of income and wealth among residents of a given community—and economic **segregation**—understood as the pattern of geographical separation between residents of different income or wealth endowments. Although economic segregation also occurs at the workplace and in learning and leisure activity spaces throughout the day (Silm and Ahas 2014; Le Roux et al. 2017; Wang et al. 2018), our focus here is on residential (night-time) segregation, the most documented and consequential form of segregation for public policies.

It is argued that "rising inequality will always and necessarily have the effect of increasing the geographic clustering of resources" (Highsmith 2018, 448), i.e., economic segregation. Kawachi (2002) calls this connection "undoubtedly causal"—the cause of economic segregation being the power imbalance in the housing market created by economic inequality: wealthy households can outbid poor households from entire areas. For others,

> local inequality is actually the inverse of area-level income segregation. Holding national inequality constant, local inequality falls as people are stratified across space so that rich live with rich and poor live with poor. (Glaeser et al. 2009, 618)

This makes it crucial to keep the units and scales of analysis constant when measuring economic inequality and segregation. This article focuses on inequality and segregation measured at the meso-scale of cities and urban regions.

Economic inequality is commonly seen as the precondition for economic segregation: if there were no economic inequality, there could be no economic segregation (Hu and Liang 2022; Reardon and Bischoff 2011; Tammaru et al. 2020; Wessel 2022). "Common sense and empirical evidence suggest that these trends are linked [...], but it is less clear in what specific ways income inequality affects income segregation" (Reardon and Bischoff 2011, 1,093). The question of causality, of its (non)linear nature (Marcinczak et al. 2016) and the "many directions that causality can take" (Scarpa 2015, 906), is an important unknown that characterizes this field.

Although the references cited above might suggest that the relationship between economic inequality and economic segregation is a well-researched topic, the literature linking these concepts is characterized by two patterns: first, its visibility is limited to "a handful of empirical studies" (Hu and Liang 2022, 520), as a few articles from the 2000s studying US cities dominate citations on the topic; second, it remains segmented by disciplines, with articles on economic inequality and articles on economic segregation operating at different geographical scales, relying on different actors and theories, and published by different communities (Lobao and Hooks 2025).

In this article, I aim to uncover a more representative literature dedicated to the multifold connection between economic inequality and economic segregation, to explore the findings of (potentially overlooked) articles on the topic, related to the causal pathways and theoretical mechanisms involved, and to write a new state of the art of our current knowledge base. I address these aims by performing a **multilingual** and **multidisciplinary systematic literature review** of economic inequality and economic segregation, two major challenges that affect contemporary societies, threaten social cohesion and harm democratic representation (Alacevich and Soci 2018; Bailey et al. 2013).

I enhance comparability between these streams of academic literature by reviewing the **causal pathways and mechanisms** that link inequality and segregation in economics, geography, sociology, demography, law, physics, and mathematics while systematically analyzing their empirical operationalization and conclusions using reproducible open-source methods. Following Manzo and Sage (2024), I distinguish between accounts of causality which rely on dependence—a causal event must happen for an outcome to occur—from those which rely on production—a causal event of the outcome is one which helped generate it. By causal pathways, I mean a causal

relationship involving an intervening variable (e.g., house prices) between a treatment (e.g., economic inequality) and an outcome (e.g., economic segregation). This is the understanding of causal mechanisms under the dependence perspective (Morgan and Winship 2014). Different causal pathways relate to different variables or life domains connecting inequality and segregation. By contrast, I reserve the term mechanism to describe a model of the explicit system of units whose interacting behaviors "generate a sequence of micro-level changes that are supposed to create the dependence connections of interest" (Manzo and Sage 2024, 3). This follows the production perspective on causation (Machamer et al. 2000). Consequently, the articles reviewed here can propose causal pathways between economic inequality and economic segregation, without necessarily mentioning generative mechanisms.

Historical background

Economic inequality among individuals is the most prominent of the two research topics. It has roots in the works of classical economists of value and distribution (Riccardo and Marx). The focus on inter-individual inequality emerged in the nineteenth century, when the individual as a unit of analysis supplanted the previously dominant class concept in economics (Alacevich and Soci 2018). Scholars like Pareto, Lorenz, Gini, Theil, Kuznets, Dalton, and Atkinson have since contributed significant theories and methods to understand and measure income and wealth inequality, assess their optimal level, and discuss redistribution and welfare consequences. Piketty, Saez, and Zucman (2018) have revived the topic and given it renewed importance by collecting and analyzing international data on income and wealth concentration among the richest. They argue that wealth inequality today is returning to its Golden Age levels after a century of wars and welfare state redistribution, because of the conjunction of low growth and the divergence between the retribution rates of labor vs. capital (Piketty 2013).

Within this literature, economic inequality is generally defined for countries, i.e., with individuals taken as non-spatial data points. It is measured using indices—the Gini coefficient being the most widespread—on individual, household, or family economic resources, typically income or wealth, derived from tax records, either pre-tax or post-tax, normalized or not by the composition of the household. Economic inequality is higher in apartheid and neoliberal economies and lower in socialist regimes and countries with a strong welfare state. Most inequality at the world level pertains to inequality between countries where income is concerned (~60 percent), but within-country inequality has been growing in proportion (Sala-i-Martin 2006). This is even more pronounced for wealth (Piketty 2013). Within countries, within-city[1] inequality is higher than inter-city inequality (Glaeser et al. 2009).

Compared to economic inequality, **economic segregation**—considered by some as its spatial counterpart—remains under-researched. Predominantly studied in geography, sociology, regional science, and demography, it has multiple historical traditions. Urban models such as von Thünen's or Alonso-Muth-Mills's have produced predictions on the spatial distribution of households according to their means in cities. The expected trade-off between housing costs, commuting costs, and living space in a concentric (American) city leads to a systematic spatial allocation: poor households concentrate in the city center, while affluent households trade accessibility for larger living space and higher transport costs in the suburbs. Urban ecology models stemming from the Chicago School of Sociology in the 1920s have had long-lasting impacts on the conceptualization of income segregation as a dynamic process of competition and succession involving migrants and income mobility. In these models, newly arrived (poor) migrants settle in small, inadequate but cheap and accessible housing of cities' centers, then move outwards as they become more integrated, richer and less dependent on public transportation. In both cases, the circulation of models to new geographical contexts poses problems because the social structure of space and the spatial dynamics of various income groups differ from that of the United States of the twentieth century, the implicit reference embedded in dominant urban models (Cottineau et al. 2024).

The most cited works on **residential segregation** are associated with the study of racial segregation in the United States, by researchers like Massey, Denton, Wilson, Logan, and Sampson. In this literature, the emergence/maintenance of a spatial separation between (wealthy) whites and (poorer) minorities is explained by differences in individual preferences, racial discrimination and differences in economic resources, "but also by the social and economic repercussions of segregation itself" (Krysan and Crowder 2017, 5), in a *cycle of segregation*.

Although racial/ethnic segregation and economic segregation are intertwined, the sole focus on economic segregation became noticeable once fine-grained spatialized data on income and wealth became available—that is, from the 1970s onwards in some countries of North America and Western Europe, but mainly in the past three decades, and especially where register-based geodata is available, as in Sweden and the Netherlands. Economic segregation was initially measured using group indices inherited from research on racial segregation (such as the dissimilarity index). More recent attention to the ordinal nature of economic resources has spurred more adequate measures like the Neighborhood Sorting Index (Jargowsky 1996), the Centile Gap Index (Watson 2009), and Reardon's (2009) rank–order information theory indices. Economic segregation is typically measured for one or more cities on household or family income derived from tax records, either pre-tax or post-tax (e.g., before or after redistribution), normalized by the household composition or not.

"Although a large volume of studies exists on both income inequalities and residential segregation, their connection is poorly studied, especially in a comparative framework" (Tammaru et al. 2020, 451). Hu and Liang (2022, 520) refer to "a handful of empirical studies", whereas Cauvain et al. (2022, 592) lament that the evidence "comes overwhelmingly from the USA." Indeed, articles on the relationship between economic inequality and economic segregation tend to overwhelmingly cite a narrow but consistent set of academic references—Jargowsky (1996), Mayer (2001), Watson (2009), and Reardon and Bischoff (2011)—which conclude through statistical analysis that rising income inequality since the 1970s correlates with socioeconomic segregation in the United States.

Causal pathways and mechanisms

The segregation literature provides two main integrated frameworks to understand the causal connection between economic inequality and economic segregation: the "cycle of segregation" approach (Krysan and Crowder 2017) and the "vicious circles of segregation" approach (Tammaru et al. 2021).

Although developed to understand the persistence of racial segregation in the USA, the "cycle of segregation" approach contains an implicit model of how economic inequality and economic segregation interact. On the one hand, economic inequality means unequal housing resources, from the time spent searching for adequate accommodation to the choice of neighborhood, tenure type, price levels, and the satisfaction of preferences towards similar neighbors (e.g., homophily). Households with high income and wealth will likely reside in the units of their choice in agreeable neighborhoods. Poorer households will default to smaller and less convenient units, in more deprived neighborhoods, further away from valuable amenities. When aggregated, these choices lead to concentrate households of similar economic resource levels in similar neighborhoods, i.e., economic segregation. On the other hand, Krysan and Crowder (2017) show that during their search for a new residence, individuals express attitudes and behaviors linked to their residential history and social networks: they tend to consider neighborhoods based on what they have heard of through friends, family, and acquaintances. The neighborhoods selected for consideration are therefore similar to the ones they live in (or have lived in) in terms of racial and socioeconomic make-up. This channels further the concentration of similar people in similar places and ensures the maintenance of segregation over time, even when initial factors of segregation (such as racial discrimination) have decreased. Incidentally, the authors also show that through inequality in the housing market, the matching of low-income households with inadequate neighborhoods

and units creates transportation and maintenance costs as well as missed opportunities (housing value appreciation and access to desirable schools and jobs), making them poorer in the long run; thus reinforcing economic inequality.

The "vicious circles of segregation" approach corresponds to the connections between spatial inequalities in different life domains, in a multilevel and longitudinal way (van Ham et al. 2018). Life domains correspond to daily life's social and spatial settings, such as neighborhoods, schools and workplaces, connected by individuals' daily mobility and social network formation.

> "Segregation experienced in one life domain tends to be reproduced in other life domains [. . .] Segregation experienced early in life is often reproduced later in life and transmitted from parents to children because of the interconnected lives of the family members" (Tammaru et al. 2021, 68).

Within a city, economic inequality translates into economic segregation through spatial sorting on the housing market: affluent households choose the most desirable units and neighborhoods while poor households are constrained to concentrate in less desirable neighborhoods. Residential segregation reinforces school segregation through the geography of local catchment areas or the importance of distance in school choices (Dignum et al. 2024) and workplace segregation through the influence of commuting distances. In return, economic segregation creates socially distinct spatial contexts. Contextual effects are theorized to affect long–term income levels and job types for pupils and residents of segregated cities: children growing up in poor neighborhoods achieve lower income compared to peers growing up in affluent neighborhoods (Galster and Sharkey 2017; Chetty and Hendren 2018). This amounts to a retroactive effect of segregation on inequality. Finally, over the lifecourse, segregation in one domain (e.g., school segregation) thus influences future segregation in other domains (e.g., workplace and residential segregation). Additionally, through the interconnection of family members, segregation and neighborhood contexts are transmitted across generations (Hedman and van Ham 2021), reinforcing both segregation and inequality, unless changes in the institutional setup and spatial distribution of opportunities break (or diminish the influence of) the vicious circles of segregation.

These two frameworks summarize and concatenate multiple partial theories and mechanisms, which connect inequality and segregation, in recursive and mutually reinforcing dynamics. In this article, I hypothesize that the relationship between economic inequality and economic segregation is better documented that it seems at first sight, and that relevant publications are ignored in mainstream citation practices due to the multidisciplinary nature of this research field and the associated disconnection among different research traditions (in terms of scales, actors, methods, and epistemologies[2]), and due to the reduced visibility of research published in non-English languages or applied to case studies outside North America and Northern Europe. I argue that a systematic literature review can help uncover some of the missing references and address the following research questions based on a richer knowledge base:

1) Does economic segregation vary with economic inequality, and to what extent are the two phenomena linked? Which causal pathways and mechanisms are proposed to explain their connection?
2) To what extent does existing research belong to distinct literatures? What are the consequences regarding the comparability of results and the compatibility of mechanisms?

Data and methods

Systematic literature reviews aim to answer a research question with comprehensive publication–based data in a transparent and reproducible way, making them a new gold standard for many fields of research, including in the social sciences (Davis et al. 2014). They are particularly suited to multidisciplinary fields like urban studies (Xiao and Watson 2019; Pickering et al. 2021; Cottineau-Mugadza et al. 2024b). According to Pickering et al. (2021, 33), only this type of review

can "assess unknown unknowns [. . .] revealing papers that we may have missed with a narrative review". This is the main appeal for this method here.

Systematic reviews start with an iterative search strategy for relevant records and involve a transparent screening process where records are included or excluded based on explicit criteria. The records' content is then read, analyzed, and interpreted systematically to answer the research questions. Here, the **search expression** was determined to identify the two main concepts (economic inequality and segregation), targeting articles interested in causal pathways, explanations, relationships, and processes. Additional constraints were added after several iterations to ensure that both segregation and inequality were central concepts rather than anecdotal keywords, excluding papers relating to the geography of production, originating primarily from regional science and identified with the expression "spatial inequality." As of March 2023, the search query:

((TS = segregation AND (TS = income OR TS = wealth OR TS = economic))

OR (TS = inequality AND (TS = income OR TS = wealth OR TS = economic)))

AND (ALL = mechanis* OR ALL = expla?n* OR ALL = effect* OR ALL = caus* OR ALL = relation* OR ALL = process*)

AND (AB = segregation OR AB = inequality)

NOT (AB = spatial inequality)

returned 21,954 records from the Web of Science (fig. 1), 97.4 percent of which (n = 20,243) were written in one of the five languages selected (92.2 percent in English, 3.3 percent in Spanish, 1.4 percent in Russian, 0.5 percent in French and 0.01 percent in Dutch)[3]. Given the size of the corpus retrieved and the fact that it contained the classical articles (e.g., Jargowsky 1996; Reardon and Bischoff 2011; Watson 2009), I decided to limit the bibliometric database to the Web of Science, one of the two most extensive databases which produce highly correlated results (Archambault et al. 2009).

The first phase of **screening** meant manual screening of the first 5,732 records (28.3 percent of the total) to identify 100 relevant titles (Appendix A, section A). I then used the open-source platform ASReview (van de Schoot et al. 2021) to reorder the list of records based on text similarity and prior knowledge about relevant and irrelevant records, prioritizing abstracts more likely to be relevant. The first active learning model used the 100 relevant articles as positive priors and the first 100 irrelevant articles as negative priors. Reordered records were screened based on their abstract until 100 consecutive records were excluded. This approach resulted in the additional screening of 704 references, 76 of which were eventually included. Thirty-four references initially excluded based on titles were included based on the abstract (recall). As advised by Teijema et al. (2023), a second active learning model was set up using the first model as prior and different specifications for optimal screening. During this phase, an additional 100 records were screened based on their abstract, resulting in 9 new inclusions. In total, 185 relevant records were selected for a full read (Appendix A, section B).

The second phase of screening involved retrieving and **reading** the content of the 185 relevant references and sorting them into three categories based on explicit exclusion and inclusion criteria: **108** records were labelled **ineligible** because: (1) they did not concern economic segregation (but occupational or racial segregation); (2) they did not concern economic inequality (but gender or racial inequality); (3) they were inaccessible (n = 2)[4]; (4) they were in a non-selected language (n = 1)[5]. **76** articles were labelled **eligible**. Within this group, **30** articles estimated empirical relationships between inequality and segregation or analyzed the theoretical linkages between economic inequality and economic segregation. They were labelled **core** articles.

Finally, 4 references were added to the **eligible** set through snowballing (the inclusion of relevant references frequently cited by eligible articles) and expert identification (fig. 1). The expert choice method is not very desirable in a systematic approach and was only used to add a reference (Mutgan and Mijs 2023) published shortly after the search date, which replicates the results of the most iconic paper of this literature (Reardon and Bischoff 2011) on another national case study. Since the article was evidently a core article, an exception was made to include it in the review. The final list of eligible and core articles is in Appendix A, section C.

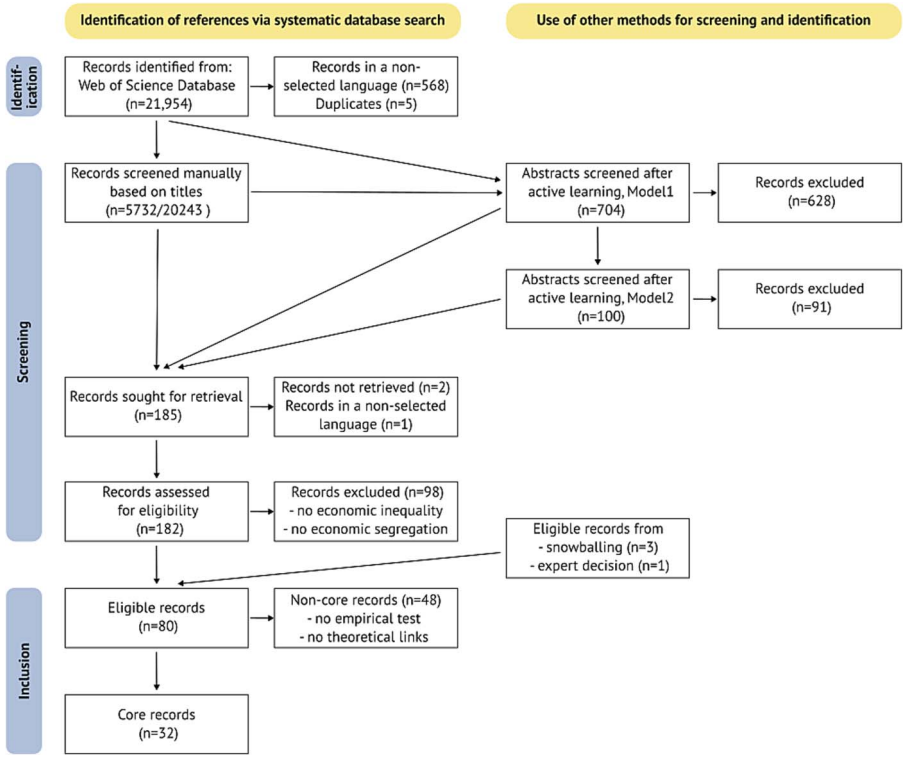


Figure 1. PRISMA-inspired reporting of the identification, screening, and inclusion phases of the systematic review.

Each eligible article was **coded** along a scheme developed iteratively, covering four dimensions of the relationship between economic inequality and economic segregation:

1/ the main **concepts** and their operationalization.

2/ the assumed relationship, direction, **causality**, and mechanisms linking economic inequality and economic segregation (Appendix A, section D).

3/ the **methodology** used to assess the relationship.

4/ the **conclusions** obtained by the study.

Finally, the data gathered was linked to bibliometric information about each of the 80 articles, enriched with the discipline estimated for the published journal (Appendix A, section E), and analyzed using an R computational notebook. Additional qualitative insights are given for core articles.

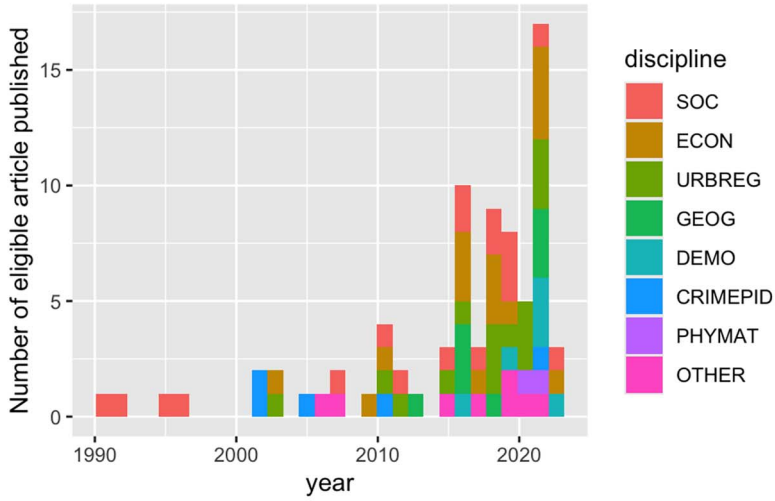
Results

Presentation of the corpus

The 80 eligible articles selected for the review were published between 1991 and 2023, with half published after 2018. 78 were written in English and 2 in Spanish. They were published in 60 journals belonging to eight disciplinary fields (fig. 2A).

The four dominant fields of publication are sociology (SOC, $n = 18$), economics (ECON, $n = 16$), urban and regional science (URBREG, $n = 15$), and geography (GEOG, $n = 8$), and the top journals disseminating research about economic inequality and segregation are *Urban Studies* ($n = 5$), *Demography* ($n = 4$), *Social Problems* ($n = 3$), and the *Journal of Regional Science* ($n = 3$). Although

A



B

Category	n	Median year	Mean Citing	Mean Cited
Considered ineligible	109	2014	52.9	73.2
Eligible, not core	48	2016	57.4	23.5
Core article	31	2015	51.4	51.8

Figure 2. Descriptive features of the corpus selected. 2A: Distribution over time by discipline. 2B: Bibliometric summary.

each category of articles has about 50 references in their bibliography and a comparable median publication year, core articles are cited on average twice as often as eligible non-core articles (fig. 2B). This discrepancy could derive from the polarization of attention on the "handful of papers" mentioned above. However, core articles are statistically less cited than ineligible articles, which include prominent health and epidemiology articles that have received several thousand citations.

Our first result is thus that there are indeed more than a handful of studies dedicated to the link between economic inequality and economic segregation, and that the source of bias is less the language in which they are written[6] than disciplinary boundaries.

Study design analysis

In terms of the **operationalization of concepts**, there is a remarkable homogeneity in the eligible corpus: most authors understand segregation as the separation of people based on the location of their residence (n = 63), inequality as a skewed distribution of resources (n = 47),

and the economic resource is defined primarily as income (n = 72). Interestingly, few studies use wealth to study inequality and segregation, especially as the sole variable. Those who do—De la Cruz-Viesca et al. (2018), Gordon and Bruch (2020), and Levy (2022)—look at the wealth gap between Blacks and Whites in the United States and how this gap is linked to the legacy of racial segregation. Alternatively, they examine the impact of intergenerational transfers (and therefore the transmission of intragenerational wealth inequality) on home ownership differences and its impact on residential choices (including neighborhood choice and attainment, thus fueling income and wealth segregation), in the Netherlands (Hochstenbach 2018) or Australia (Ong ViforJ et al. 2023). Due to the scarcity of fine–grained geolocated wealth data, income and wealth are only studied jointly in the theoretical setting of simulation models (Bonakdar and Roos 2022; Fernandes and Tempere 2020; Panagiotakopoulos et al. 2022) or in countries providing access to rich, detailed, and linkable register data, such as Norway (Wessel 2015, 2022).

Regarding **study design and methodology**, North American case studies dominate the eligible corpus. This dominance is less strong among core articles, probably due to data restrictions (fig. 3). Indeed, countries with fine-grained, longitudinal, geolocated, and linkable register data are over-represented in the core literature about economic inequality and segregation because they are the best possible material to study the spatio-temporal dynamics of both processes and their potential causal links. This pattern is ironic because register-data countries—Sweden, Denmark, Norway, the Netherlands—also tend to be the least unequal and segregated at the world level.[7] One would want to read about how inequality and segregation unfold in metropolises like Mumbai, Dubai, or Harare, but the most studied cities in the literature[8] are Oslo (n = 4), Stockholm (n = 3), and Malmö (n = 3)[9].

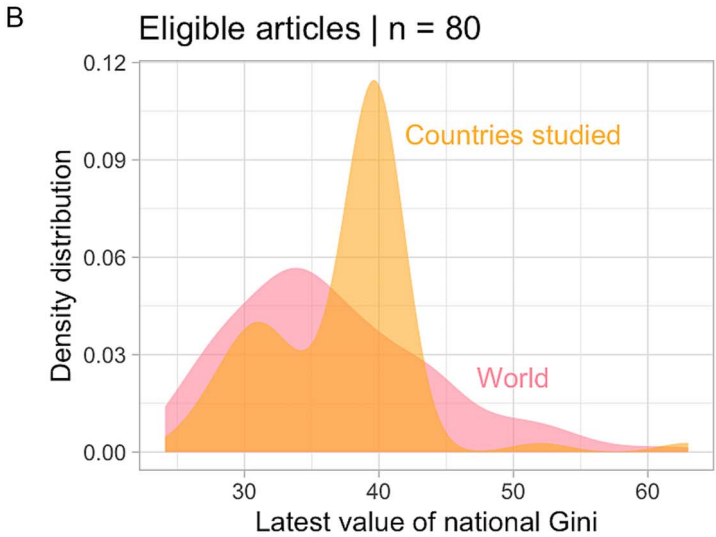
The distribution of inequality levels in the countries studied in the literature vs. in the world[10] shows that eligible articles over-represent countries with middle levels of inequality (and the United States in particular, G = 39.8 in 2021) at the expense of low-inequality and high-inequality countries. Core articles do better but still misrepresent high-inequality countries.

Data availability also restricts the temporal coverage of studies, with the bulk of research using cross–sectional census data from the 1990s, 2000s, and 2010s. Exceptionally, longitudinal studies can span a continuous period of 20–30 years (Appendix A, section G), typically in register-data countries where the entire population is covered (Hu and Liang 2022; Mutgan and Mijs 2023; Scarpa 2015; Wessel 2022) or in countries where researchers have made creative use of historical sources, tax records, and peripheral surveys (Chetty and Hendren 2018; Gordon and Bruch 2020; Pais et al. 2012).

In terms of the **units and scales** chosen for the analysis, differential data availability restricts the level at which information can be compared. Additionally, the processes hypothesized and tested depend on the disciplinary framework of the authors: while sociologists might favor an individual-based explanation of collective processes, geographers frequently use geographical aggregates as the basic units in their explanation of economic segregation and economic change. Another scale that seems determined by disciplinary habitus is the scale at which the analysis is made. Results are mostly interpreted at the national scale (e.g., comparing the relationship between inequality and segregation in multiple cities of a given country) in articles published in sociology (n = 14/18) and demography (n = 5/6) journals. By contrast, the scale of analysis for the same processes tends to be the metropolitan area for studies published in geography (n = 5/8), urban and regional science (n = 7/15), and economics (n = 6/16) journals. Finally, these units and scales correlate strongly with the methods used to test, assess, and explore the relationship between economic inequality and economic segregation (fig. 4). A disciplinary gap is visible between the dominant use of statistical regressions (sociology and demography), analytical models and simulation (economics, urban/regional science, and math/physics), or a range of less unified and normalized methods.

A

Corpus	North America	Europe	Asia / Middle East	South America	Oceania	Africa	Multiple locations	Total
Eligible non-core	N=27 (USA)	N=7 (UK, France, Finland, Germany, Norway)	N=4 (China, Israel)		N=2 (Australia)	N=1 (South Africa)		41
Core articles	N=11 (USA, Canada)	N=7 (Sweden, Norway, NL, UK)		N=3 (Argentina, Uruguay, Brazil)			N=3 (Europe, OECD, USA-France)	24
Total	38	14	4	3	2	1	3	65



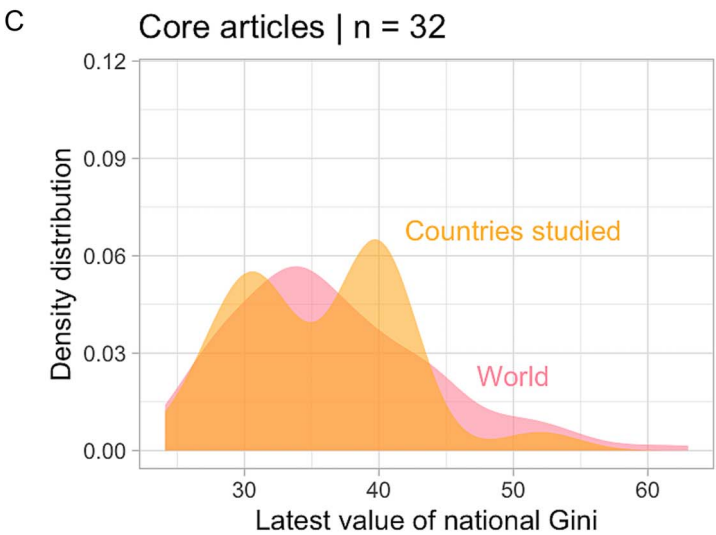


Figure 3. Geographical focus of empirical studies and representativity. 3A: Geographical distribution of case studies. 3B: Distribution of Gini indices in the eligible corpus. 3C: Distribution of Gini indices in core papers. Source: World Bank Poverty and Inequality Platform.

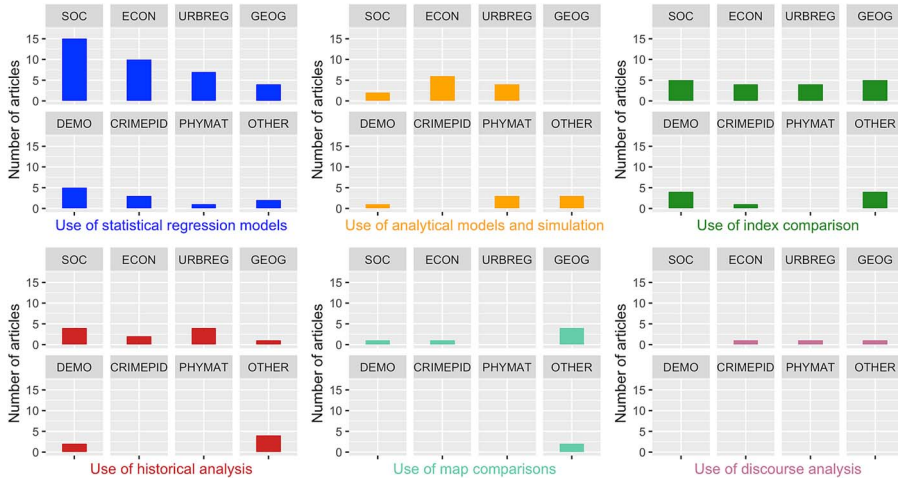


Figure 4. Differential use of methods by disciplinary fields. Each bar represents the number of articles using a given method in a discipline.

Review of causal pathways and mechanisms

The main direction of causality assumed in the literature runs **from economic inequality to economic segregation**. Two-thirds of the articles acknowledge a reverse causality, even when they only empirically test one direction of causal effects. This pattern holds for the eligible corpus but is even more pronounced among core papers.

The dominant causal pathway through which economic inequality and segregation are assumed to be related goes through the **housing domain**. The most frequent mechanism reflected in the literature is that rising economic inequality enables wealthy households to disproportionately outbid the poor in the most desirable areas of cities (with advantageous amenities like good schools, high-paying jobs, views), in the spirit of the Tiebout model. Tiebout's (1956) residential sorting model assumes that wealthy agents with the "willingness to pay" for amenities and local public goods will self-select into areas where taxes are high and public goods abundant. In contrast, agents without the willingness/ability to pay will reside in municipalities with fewer taxes and public goods. Increasing inequality thus increases the differential ability to pay and economic segregation. This theoretical explanation conflates elements of preference (for amenities) and economic inequality into the rational residential choice model made by households while municipalities engage in tax competition. One takeaway from the model is that tax rate decisions should be as decentralized as possible to allow maximum competition between local areas[11]. This framework was selected in n = 2/7 articles that focused on the econometric estimation of the covariation between economic inequality and economic segregation. It explains the covariation conveniently but does not involve complex interactions between life domains, life course events, or active discrimination.

An alternative mechanism following the same pathway suggests that homophily drives the residential separation of socioeconomic groups. Similar neighbors constitute the sought-after "amenity" of desirable places in this case. In the framework of the cycle of segregation, this intervention of preferences (for similar neighbors or similar preferences) can interact with the constitution of neighborhood consideration sets, whereby individuals are influenced in their housing search by people like them and end up residing in similar neighborhoods. Such matching eventually amounts to residential segregation. In the corpus, this mechanism is mentioned by four core articles. It is conditioned by the fluidity of the housing market (Watson 2009),

specific populations (families with children in Owens 2016; households with a migration background in Mutgan and Mijs 2023, racial groups in Reardon and Bischoff 2011). This housing-mediated pathway is mentioned in 19 percent of the core articles vs. 10 percent of the non-core articles.

Causal pathways going from economic segregation to economic inequality are more represented in the non-core articles (as the sole direction in 25 percent of papers vs. 0 percent in the core article) and pass more frequently through the labor (11 percent) and school (9 percent) domains. The associated causal mechanisms, spanning more extended periods of time, are generally sustained by contextual effects theories. Neighborhood/contextual effects are cited by almost half of the non-core papers. This theory assumes that the social and physical contexts in which one lives, studies, and works impact future individual outcomes (Galster and Sharkey 2017). Under economic segregation, poor residents have a higher probability of residing next to other poor neighbors, and wealthy residents next to other wealthy neighbors. This disparity reinforces the inequality of opportunities—in the school system with differential investment and peer effects (Bischoff and Owens 2019), on the housing market with single-family housing areas promoting socialization and behaviors more compatible with the job market (Andersson and Malmberg 2018), on the job market with complementary skills (Asquith 2018), through health, criminality, or stigma (Sampson 2019)—and eventually translates into differential income prospects in adulthood (Chetty and Hendren 2018).

Within the "vicious circles of segregation" approach, I thus corroborate an interesting result, which is that the direction of causality between inequality and segregation differs between life domains: the residential domain transforms economic inequality into economic segregation, but the school and work domains in turn produce inequality from segregation. Two mechanisms are given to explain this causal link in the school domain (Bischoff and Owens 2019): on the one hand, affluent communities create better schools in a system of local education funding; on the other hand, the composition of school peers in segregated settings means that more resources are available for educational attainment in affluent areas, from role models to cultural capital. Over time, the spatial inequality in educational resources, translated into educational inequalities for children growing up in unequally endowed places, creates divergent trends for their expected future income and wealth levels, reproducing economic inequality.

Among pathways going through the workplace domain, frequently cited theories and mechanisms mentioned in the literature reviewed include Sassen's (2001) hypothesis that the professionalization of the workforce in **global cities** induces a revisualization of low-skilled and low-paid jobs, held mainly by immigrants. Such global labor market–induced inequality translates into economic segregation by the double sorting of ever-higher-paid native professionals in prestigious neighborhoods and low-paid immigrants in affordable neighborhoods (Marcinczak et al. 2016; Tammaru et al. 2020; Wessel 2015). The **spatial mismatch** theory (Kain 1968; Wilson 1987), which explains the employment and economic inequality between affluent whites and low and middle-income Blacks in the United States by the mismatch between the location of jobs and jobseekers following the suburbanization of employment opportunities, appears in three eligible articles (Chetty and Hendren 2018; Galaskiewicz et al. 2021; Santiago and Wilder 1991).

Other **pathways** are suggested in the eligible literature. In one study, Bailey et al. (2013, 2155) hypothesize that economic segregation erodes "the bonds of solidarity or sympathy which help to underpin redistribution through tax and benefit systems", thus increasing economic inequality. Many US-based authors (Ananat 2011; Gordon and Bruch 2020; Galaskiewicz et al. 2021; Intrator et al. 2016; Levy 2022; Pais et al. 2012; Thomas et al. 2018) mention racial inequality and discrimination as a mediator of the relationship between economic inequality and segregation. Indeed, the bulk of the literature on residential segregation—and the cycle of segregation framework in particular—is primarily interested in racial segregation. Such articles consider economic inequality as inequality in income and wealth by race, a factor which explains the lower level of resources available to Black and Hispanic households compared to whites in their search for housing. The consequence of this lower level of economic resources (combined

with different preferences and discrimination) is racial segregation, which means economic segregation, as racial groups have unequal levels of income and wealth.

Other studies from North America (Chen et al. 2012; Hipp 2011; Kang 2016; Sampson 2019; Watson 2009) cite crime as a domain through which inequality translates into segregation (or vice versa), whereas scholars outside North America focus instead on the mediating role of the welfare state and redistributive policies (e.g., Beaubrun-Diant and Maury 2022; Serna and Mora 2022; Wessel 2022). In Chinese case studies, the *hukou* system regulating internal migration is a notable ingredient of the mechanisms linking economic inequality and economic segregation (Fang and Huang 2022; Pan et al. 2016). More generally, Galster and Sharkey (2017, 1) mention a broad set of resources (or spatial opportunity structures) unevenly distributed in segregated cities, which "affects the socioeconomic outcomes that individuals can achieve [. . .] by altering the payoffs that will be gained from the attributes individuals have during any given period and the bundle of attributes that individuals will acquire (both passively and actively) during their lifetimes".

Finally, over **one-quarter of eligible articles do not mention any mechanism or theory**.

Looking at the **actors** named in the articles as agents of translation of inequality into segregation or segregation into inequality (Appendix A, section H), I find only one consensus: the core actor of this literature is the household, i.e., the social entity at which level residential decisions are made.

Empirical estimations and simulation models

To summarize the direction, significance and strength of the relationship between inequality and segregation, I sort core papers into **clusters** using a three-level decision tree. Dichotomies reflect the direction of causality—inequality to segregation (I➔S) or segregation to inequality (S➔I), the type of relationship—positive or negative, and the type of proof proposed—empirical or theoretical (fig. 5). A striking finding is that 23 of the 32 core articles argue that greater economic inequality leads to greater economic segregation. A articles (n = 20) conclude a positive I➔S relationship using empirical data, B articles (n = 3) using analytical and agent–based simulation models. Two empirical studies conclude a negative effect (group C). Within the seven articles addressing the S➔I causation, six find a positive relationship (with empirical evidence in group D and modelling evidence in group E), and one suggests a negative relationship (group F). Given the uneven distribution of articles between group A and the rest, I decided to refine the description of group A articles into three sub-groups.

In **group A1**, I select the seven articles that report a coefficient of the statistical influence of inequality on segregation, making them a relatively homogenous and comparable set. A1 includes the "handful" of famous North American sociology references—Watson (2009), Reardon and Bischoff (2011), and Owens (2016)—a replication study (Simpson et al. 2023), an early study of Brazilian cities (Telles 1995) and two recent articles on Sweden—Hu and Liang (2022) and Mutgan and Mijs (2023). Among this small set of most comparable articles, I find an alarming diversity of indices of inequality and segregation, of estimation strategies, control variables and fixed effects (Table 1). Their comparison (Appendix A, section I) might suggest that increased inequality leads to higher segregation in the United States (Reardon and Bischoff 2011; Owens 2016; Simpson et al. 2023) than in Brazil (Telles 1995) and Sweden (Hu and Liang 2022; Mutgan and Mijs 2023), but too many factors collide to conclude on such international comparisons. Only Hu and Liang's (2022) article considers time lags.

In **group A2**, five articles have the same qualitative conclusion as A1 articles but use less rigorous methods of estimation—visual inspection (Ilic and Sawada 2021; Marcinczak et al. 2016; Tammaru et al. 2020; Wessel 2015) or bivariate correlation (Rodríguez 2020). Data-related and discipline-related reasons can explain this: gathering harmonized fine–grained urban data for multiple countries is challenging (Cura et al. 2017); some countries do not publish economic data at the city level; some disciplines do not consider econometrics as a gold methodological standard.

Table 1. Empirical estimation of the effect of inequality on segregation in group A1 articles.

Reference	Loca-tion	Time	Data type	Measure I	Measure S	Estimation	Non-standardized coefficients (significant?)
Telles, 1995	Brazil	1980	Census, N = 39 cities	Gini	Entropy index H	OLS regression	0.01 (no) 0.016 (yes) with controls
Watson, 2009	USA	1970, 1980, 1990, 2000	Census, *n* = 210 metro areas	log(80–20 Family income ratio)	Centile Gap Index (CGI) Neighborhood Sorting Index (NSI)	Fixed-effects regression	0.108 to 0.126 (yes) depending on specifications
Reardon and Bischoff, 2011	USA	1970, 1980, 1990, 2000	Census, *n* = 100 largest MSAs	Gini	Rank-Order Information Theory Index (ROITI), Spatial information theory index	Fixed-effects regression	0.286 to 0.502 (yes) depending on specifications
Owens, 2016	USA	1990, 2000, 2010	Census, *n* = 100 largest MSAs	Gini	ROITI	Longitudinal regression	0.160 (yes) 0.232 (yes) with controls
Hu and Liang, 2022	Sweden	1990–2007	Register, *n* = 290 muni	Sd of log(income), various income ratios	Dissimilarity index (D), NSI	Fixed-effects, 5-year time lag	0.062 to 0.076 (yes) depending on specifications
Simpson et al. 2023	USA	2018	Census, *n* = 100 largest MSAs	Gini	ROITI, Kullback–Leibler (KL) divergence index	EIV regression on L-PRLN estimates	0.427 (yes) with ROITI 0.763 (yes) with KL
Mutgan and Mijs, 2023	Sweden	1990–2017	Register, *n* = 231 muni	Gini, Theil	ROITI, 2-group H	Fixed-effect regression models	0.116 to 0.226 (yes) depending on specifications

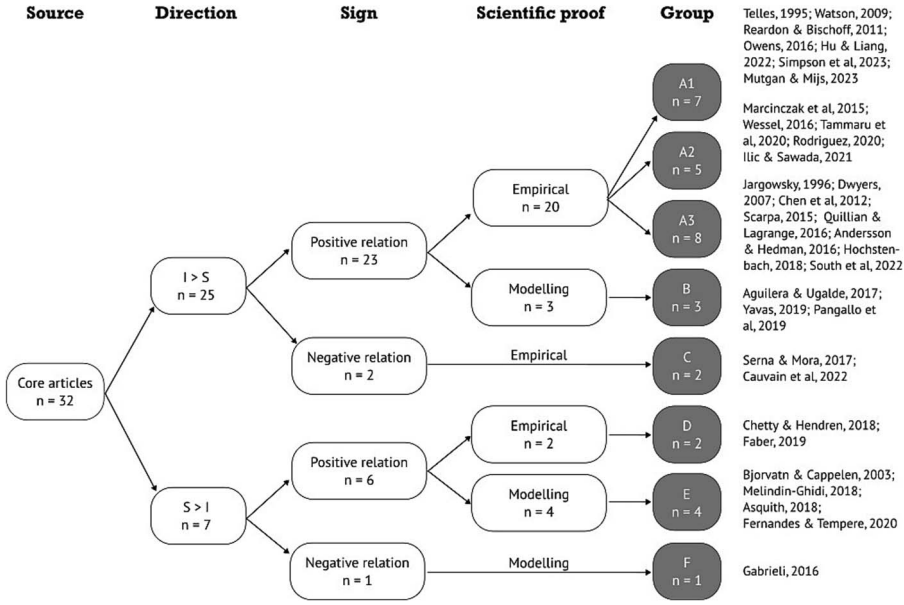


Figure 5. Classification of core articles. I➔S = inequality to segregation. S➔I = segregation to inequality.

In **group A3**, the remaining eight articles are heterogeneous and focus on various external factors that affect or mediate the influence of economic inequality on economic segregation. Hochstenbach (2018) highlights the role of parental wealth inequality on the segregation patterns of young Amsterdamers and Rotterdamers. Andersson and Hedman (2016) frame income inequality and income segregation as by-products of recession crises in Malmö. Dwyer's (2007) analysis places new housing construction as the center of the relationship in the United States. Quillian and Lagrange (2016) consider differences in public housing policies and income inequality trends when explaining the differences in income segregation between France and the United States. South et al. (2022) emphasize residential mobility selectivity, and Jargowsky (1996) concentrates on racial inequality. Finally, Scarpa (2015) in Sweden and Chen et al. (2012) in Canada decompose neighborhood inequality between income inequality and income segregation and demonstrate that most of the rise in inequality and segregation comes from a divergence in earnings: labor market dynamics explain this relationship better than changes in the welfare state.

All three **B articles** find a positive effect of economic inequality on economic segregation by simulating agent-based models (ABM) of abstract housing markets (e.g. Aguilera and Ugalde 2007). Yavaş (2019) and Pangallo et al. (2019) increase the comparability of their results with the empirical literature by using Gini as the index of inequality and the rank–order information theory index for segregation. Based on residential mobility and competitive bidding mechanisms, they show that models parameterized with high inequality produce highly segregated simulations. The relationship is nonlinear in Yavaş (2019): segregation plateaus once Gini values exceed 0.4.

Empirical articles from **group C** report a negative effect of economic inequality on economic segregation. Serna and Mora (2022) conclude this from the decreased income inequality and increased segregation observed in Montevideo. It is hard to generalize this conclusion, as only one case study was analyzed, no regression was performed, and inequality could affect segregation through a time lag that the authors did not consider. A potential explanation here could also be the "segregation paradox" (Sýkora 2009), whereby in a context of increasing income inequality and urban renewal, the phenomenon of gentrification temporarily reduces economic segregation by mixing rich and poor households in the same inner-city neighborhoods. Over the long run,

however, mixing decreases in gentrified areas and segregation increases again. The other article from group C, which finds a negative relationship between inequality and segregation, is Cauvain et al. (2022, 591), who conclude that in the UK, "wealthier cities and districts [. . .] have higher income inequality (Gini), but are less segregated (Index of Dissimilarity). Lower average income cities tend to be more segregated, due to self-segregation of high-income households into pockets of affluence". Their multiscale consideration of the spatial organization of income groups in cities of varying levels of affluence points to a knowledge gap that the visual inspection method does not exhaust.

In **group D**, articles report a positive effect of economic segregation on economic inequality using empirical data. Chetty and Hendren (2018) show that growing up poor in a poor neighborhood leads to lower income in adulthood than growing up poor in a rich neighborhood. This classical piece of neighborhood effect research further demonstrates, using longitudinal tax record data, that "80 percent of the association between segregation and upward mobility across [commuter zones] in observational data is driven by the causal effect of place; only 20 percent is due to sorting" (Chetty and Hendren 2018, 1,169). Faber (2019) proceeds differently and shows that poor neighborhoods in the United States (and poor Black neighborhoods in particular) concentrate a disproportionate level of alternative financial services (i.e., payday lenders, check cashers), which distorts "the very cost of money" at the expense of (Black) residents of poor neighborhoods, thus increasing inequality over time.

Group E contains four articles from economics, physics, and urban/regional science articles. Unlike B articles, comparing their analytical models with empirical results is hard because their measurement of inequality and segregation tends to be bespoke. Very abstract representations of cities (as a line or two-region space) allow the authors to keep the description of agents detailed, but question the transferability of their results to real cities. Fernandes and Tempere (2020) model the dynamics of wealth and income distribution like "microscopic collisions of gas particles" and show the path–dependent consequences of spatial concentrations of wealth on inequality. Bjorvatn and Cappelen (2003) look at redistribution patterns in segregated societies, Asquith (2018) at the effect of housing market restriction, and Melindi-Ghidi (2018, 914) at the interaction between "school quality, residential choice, and tax decision with probabilistic voting".

Group F contains a single article that analytically models the effect of neighborhood compositions on forming beliefs about economic opportunities (Gabrieli 2016). The author finds that very segregated and non-segregated cities can lead to similar welfare and economic inequality levels.

Conclusion

I have shown with this systematic literature review that more evidence exists to conclude that economic segregation varies according to economic inequality than not[12]. The relationship has been estimated as positive and significant many times. The existing literature suggests a plethora of pathways through which inequality translates into segregation and segregation into inequality, ranging from racial inequality to voting behaviors or violent crime. However, the housing domain is central in translating inequality into segregation, through price, legal restrictions or the bidding process. By contrast, the school and labor domains are important in translating segregation into inequality, through funding, peer composition, beliefs and opportunity.

The most cited scholarship on economic inequality and segregation stems from US sociological studies and shares standards of presentation and econometric rigor that articles published in geography journals tend to lack. Although recent ABM are used to dissect the interplay between causal mechanisms in a way relatable to the empirical literature, analytical modelling studies from economics and physics journals seem disconnected from mainstream research, reducing the comparability of research outputs and mechanisms analyzed. Cross-training researchers from different fields to review the theoretical heritage, conceptual language, and methodological toolbox of others could help, for instance, through topical summer schools and workshops.

The obstacle of language is limited, as >90 percent of research recorded in the Web of Science on this topic is published in English, yet crucial, as research on multiple case studies is needed. In this article, the bias introduced by selecting five languages seems circumscribed and identified (corresponding to three articles from Brazil). However, future research could use systematic translation to reduce linguistic biases further, improve the screening process and give equal weight to scientific evidence regardless of where they originate from. At a more general level, we also salute translation efforts made by journals from non–English-speaking countries.

Several gaps in the current literature limit our knowledge of economic inequality, economic segregation and their connection, but also constitute future research areas. First, although authors mention the **time-lagged** nature of the relationship between inequality and segregation (changes in income take time to manifest in space because moving is lengthy, costly and linked to emotional attachment to places), most ignore it when designing their study protocol. Studies that account for temporal lags in segregation values compared to inequality values (e.g., Hu and Liang 2022) are a minority. A future avenue for research would be to exploit longitudinal data to analyze the time-lagged relationship between inequality and segregation and infer the potential (reverse) causality. Incidentally, this could address the so-called "segregation paradox".

Second, a complicated issue revealed by this review is that of **scale** and the geographical level at which inequality and segregation are best measured and analyzed. Even the term segregation is sometimes used to characterize the concentration of homogenous individuals at the local level. The obvious qualitative links between contextual effects (on individuals) and inequality and segregation (at the aggregate level) must be better conceptualized and organized in future research. In addition, the functional inter-linkages between cities of a given region/country can also affect residential mobility, gentrification and segregation as spillovers (Janssen et al. 2024). Future studies could consider segregation between cities and between locations at the subnational level (Lobao and Hooks 2025) in addition to segregation within cities.

Third, recent publications tend to adopt **indices** suited to ordinal data when measuring economic segregation, such as the rank–order information theory index or the divergence index (Roberto 2015). This is a welcome trend for the validity of the measurements and comparability. Existing studies which do not use them could be replicated using adequate measures.

Fourth, there is a **trade-off** in this literature, between studying places that face significant levels of economic inequality and segregation (particularly in the Global South) and satisfying the data requirements to estimate rigorous econometric models. Longitudinal geolocated individual-level data should be the gold standard for inequality and segregation data, but their analysis currently restricts one to studying only small, rich European countries.

Fifth, it would be interesting to funnel future research into the **institutional setups** (welfare state, family-based solidarity) and **spatial arrangements** (location of social housing, urban sprawl), reinforcing or dampening the translation of inequality into segregation and vice versa. These elements probably play a role in comparing US-based results, where the correlation between inequality and segregation is strong and non-US results, where the correlation is less or negative. There is an extensive literature on institutional setups and spatial arrangements by themselves, but only loosely connected to the income inequality-segregation one.

To conclude, I would like to emphasize a series of best practices in future research on economic inequality and segregation. These include (but are not restricted to) the choice of up-to-date and comparable indices of inequality and segregation; the choice of new and diverse case studies, particularly in unequal and segregation cities from non-dominant countries; an attention to temporality and reverse causality, which favors the choice of longitudinal data, causal inference methods and time-lagged regressions; a mutual awareness between empirical and theoretical research. Although some are sometimes incompatible (such as the diversity of case studies and the use of longitudinal data), others are low-hanging fruits which should become new standards (the use of ordinal segregation indices for ordinal economic data).

Endnotes

1. Throughout this article, a city is defined as a functionally integrated space of daily interactions and activities, which does not necessarily match the boundaries of political units such as municipalities.
2. For instance, economics studies of inequality take the national scale as given (Heidenreich, 2010), whereas economic segregation is mostly studied at the urban scale in geography.
3. These languages are the ones that I can read and understand. This choice denotes the aim to make the review as inclusive as possible without using automated translation and the associated risks of concept misunderstanding and copyright infringement. It has the benefit of opening the search beyond English, but the drawback of excluding important scientific languages such as Portuguese, German and Chinese. To assess the level of bias introduced by this choice, I read the English translation of the titles and abstracts of the remaining 568 articles and found three articles, all written in Portuguese, which might have been overlooked. I analyze these abstracts in Appendix A, section F.
4. Although very limited here, the lack of institutional access can introduce significant bias. It tends to bias results according to where research was published: in journals owned by large companies (Elsevier, Wiley, Nature) vs. others. Additionally, inequalities in open access funding promote research from authors hosted by wealthy institutions and institutions supported by strong national policies (such as the Dutch national agreement with scientific publishers).
5. This corresponds to a case where the article language was reported as English in the database but was actually Portuguese.
6. With the caveat that this review ignores articles published in many languages, including Portuguese (1 percent of original records), German (0.5 percent) and Chinese (0.05 percent). A robustness analysis of 568 records excluded based on language is performed in Appendix A, section F.
7. With an average Gini coefficient of 27.9 for the four countries vs. 36.5 worldwide. See https://pip.worldbank.org/home
8. I count cities that appear as case study in articles analyzing less than ten cities.
9. If articles written in Portuguese were included in this review, three additional case studies (Brasilia, Rio de Janeiro and Belem) could have somewhat lessened this bias.
10. According to World Bank open data estimates available on September 3, 2024. https://data.worldbank.org/indicator/SI.POV.GINI?locations=1Wandmost_recent_value_desc=false.
11. This logical conclusion is contested by Highsmith (2019), who argues that in such a model, higher inequality would mechanically induce more segregation and a lack of redistribution, causing further inequality.
12. Although this conclusion is subject to the well-known reporting and publication biases, whereby positive results are more prone to be reported and published than negative results or the absence of correlation.

About the author

Clémentine Cottineau-Mugadza is a research associate at CNRS and an Assistant Professor of Urban Studies at TU Delft. Her research interests include urban inequality and segregation, urban scaling, urban shrinkage and the history of urban models. Working from the scale of the individual to that of macro-regional systems of cities, she uses advanced computational methods and microdata to review, analyze, model, and visualize the complexity of processes producing and maintaining inequalities in cities. Recent relevant publications include Cottineau and Pumain (2022), Cottineau and Vallée (2022), Sarkar, Cottineau-Mugadza and Wolf (2024), and San Millán, Cottineau-Mugadza and Van Ham (2025a, 2025b).

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Supplementary material

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Conflicts of interest

None declared.

Data availability

The data and code underlying this article are available at https://github.com/SEGUE-Project/SystematicLiteratureReview. A companion notebook is available at www.erc-segue.nl/SystematicLiteratureReview/SLR_inequality_segregation.html.

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