# Beyond Segregation: Structural Drivers of Concentrated Socioeconomic Advantage in U.S. Public Education

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## List of Abbreviations

| | |
|---|---|
| ACS | American Community Survey |
| FAR | floor area ratios |
| IQ | intelligence quotient |
| IZ | inclusionary zoning |
| K-12 | kindergarten through 12th grade |
| LEM | local education market |
| LMI | Local Moran's I |
| LMQ | Local Moran's Quotient |
| MLD | mean log derivation |
| MLE | maximum likelihood estimation |
| NCES | National Center for Education Statistics |
| OECD | Organisation for Economic Co-operation and Development |
| PK | pre-kindergarten |
| PISA | Programme for International Student Assessment |
| PMC | professional-managerial class |
| RFSAI | relative family socioeconomic advantage |
| SDT | structural-demographic theory |
| SES | socioeconomic status |

## Definitions of Key Terms

| | |
|---|---|
| areas of concentrated advantage | Geographic zones where advantaged school districts share borders with other similarly advantaged districts. |
| disadvantage segregation | The spatial separation of populations based on low socioeconomic status results in distinct residential patterns and unequal access to resources and opportunities. |
| overclass | A university-educated elite that wields considerable influence over government, the economy, and culture. |
| professional-managerial class | This segment of the American class structure consists of educated professionals with managerial, technical, and cultural roles, specialized skills, and higher education that enable them to manage and influence production processes. |
| socioeconomic advantage | The benefits and opportunities of individuals or groups due to their higher income, education, occupation, and access to resources and power enhance their quality of life and social standing. |
| socioeconomic segregation | The spatial separation of groups based on differences in socioeconomic status encompasses factors such as income, education level, occupation, and others. In the context of education, it typically refers to the extent to |

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|---|---|
| | which students from different socioeconomic backgrounds are assigned to distinct schools or school districts. It reinforces broader patterns of inequality by concentrating advantages and disadvantages in separate geographic areas. 'Segregation' refers to socioeconomic segregation unless otherwise specified. |
| spatial clustering | In human geography, the concentration of similar human activities, populations, or social groups in specific areas creates distinct settlement patterns or land-use patterns. |
| spatial socioeconomic sorting | The process by which populations or activities are distributed across space based on socioeconomic status. |
| underclass | A group whose members lack the skills, education, and mobility required by the current technocratic and meritocratic system dominated by the managerial elite, resulting in socioeconomic and political marginalization. |

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Any flaws that remain are mine alone.

## Contribution to Original Knowledge

The neighborhoods and school districts where students grow up shape their educational outcomes and the long-term trajectory of their lives (Aaronson et al. 2021; Chetty et al. 2020; Graham 2018; Owens and Massey 2018). These contexts are central to how opportunity and inequality are organized and reproduced. In the United States, these places have become increasingly socioeconomically stratified[1] which can limit the opportunities students have to succeed (Bischoff and Owens 2019; Fry and Taylor 2012; Galster and Sharkey 2017; Owens and Candipan 2019; Owens, Reardon, and Jencks 2016; Reardon et al. 2018; Rusk, 2017). These changes can be partly attributed to broader economic shifts that are reflected in deepening patterns of educational and occupational sorting (Florida and Mellander 2017), connected to differences in parental education, wealth, and access to resources and educational opportunities across places (Belley and Lochner 2007; Nam and Huang 2009; Owens and Massey 2018; Pfeffer 2018; Sims 1999).

Socioeconomic segregation is typically understood as the uneven spatial distribution of income and related resources across neighborhoods or districts within metropolitan areas (Owens et al. 2016; Reardon and Bischoff 2011). While often framed through the lens of socioeconomic segregation, concentrated advantage—clusters of high-income, highly educated households—may plays an equally powerful role in shaping the geography of opportunity (Butler and Sinclair 2020; Chetty, Friedman, and Hendren 2018; Connor and Storper 2020; Green, Sánchez, and Germain 2017; Tate 2008). This focus connects to sociological theories of opportunity hoarding (Tilly 1998) and to exclusionary practices in education, housing, zoning, and political

[1] Spatial socioeconomic stratification refers to the geographic organization of households into different areas based on socioeconomic characteristics, often resulting in unequal access to resources, opportunities, and outcomes across those spaces. Socioeconomic stratification in U.S. public education refers to the division across schools and districts based on the socioeconomic status (SES) of families in those areas. This division is shaped by housing markets, residential zoning, and local funding mechanisms, particularly since schools often rely heavily on local property taxes (Verstegen 2018).

fragmentation (Ball 2003; Bischoff 2008; Freidus 2016; Owens and Candipan 2019; Roda and Sattin-Bajaj 2024; Sattin-Bajaj and Roda 2018).

This dissertation contributes to and extends this literature. Across three studies, I show that (1) areas of concentrated socioeconomic advantage among U.S. public school districts are more prevalent than areas of socioeconomic segregation and therefore, may play an important role in shaping educational opportunity and inequality, (2) many factors commonly associated with other forms of socioeconomic sorting in education; including inequality in district spending, per pupil spending, local education spending, and state political orientation do not play such a role in areas of concentrated advantage, (3) intra-elite competition, which to my knowledge has never before been examined in research on school district socioeconomic stratification, plays a role in these areas and (3) that areas of concentrated advantage provide an academic performance benefit to students that advantage districts alone do not. With greater understanding of concentrated school district advantage, it may be possible to expand their benefits and improve the academic and life outcomes for students outside these areas.

## Contribution of Authors

This dissertation consists of three manuscript chapters, each of which I am the sole author. My doctoral supervisors, Prof. Joseph Smearman Levitan and Prof. Caroline Riches from McGill University's Department of Integrated Studies in Education (DISE), have provided guidance and feedback on the dissertation chapters.

Prof. Peter McMahan, a member of my supervisory committee from McGill University's Department of Sociology, has provided feedback and guidance on the methods employed. All maps are my own.

**Abstract**

The school districts where students live and go to school shape the educational opportunities they have and the long-term outcomes of their lives. As such, they are central to how opportunity and inequality are organized and reproduced in the United States because these places have become increasingly socioeconomically stratified. This socioeconomic stratification produces areas where socioeconomically advantaged households are concentrated. These areas shape access to educational opportunity through opportunity hoarding. This has significant implications for the overall educational performance of American students and the U.S. workforce. However, there is little consensus on what drives this form of spatial inequality. Prior research has not established whether the concentration of advantaged districts provides additional benefits to students beyond what they could gain simply by attending a more advantaged district. To address these gaps in our understanding, I conducted three studies that explore (1) patterns of concentrations of socioeconomically advantaged school districts, (2) structural and demographic factors associated with these areas, and (3) the potential academic performance benefits for students in these areas. The first maps the spatial concentration of advantaged school districts across the country, showing that these areas are not necessarily spatially linked to socioeconomic segregation, suggesting that concentrated advantage is not merely the inverse of socioeconomic segregation but may have distinct underlying mechanisms. Findings from the second study show that factors typically linked to socioeconomic segregation are not significantly associated with concentrated advantage. Instead, intra-elite competition and home values play a larger role in districts located in areas of concentrated advantage. The concentration of wealth and opportunities in certain districts is more closely related to state or local economic competition than to the factors typically associated with socioeconomic segregation. The third shows that students in areas of concentrated advantage perform better than those in advantaged districts outside these areas, as well as students from disadvantaged districts in general. These three studies reveal that these areas of concentrated advantage may be driven

more by economic competition and housing market dynamics than by school funding inequality and other factors commonly linked to socioeconomic segregation. In sum, concentrated advantage in U.S. public education is a distinct and meaningful form of spatial inequality with the potential to limit educational opportunities for American students.

*keywords*: socioeconomic stratification, educational opportunity, spatial opportunity, socioeconomic segregation, geography of opportunity

**Résumé**

Les districts scolaires où les élèves vivent et vont à l'école façonnent les possibilités éducatives qui leur sont offertes ainsi que les résultats à long terme de leur vie. À ce titre, ils jouent un rôle central dans l'organisation et la reproduction des opportunités et des inégalités aux États-Unis, car ces territoires sont devenus de plus en plus stratifiés sur le plan socioéconomique. Cette stratification produit des zones où se concentrent les ménages socioéconomiquement favorisés. Ces zones modèlent l'accès aux opportunités éducatives par des mécanismes d'accaparement des ressources. Cela a des répercussions importantes sur les performances scolaires globales des élèves américains ainsi que sur la main-d'œuvre nationale. Cependant, il existe peu de consensus quant aux causes de cette forme d'inégalité spatiale. Les recherches antérieures n'ont pas établi si la concentration de districts favorisés offre aux élèves des avantages supplémentaires par rapport à ceux qu'ils obtiendraient simplement en fréquentant un district plus favorisé. Pour combler ces lacunes dans notre compréhension, j'ai mené trois études qui examinent : (1) les schémas de concentration des districts scolaires socioéconomiquement favorisés ; (2) les facteurs structurels et démographiques associés à ces zones ; et (3) les avantages potentiels en matière de performance scolaire pour les élèves qui y résident. La première étude cartographie la concentration spatiale des districts favorisés à l'échelle nationale, montrant que ces zones ne sont pas nécessairement corrélées à la ségrégation socioéconomique. Cela suggère que l'avantage concentré ne constitue pas simplement l'inverse de la ségrégation socioéconomique, mais pourrait reposer sur des mécanismes distincts. Les résultats de la deuxième étude indiquent que les facteurs généralement associés à la ségrégation socioéconomique ne sont pas significativement liés à l'avantage concentré. En revanche, la concurrence intra-élite et la valeur des biens immobiliers jouent un rôle plus important dans les districts situés dans des zones d'avantages concentrés. La concentration de la richesse et des opportunités dans certains districts semble davantage liée à la concurrence économique locale ou étatique qu'aux facteurs traditionnellement associés à la ségrégation.La troisième

étude montre que les élèves vivant dans des zones d'avantages concentrés obtiennent de meilleurs résultats scolaires que ceux des districts favorisés situés en dehors de ces zones, ainsi que ceux issus de districts défavorisés. En somme, ces trois études révèlent que les zones d'avantages concentrés sont peut-être davantage façonnées par la concurrence économique et les dynamiques du marché du logement que par l'inégalité du financement scolaire ou d'autres facteurs traditionnellement liés à la ségrégation socioéconomique. L'avantage concentré dans l'enseignement public américain constitue une forme distincte et significative d'inégalité spatiale, susceptible de restreindre les opportunités éducatives offertes aux élèves.

*mots clés*: stratification socioéconomique, opportunité educative, opportunité spatiale, ségrégation socioéconomique, géographie des opportunités

## Chapter 1: Spatial Foundations of Educational Inequality

We know that the places where students grow up and attend school are crucial for their education, health, social mobility, and the long-term outlook of their lives (Bernardi et al., 2019; Chetty & Hendren, 2018; Graham, 2018; Owens & Massey, 2018; Schiffer). However, over the last several decades, despite the many policy reforms and innovative educational interventions implemented during this time, housing and education in the United States (U.S.) have become increasingly socioeconomically stratified.[2] As geographers Galster and Sharkey (2017b) war n, "the rise of economic segregation will become an increasingly important dimension of urban inequality," and educational inequality (p. 7). Furthermore, according to work by Reardon and colleagues (2018), income-based segregation among families with children has increased in recent decades and is strongly correlated with disparities in educational achievement. They show that high-income families tend to live in neighborhoods with well-funded schools that offer a host of benefits to their children. In contrast, children from low-income families often live in areas with underperforming schools. This form of inequality is deeply embedded into the nation's geography and is a simple fact of life for its students.

Although spatial socioeconomic stratification is often understood as an issue primarily involving disadvantaged students, as of 2019, socioeconomically advantaged students were more segregated in the American educational system (0.19) [3] than in other wealthy developed nations, including Canada, South Korea, Japan, France, and New Zealand, while disadvantaged students were segregated at the OECD average (0.16) (Schleicher, 2019, p. 20). Despite this, and in contrast to the rich scholarship on

[2] Spatial socioeconomic stratification refers to the geographic organization of households into different areas based on socioeconomic characteristics, often resulting in unequal access to resources, opportunities, and outcomes across those spaces.

[3] To measure segregation between students with different levels of socioeconomic status (SES), the 2018 PISA employs the isolation index to distinguish between high SES students in the top quarter of the PISA index of economic, social, and cultural status and low SES students in the bottom quarter of the ESCP Index (Schleicher, 2019).

socioeconomic stratification in the United Kingdom, the study of socioeconomic advantage was somewhat neglected in the American context, where upward mobility is lower and inequality higher than in the United Kingdom (Dorling, 2011, p. 158).

In general, advantaged areas provide numerous material and immaterial benefits to students, whereas disadvantaged areas lack these benefits and come with their own challenges. Addressing spatial socioeconomic stratification within the public education system is crucial because it limits the social, economic, educational, and physical opportunities that help students reach their full potential. The *places* where students live and go to school are thus critically important to the course of their lives.

## Spatial Forms of Socioeconomic Inequality

Socioeconomic segregation and socioeconomic clustering, or concentration, are distinct yet related concepts in urban sociology and geography. Socioeconomic segregation refers to the degree to which people or households from different socioeconomic backgrounds—defined by income, education, occupation, and wealth—live apart from one another. Its defining feature is the spatial separation of groups into different areas, creating internally similar communities isolated from other socioeconomic groups. Work done to understand socioeconomic segregation emphasizes how spatial divisions reinforce inequality, affecting education, health, and economic mobility. Massey and Denton, (1993), Owens (2018) and Reardon and Bischoff (2011) show how segregation can perpetuate poverty and inequality by restricting access to opportunities, resources, and social networks.

Socioeconomic clustering describes the spatial concentration of people with similar socioeconomic characteristics within particular neighborhoods or areas. While segregation emphasizes separation between groups, clustering emphasizes the internal composition of socioeconomic similarity within neighborhoods or communities. Clustering leads neighborhoods and communities to become predominantly affluent or poor, each associated with their own social conditions, norms, and institutional resources. Chetty and Hendren (2018b), Dwyer (2010), Pfeffer and colleagues (2013),

and Saporito and William (2007) have all examined how concentrated poverty or wealth shapes neighborhood institutions, community stability, social behaviors, and individual outcomes. They highlight how concentrated disadvantage, for instance, creates neighborhoods with fewer resources, diminished economic opportunities, and less effective local institutions.

### *Socioeconomic Segregation vs. Clustering*

Although closely linked, socioeconomic segregation and clustering differ both conceptually and analytically. Studies of socioeconomic segregation often employ index measures, such as the dissimilarity index, isolation index, or exposure index, to assess the degree of separation between socioeconomic groups. When used in isolation, traditional methods of understanding segregation, such as the dissimilarity index, can obscure the interrelated socioeconomic, structural, and spatial mechanisms that contribute to socioeconomic segregation. In response to their limitations, alternatives have been developed to capture aspects of segregation, such as exposure or information exchange, and spatial approaches, including kernel density estimation, to visualize the geospatial quality of segregation (Johnston et al., 2007; O'Sullivan & Wong, 2007; Park & Kwan, 2018). Some combine different segregation indices, as Saporito and William (2007) do by mapping exposure and dissimilarity indices on top of spatial census data in hierarchical models, or as Hong and colleagues (2014) propose by combining an index score with spatial measurement. Studies of concentration or clustering typically employ spatial analytical tools, such as spatial autocorrelation or location quotients, to measure the extent to which populations with similar socioeconomic characteristics cluster in specific areas (Galster & Sharkey, 2017a).

## Importance of Concentrated Socioeconomic Advantage

To effectively mitigate the negative impacts of socioeconomic stratification on disadvantaged students in public education, policymakers must understand the underlying factors that drive stratification. Expanding stratification research to include the spatial concentration of advantaged school districts, rather than focusing narrowly

on the segregation of disadvantaged districts, is crucial for identifying drivers of socioeconomic stratification in public education. This may require a more holistic perspective, incorporating the role of economic geography in all students' educational and life outcomes, not just those who attend schools in disadvantaged districts.

In the sense I use the term, areas of concentrated advantage refer to statistically significant clusters of socioeconomically advantaged school districts. Socioeconomically advantaged school districts often share borders with similarly advantaged districts, creating areas of *concentrated advantage* that have their own spatial opportunity structures—the variation in spatial context at different geographical levels, encompassing the various factors that contribute to the opportunities available in a specific area (Galster & Sharkey, 2017a). These factors can include housing, labor, financial markets, education, health, transportation, social services, political and judicial systems, public and private organizational services, social networks, collective social norms, practices, and traditions (Galster & Sharkey, 2017a). All are influenced by the area's natural and built environment[4] (Galster & Sharkey, 2017a).

At the school level, differences in program offerings, teacher quality, and peer groups significantly impact educational outcomes. At the district level, factors such as resource allocation, demographics, culture, and social structure vary widely. Beyond district boundaries, differences in local housing markets, zoning laws, and district funding further deepen inequalities (Galster & Sharkey, 2017a). Across metropolitan areas, differences in job availability, pay, working conditions, and commuting needs also impact residents' socioeconomic prospects (Galster & Sharkey, 2017a). Such differences in environmental, structural-demographic, and public safety conditions significantly affect opportunities available to students at every level of geography.

[4] The built environment includes all human-made surroundings where people live, work, and interact (Galster & Sharkey, 2017b). It encompasses everything constructed or altered by human activity, such as buildings, roads, bridges, parks, and transportation systems (Galster & Sharkey, 2017b). The built environment has a significant impact on various aspects of daily life, including education, health, social interactions, and economic activities (Galster & Sharkey, 2017b). It often mirrors a society's values, needs, and priorities (Galster & Sharkey, 2017b).

The presence of concentrated socioeconomic advantage thus shapes the community-wide opportunity structures from which students benefit. Children growing up in these advantaged areas often gain greater access to resources, even if their immediate family or school background does not offer explicit advantages. This spatial advantage not only enhances their educational outcomes but also increases their likelihood of maintaining socioeconomic advantage later in life, influencing choices such as residential location and mate selection, factors that perpetuate socioeconomic stratification across generations (Ehrenreich & Ehrenreich, 2013; Mare, 2016; Plomin & Deary, 2015).

In contrast, students attending schools outside areas of concentrated advantage may miss these beneficial opportunity structures, exacerbating socioeconomic disparities. This form of spatial socioeconomic stratification[5] is distinct from socioeconomic segregation and has been identified as a critical factor contributing to American students' relatively poor performance in reading and mathematics compared to their peers in other wealthy countries (Schleicher, 2019, p. 20).

Without a clear understanding of the underlying mechanisms of these areas of concentrated advantage, it is difficult to develop reform to effectively mitigate the negative externalities associated with socioeconomic stratification in U.S. public education and inequality in educational opportunities for American students.

**Aim and Scope**

To deepen our understanding of concentrated advantage and its underlying mechanisms, I conducted three nested studies which: (1) identify the locations of concentrated socioeconomic advantage among U.S. PK/K-12 public school districts nationwide, (2) investigate whether common factors associated with socioeconomic segregation are also involved in areas of concentrated advantage, (3) examine for the first time, the role of intra-elite competition as a factor in areas of concentrated

[5] I use the term *sorting* where appropriate instead of segregation because it is a relatively neutral term and does not attribute reasons for the spatial arrangement of groups.

advantage among school districts, and (4) determine the academic performance benefits of advantaged districts within areas of concentrated advantage compared to districts within other patterns of socioeconomic sorting. Ultimately, these findings show that areas of concentrated advantage represent a distinct and significant form of spatial socioeconomic inequality in U.S. public education. The studies concentrate on socioeconomic sorting, excluding other forms of spatial inequality, to isolate the underlying structural mechanisms. To support this aim, I limit the dissertation's scope to U.S. PK/K-12 public school districts, focusing exclusively on socioeconomic sorting.

## Overview

This dissertation is structured into six chapters divided into three main parts. Part I lays the groundwork for the three studies detailed in Part II (Chapters 4-6) by placing them within the relevant theoretical and empirical frameworks. In Chapter 2, I discuss the theoretical and conceptual frameworks used to understand various forms of socioeconomic stratification. I critically examine these frameworks, highlighting those that involve individual-level socioeconomic status,[6] and ways in which they can fall short in conceptualizing spatial socioeconomic advantages or their underlying drivers. I explore alternative frameworks that, although less commonly used, provide alternative approaches to understanding area-level socioeconomic stratification in education.

In Chapter 3, I review the literature on socioeconomic advantage, particularly at the area level. While research on income and wealth residential segregation is extensive, important gaps exist in understanding area-level socioeconomic advantage in U.S. public education. I also examine the role of housing markets in socioeconomic stratification, exploring how neighborhood contexts affect students' academic

[6] The American Psychological Association (2017) defines socioeconomic status (SES) as a term that usually includes various factors, such as income, education level, social status, wealth, and social class. However, there is no set measure of SES, and such measures often vary according to the research context and research questions.

performance and life outcomes, as well as how the geography of school districts interacts with these dynamics. Furthermore, I discuss the connection between socioeconomic stratification in housing and disparities in education funding, highlighting its impact on student achievement. The chapter concludes with a brief historical overview of legal challenges related to disparities in state education funding, arguing that legal remedies aimed at funding equalization fail to address the broader negative effects of spatial socioeconomic stratification on disadvantaged students. I demonstrate that the existing literature has not fully explored the mechanisms that contribute to the creation of concentrated socioeconomic advantage among school districts, nor has it adequately considered the implications of this phenomenon for students in less advantaged areas.

Part II presents three studies that collectively show that areas of concentrated advantage represent a distinct and significant form of spatial socioeconomic inequality within the American educational landscape. Chapter 4 explores how these areas differ from other forms of spatial socioeconomic stratification. This chapter addresses the extent to which areas of concentrated socioeconomic advantage exist among U.S. PK/K-12 public school districts and where they are located.

Chapter 5 explores the structural mechanisms underlying these areas. This chapter addresses the following questions: (1) Are the factors commonly associated with socioeconomic segregation also present in areas of concentrated advantage? Moreover, (2) Does intra-elite competition play a role in forming these advantaged areas among school districts? The findings from this chapter show that concentrated socioeconomic advantage is a distinct phenomenon, separate from socioeconomic segregation.

In Chapter 6, I demonstrate that areas of concentrated advantage constitute a significant and unique form of spatial socioeconomic stratification within U.S. public education. This chapter addresses the following question: Do students in districts located in areas of concentrated advantage perform better than those in districts with other forms of socioeconomic sorting, namely isolated advantaged districts?

Part III (Chapter 7) synthesizes these findings within the broader research context, including how areas of concentrated socioeconomic advantage represent a distinct and meaningful form of spatial inequality. In this chapter, I discuss the policy implications of these findings, reflect on the limitations of the studies, and offer recommendations for future research.

# Chapter 2: Theoretical and Conceptual Frameworks for Understanding Socioeconomic Stratification and Advantage

The study of socioeconomic stratification in education has traditionally focused on the impact of individual skills, traits, and attributes, the reproduction of disparities across generations, and the role of institutions. Other frameworks examine the structural and demographic conditions that drive socioeconomic sorting. Despite the diversity of these theories, and perhaps because much of the literature on socioeconomic stratification has understandably focused on disadvantage, socioeconomic advantage remains somewhat undertheorized in the U.S. education context.

In this chapter, I review the key theories that have been or could be used to understand the mechanisms behind socioeconomic sorting among school districts and the broader educational consequences of such sorting. I also discuss the theoretical frameworks that informed the methodological choices for the studies in Chapters 4-6. Finally, I introduce and apply complementary frameworks to conceptualize socioeconomic advantage in more concrete terms, addressing the gap in the literature and offering a more nuanced understanding of how advantage operates within the U.S. public K-12 school system.

## Frameworks for Understanding Socioeconomic Advantage

This section reviews the major theoretical approaches used to conceptualize socioeconomic stratification. These approaches include (1) individualistic theories, which focus on the relationship between a person's inherent or acquired traits and their access to power; (2) social theories, which emphasize the role of social networks and relationships in shaping socioeconomic outcomes; (3) reproductive theories, which examine how social and economic positions are transmitted across generations; (4) stratification theories, which explore the hierarchical organization of individuals or groups within society; (5) power theories, which analyze the structure and distribution of power within social systems; and (6) macro-sociological theories, which investigate the influence of demographic, economic, and political factors on the long-term

dynamics of societies. Each of these frameworks enhances our understanding of the complex and multifaceted nature of socioeconomic stratification. However, some are more effective than others in conceptualizing the geographic dimensions of socioeconomic advantage and identifying its underlying drivers.

### *Individualistic theories*

Individualistic theories of social stratification focus on the attributes of individuals and their relationship to power dynamics and societal outcomes. Intersectionality theory, which falls within this group, emphasizes the interaction of various ascriptive social identities—such as race, gender, and class—that can either burden or benefit individuals in relation to others (Crenshaw, 1991). While this theory is valuable for understanding the personal experiences and social identities that shape individual outcomes, its focus on the individual limits its applicability in explaining spatial drivers of socioeconomic sorting. It does not adequately address the structural, economic, or policy conditions that contribute to concentrated advantage, nor does it provide a basis for differentiating it from other forms of spatial socioeconomic stratification.

Human capital theory, another individualistic approach, also considers the relationship between individuals and society, but it is more relevant to conceptualizing socioeconomic sorting. This theory suggests that people with greater cognitive abilities tend to perform better academically and complete more education, which is often rewarded with higher incomes. Over time, this diversity produces stratification, which, through interaction with various economic and social processes, leads to the concentration of households whose members possess high levels of human capital in specific areas, a process reinforced by assortative mating and housing submarkets (Mare, 1991; Morris et al., 2016). However, other literature proposes that cognitive abilities are not heritable. Richards and Sacker (2003) have shown that educational experiences can enhance cognitive abilities, suggesting that socioeconomic context, educational opportunities, and policy environments shape cognitive ability.

Additionally, the Flynn Effect,[7] for instance, proposes that the substantial intergenerational increases in IQ scores seen over the twentieth century indicate that cognitive ability is influenced by environmental and educational factors rather than genetics alone. Recent research has challenged the universality and persistence of the Flynn effect, with several studies documenting stagnation or even declines in IQ scores in developed countries (Bratsberg & Rogeberg, 2018; Dutton et al., 2016; Shayer et al., 2007). This effect is complicated by decades of evidence on assortative mating, which introduces a genetic contribution to this relationship (Mare, 1991, 2016; Plomin & Deary, 2015).

In general, though, of the individualistic theories, human capital theory provides a particularly useful framework for thinking about how individual traits contribute to broader patterns of socioeconomic advantage and spatial sorting.

### *Social Theories*

Social theories of stratification emphasize the vital role of social networks, relationships, and cultural background in shaping academic achievement and socioeconomic outcomes. Unlike human capital theory, which focuses on individual traits and skills, social capital theory underscores the significance of social connections and relationships in academic success (Coleman, 1988). From a social capital perspective, students with professional parents may benefit from access to beneficial social networks and more resources, thereby gaining better opportunities for enriching experiences.

Closely related to social and human capital, cultural capital theory proposes that individuals possess different forms of knowledge, skills, and cultural values based on their socioeconomic backgrounds (Bourdieu, 1986). This theory suggests that students from advantaged families, whose parents often have higher levels of education, are better equipped to navigate educational institutions, build valuable professional

[7] The Flynn effect refers to an observed rise in average IQ scores over the 20th century across many countries and generations (Flynn, 1987)

networks, and capitalize on opportunities. Thus, cultural capital provides a lens through which to understand how socioeconomic background influences a student's ability to succeed academically and secure social and economic advantages.

### *Reproductive Theories*

Reproductive theories of social stratification emphasize how social and economic advantages are perpetuated across generations through the accumulation of cultural capital, the maintenance of social networks, and the reinforcement of institutional practices.

Social reproduction theory posits that social and economic inequalities are transmitted from one generation to the next through the accumulation of cultural capital and the influence of social networks (Bhattacharya & Vogel, 2017). This suggests that students from advantaged families are more likely to succeed academically and gain access to higher education because they possess the cultural capital and social connections necessary to navigate the educational system and maintain or surpass their parents' class position. Conversely, students from less advantaged backgrounds face limited opportunities for upward mobility due to a lack of cultural capital and connections to elite social networks.

Similarly, cultural reproduction theory argues that schools play a critical role in maintaining social inequality by reinforcing the cultural values and beliefs of the dominant class (Bowles & Gintis, 2002). Students from advantaged families bring distinct cultural resources and knowledge to the educational environment, which can lead to higher academic achievement and the perpetuation of class structures across generations.

Institutional theory, which shares some common ground with cultural reproduction theory, asserts that socioeconomic segregation results from the processes, policies, and practices of educational institutions (Meyer & Rowan, 1977). According to this perspective, the educational system may inadvertently reinforce socioeconomic stratification through institutional frameworks.

While human capital theory and cultural reproduction theory offer valuable insights into educational inequality at the individual level, they may not fully capture the complex demographic and structural factors driving socioeconomic sorting. Similarly, although institutional theory emphasizes the role of contextual factors, it may fall short of accounting for the underlying structural dynamics that contribute to socioeconomic stratification.

### *Social Stratification Theories*

Social stratification theories provide insight into the structural dimensions of social inequality. These theories propose that social inequality is sustained through the hierarchical ranking of individuals and groups based on their socioeconomic status, with those at the top enjoying greater access to resources, opportunities, and power than those at the bottom (Roksa et al., 2007). Weber's (1946) three-component theory of stratification expanded the concept of social stratification beyond mere economics by introducing a multidimensional perspective that includes economic status, social status, and political power. Within this framework, social inequality is understood to be perpetuated through hierarchies based on these intersecting dimensions. At the heart of Weber's theory and other social stratification theories[8] is the recognition of hierarchical social structures, where individuals and groups occupy different positions based on wealth, occupation, education, and social status.

These theories examine the mechanisms by which social inequality is perpetuated and transmitted across generations. Key factors in this process include socialization, education, access to resources, and institutional practices. For instance, students from high-income families are more likely to have access to high-quality educational resources that may be unavailable to low-income families, reinforcing social stratification over time (Reardon, 2011). Social stratification theories typically examine how structural factors, such as economic systems and social institutions,

[8] I include Talcott Parsons and Pierre Bourdieu in this group. However, there has been disagreement about how to characterize their work.

interact with individual attributes, such as education, skills, and behaviors, to determine a person's position within the social hierarchy.

### *Power Theories*

In contrast to social stratification theories, which often focus on the distribution of resources and opportunities across different social strata, power theories concentrate on the structure and dynamics of power itself. This collection of frameworks includes Mills' (1958) concept of the power elite and Pareto's (1935) elite theory.

Elite theory suggests that a small group of powerful people wield substantial control over society by dominating and directing large organizations (Pareto, 1935). This theory is often considered a precursor to the work of Burnham (1941), Mills (1958), and Lind (2020). From the perspective of elite theory, a relatively small group[9] disproportionately controls the allocation of resources and educational opportunities, leading to inequality between schools attended by non-elite and elite students.

Further developing this idea, Lind's (2020) double-horseshoe theory proposes that higher education is the dividing line between the *overclass,* comprising the managerial elite and the professional bourgeoisie, and the working class segment of the *underclass.* This conceptual divide is reflected in the physical environment, as evidenced by the greater geographic segregation of university graduates compared to those who did not complete high school (Mare, 2016). According to the U.S. Census (2019), 26% of Americans aged 25 and older had completed only a high school diploma, while 23% held a bachelor's degree, and just 13% had attained a postgraduate degree (US Census Bureau, 2019). Lind's "overclass" and "underclass" describe those who have benefited from recent decades of globalization and financialization versus those who have not (Lind, 2020). Like Pareto, Lind contends that the overclass wields disproportionate

[9] The term 'elite' is a morally neutral descriptor for a relatively small group of people in whom social power is concentrated. Over the course of the twentieth century, power shifted from traditional capital owners to the professionals and managers who came to control the contemporary managerial, technocratic state (Burnham, 1941). This group reproduces itself by attracting ambitious individuals from the new generation who aspire to attain positions of power. Turchin (2013) notes that many elite aspirants come from elite or professional families.

influence over institutions and policymaking, enabling them to shape education policy and funding to benefit their children. Lind's work, in particular, influenced the weighting of component variables in the index measure of school district socioeconomic advantage in Chapter 4.

### *Macro-Sociological Theories*

Macro-sociological theories focus on large-scale social processes and structures to show how societal-level phenomena, such as institutions, social systems, and broad patterns of social change, influence individual and group behavior. These theories typically examine the relationships among various components of society and how these interactions contribute to social stability or change.

Among the macro-sociological theories relevant to the dynamics of socioeconomic sorting, structural-demographic theory (SDT) offers particularly useful empirical and conceptual tools. SDT models social and economic phenomena by examining the interactions among the state, elites, and the general population, as well as the role of political instability. A key concept within SDT is elite overproduction,[10] which occurs when a society produces more elites and educated aspirants[11] than available, secure, high-status jobs.[12] This surplus leads to increased competition within the elite (intra-

[10] In 2018, the US Federal Reserve reported that 41% of recent university graduates and 38% of all university graduates were employed in jobs that did not require a university degree (Federal Reserve Bank of New York, 2018). The Strada Institute for the Future of Work (2018) found that for 4 in 10 university graduates whose first job after graduation did not require a university degree, two-thirds held non-professional jobs five years later, and three-quarters held such jobs a decade later. Meanwhile, the U.S. Bureau of Labor Statistics (2022) projected that most of the ten occupations with the highest growth from 2021 to 2031 will be low-skill service jobs that pay around $30,000 per year or less, such as restaurant workers, delivery drivers, or home health aides. Before that, between 1970 and 2012, the number of medical school applicants grew three times as fast as the overall population, and the overproduction of lawyers during this time led to significant salary inequality, creating a gulf between successful lawyers and failed aspirants saddled with high levels of student debt and low prospects for repayment (Turchin, 2016, pp. 135–136).

[11] The demand for advanced degrees serves as an indicator of intra-elite competition, which has increased as the number of university graduates outpaced the available white-collar jobs (Collins, 2019; Turchin, 2013, 2016; Turchin & Korotayev, 2020). Competition also arises during economic recessions or when a new identity group is established (Turchin & Korotayev, 2020).

[12] Turchin (2012) argues that competition within groups can weaken cooperation, giving elite members of protected identity groups, those who are most adept at exploiting their identities, better opportunities for resources, positions, and status.

elite competition), reduced incomes among the elite, and a growing number of frustrated aspirants (Turchin, 2013).[13] Demographic trends and social mobility shape the number of elites, while a labor surplus restricts economic, political, and ideological capital at the lower end of the income distribution (Turchin, 2012, 2013; Turchin & Korotayev, 2020).

While Pareto's (1935) circulation of elites recognizes the importance of elite turnover to create social mobility to prevent stagnation, SDT emphasizes the negative consequences of producing too many highly educated people, a situation that Turchin (2016) argues has occurred within the 2010s in the United States. As the number of university-educated Americans increases, more white-collar jobs must be created,[14] or parents must take steps to improve their children's competitiveness in a tighter economic landscape, such as securing enrollment in desirable school districts. Although SDT and the concept of elite overproduction inform the field of cliodynamics, further research is needed to examine their validity and applicability in education.

### *Theorizing Concentrated Socioeconomic Advantage*

I draw on social stratification, cultural capital, and structural-demographic (SDT) theories to ground the aspects of the models in Chapters 5 and 6. These chapters examine the role of competition among advantaged families for educational resources in concentrated socioeconomic advantage. Social stratification and cultural capital theories provide a comprehensive understanding of how the transmission of cultural capital across hierarchical structures sustains socioeconomic advantage. SDT can be further used to consider how these competitive dynamics may drive socioeconomic stratification in public education.

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[13] Demand for advanced degrees is used as a proxy for intra-elite competition, which rose as the supply of university graduates outpaced available white-collar jobs (Collins, 2019; Turchin, 2013, 2016; Turchin & Korotayev, 2020).

[14] This takes the form of white-collar "make-work." Such jobs provide employment or keep people occupied, rather than being genuinely productive or necessary (Dean et al., 2022; Walo, 2023).White-collar make-work jobs give university-educated children of the professional-managerial class the opportunity to maintain their class position while drawing on the productive economy.

Social stratification theories provide a foundational understanding by illustrating how hierarchical ranking based on socioeconomic status maintains social inequality, granting those at the top greater access to resources and opportunities (Roksa et al., 2007). Weber (1946) expands this understanding by including three interconnected dimensions—economic class, social status, and political power—which together reinforce social hierarchies. Students from high-income families are more likely to have access to high-quality educational resources, which can reinforce social stratification over time (Reardon & Bischoff, 2011).

Cultural capital theory complements social stratification theories by detailing how socioeconomic advantage is maintained and transmitted. According to Bourdieu (1986), cultural capital consists of cultural knowledge, skills, habits, and social networks that advantaged families leverage to maintain their status. Families transmit cultural capital through enrichment programs, private tutoring, specialized extracurricular opportunities, and exclusive social networks. Consequently, students from these backgrounds are more likely to achieve academic and professional success (Coleman, 1988; Lee & Bowen, 2006).

SDT further clarifies the competitive dynamics among elites, highlighting how intensified competition for limited high-status positions and resources drives geographic concentration of advantage. As the number of university graduates has grown, competition for white-collar jobs has increased, prompting affluent parents to seek out neighborhoods with better educational opportunities for their children (Turchin, 2013). Additionally, the shift from productive economic activity to financialization and rent-seeking in major U.S. cities has exacerbated this geographic divide, leading to the segregation of high-income households from lower-income ones (Krippner, 2005; Lind, 2020; Tomaskovic-Devey, 2011).

Work has also confirmed some of these theoretical claims by showing that schools in high-income neighborhoods benefit from greater social, financial, and instructional resources, which correlate with higher student achievement (Owens & Candipan, 2019). However, the benefits of attending such schools are not solely due to the

schools themselves, but also to the socioeconomic context and cultural capital of the families in these areas (Galster & Sharkey, 2017a).

Overall, concentrated socioeconomic advantage may be best understood as a result of intra-elite competition within the interplay of hierarchical social structures and cultural capital transmission. These interconnected processes may, therefore, mutually reinforce socioeconomic stratification and sustain areas of concentrated advantage.

**Conceptualizing Socioeconomic Advantage and Disadvantage**

By the third decade of the twenty-first century, the U.S. economy has produced new and, in some ways, deeper socioeconomic divisions (Bonica et al., 2013; Calarco, 2018; Collins, 2019; Connolly et al., 2019; Dwyer, 2010; Ehrenreich & Ehrenreich, 2013; Graeber, 2014; Lee & Shin, 2016; Lind, 2020; Liu, 2021; Markovits, 2019; Thal, 2017). However, while some divisions may be relatively new, ways of conceptualizing human hierarchies have long interested scholars. Analyzing political and economic structures at the beginning of the twentieth century, Burnham (1941) predicted that there would be "a drive for social dominance, for power and privilege, for the position of the ruling class, by the social group or class of the managers" (p. 71). As these positions of power coalesced into the managerial state, Weber (1946) theorized that the primary basis of power came from positions in powerful organizations that depend primarily on educational credentials. Several decades later, Barbara and John Ehrenreich (1979) confirmed Burnham's prediction: the expanded cadre of university-educated professionals and managers had solidified their position as part of a distinct ruling class. Unlike the capital elite, however, they rely on education and credentials to maintain their status across generations.

Building on Burnham's analysis, Lind (2020) noted that a university education now plays a more significant role in defining the overclass, similar to its role in the professional-managerial class, as described by Ehrenreich and Ehrenreich (1979). The impact of expanding the overclass—those who have benefited from a globalized and financialized economy, which Turchin (2016) calls elite overproduction—is evident in

the U.S. Distributional National Accounts produced by Piketty and colleagues (2020). Between 1986 and 2020, the United States experienced a ten-percentage-point increase in the total income share, rising from 37% to 47%, a trend not seen in other wealthy nations (Berman & Milanovic, 2020, p. 18). Furthermore, during the 2010s, approximately half of Americans were excluded from the country's pre-tax economic growth (Piketty et al., 2016). Spatial socioeconomic stratification in housing and education may relate to the structure of a deindustrialized economy in which the same group holds relatively high levels of capital and income (Berman & Milanovic, 2020).

**Competition as an Intrinsic Factor in Socioeconomic Advantage.** An increase in the number of highly educated and relatively wealthy people (those in the top 20% or so of the income distribution) greatly expands the number of families who can separate themselves socially and geographically from the working majority and remain so across generations (Berman & Milanovic, 2020). Over time, this concentration of human, social, and cultural capital solidifies into a hereditary layer of relative elites (Miliband, 1969). The student demographics of highly selective universities reflect the endpoint of this process, as graduates from these schools go on to transmit these positions through significant educational investment in their children, not wealth or property[15] (Berman & Milanovic, 2020; Ehrenreich & Ehrenreich, 1979, 2013; Marchand & Ehrenreich, 1990).

Within this environment, advantaged families strategically use horizontal differences in the K-12 education system to improve their children's opportunities (Gerber & Cheung, 2008; Lucas, 2001). Evidence of undermatching supports this: students from higher-income families disproportionately attend more selective universities than middle- and lower-income peers with equivalent ACT or SAT scores (Chetty et al.,

[15] Over the past 30 years, the upper class has increased its dominance in highly selective universities. (Domina et al., 2017). In 1985, 54% of students at the 250 most selective American universities came from the bottom three quartiles of the income distribution, a figure that dropped to 33% by 2010 (Domina et al., 2017). This trend was further highlighted by the fact that by 2020, 38 of the nation's most highly selective universities had more students from the top 1% than the bottom 60% (Chetty, Friedman, Saez, et al., 2020).

2020). Competition for educational advantage begins well before university enrollment, shaping opportunities at earlier stages of education.

Neo-institutionalist scholars have understandably welcomed the massive expansion in higher education since the 1960s, which has improved access to education and increased social mobility. In this model, higher education expands, labor markets adapt accordingly, creating roles that require higher educational attainment, thereby expanding the 'knowledge economy' and raising living standards and educational levels (Baker, 2014). These changes were thought to reflect structural transformations within the economy (Baker, 2014). The expansion of higher education initially appeared to be a solution to the challenges faced by aspiring professionals, as it has widened access to university credentials (Pfeffer & Hertel, 2015). However, this expansion, heavily financed by federal student loans (Congressional Budget Office, 2020; Dynarski, 2003a, 2003b), has produced more graduates than the labor market can handle, leading to increased credential inflation and intensified competition for professionals (Turchin & Korotayev, 2020). Rather than simply expanding the labor market for knowledge workers, the expansion in higher education has led to intra-class competition, resulting in a bifurcated labor pool that suppresses wages for most workers within their respective professional fields (Turchin & Korotayev, 2020). Moreover, the neo-institutional view may sometimes overlook the fact that expansion in non-productive labor sectors ultimately relies on a shrinking base of productive labor.

As one might expect, while this has provided millions of Americans with university degrees, many degree holders face a devaluation of their credentials and increased competition for fewer available roles (Turchin & Korotayev, 2020). To avoid downward mobility, young aspiring professionals are pushed into an increasingly tight job market, saddled with depreciating university credentials and debt. While Baker's argument highlights a plausible adaptive mechanism, it inadequately addresses the reality of labor market bifurcation that Turchin documented.

The intensified competition has brought many social and political consequences for university-educated professionals and managers, including higher costs for maintenance and reproduction (Ehrenreich & Ehrenreich, 2013; Turchin & Korotayev, 2020). Consequently, aspiring professionals from families outside the top income percentiles are unlikely to match their parents' wealth accumulation (Turchin, 2013). Policy responses, including subsidies for higher education, student loan forgiveness, and efforts to create more white-collar employment, further complicate the situation. Although intended to ease economic pressure, such measures disproportionately benefit the PMC at the expense of the working-class majority, who must bear the brunt of the increased tax burden. While the ongoing challenges faced by working-class Americans have strengthened the PMC, they have, in turn, intensified the consequences for those who fall behind (Kyeyune, 2020).

Given the serious implications of these developments for millions of American families with school-aged children, examining the role advantaged families play in stratifying the public school system through their own internal competition for places in desirable public school districts has become necessary if policymakers are to respond effectively.

### *Socioeconomic Disadvantage*

The disadvantaged generally comprise those without four-year university degrees who work outside the purview of white-collar jobs. The working class can be described as 'non-advantaged' in this context. According to Lind (2020), a significant portion of the underclass, which includes the working class, consists of people without a four-year university degree or substantial generational wealth who participate in the formal economy. The heartland working class, located mainly in low-density suburban and rural regions, is typically employed in manufacturing, infrastructure, agriculture, energy, food production, retail distribution, and warehousing (Lind, 2020). The hub-city working class serves the urban overclass directly as domestic staff or indirectly as service workers (Lind, 2020).

A third group is primarily defined by work *outside* the formal economy (Lind, 2020). While literature in this area tends to focus on its members living in urban areas, many also live in suburban and rural areas (Lichter et al., 2012, 2015). They may face family instability, multigenerational poverty, substance abuse, criminality, incarceration, or the perverse incentives of various public assistance programs.[16]

***Socioeconomic Advantage***

Despite some decreases in wealth gaps in high school graduation and university access, the most apparent and considerable change in the distribution of educational opportunities lies in the rising gap between those from the top 20% of the wealth distribution and everyone else (Pfeffer, 2018). This group of socioeconomic elites has a long history, including Mills' (1958) use of the term as part of the expression *power elite* to describe the people who ran interrelated hierarchical institutions following the Second World War (1939–1945). Along with Mills, Burnham (1941) and Lasch (1995) used it to refer to professionals and managers in high-paying, usually urban jobs, university professors, politicians, members of the media, and the owners of capital whom they serve and depend on. Writing in the twenty-first century, Turchin (2016) uses the term to indicate the small group "in whom the ability to influence the behavior of other people" is concentrated (Turchin, 2016, p. 82).

Extending Burnham's (1941) analysis, Lind (2020) proposed that the contemporary American overclass comprises three groups. The first comprises people who come

[16] Perverse incentives are unintended consequences that contradict the original objectives of a program. For example, some entitlement programs in the United States can create perverse incentives that disincentivize marriage, undermining family stability and ultimately reducing social mobility (Lundberg et al., 2016). Because eligibility and benefit levels are often determined by household income, couples who marry and combine their earnings may face a reduction in benefits or become completely ineligible for essential programs, such as Medicaid, the Supplemental Nutrition Assistance Program (SNAP), or housing assistance (Ellen, 2020; Hoynes & Schanzenbach, 2018). This structure can make marriage economically disadvantageous for low-income couples, despite its social and emotional benefits. Some programs, like the Earned Income Tax Credit (EITC), may effectively reduce benefits when a married couple's combined income exceeds certain thresholds (Ellwood et al., 1999). For example, a single mother receiving welfare may lose a significant portion of her assistance if she marries someone with even a modest income (Ellwood et al., 1999). This financial penalty can lead to decisions prioritizing economic survival over marriage, contributing to a decline in marriage rates and, consequently, to the erosion of family stability among lower-income populations.

from wealthy families. The second group, the 'monopolist entrepreneurs, like Bill Gates and Mark Zuckerberg, do not come from inherited wealth but from highly educated professionals and made their wealth, as Lind (2020) points out, often through some type of industry-wide monopoly. The third group includes people with university credentials who work in professional jobs or as managers, which he refers to as the professional bourgeoisie, along with small business owners, contractors, and the self-employed. His conceptualization significantly overlaps with Barbara and John Ehrenreich's (1979) notion of the professional-managerial class (PMC).

While professionals and managers typically move between layers in the overclass and tend to come from the same families that make up the hereditary gentry and monopolist entrepreneurs, corporate managers and executives occupy an intermediate position due to their wealth, power, and stock ownership, securing their status within the managerial elite (Burnham, 1941; Ehrenreich & Ehrenreich, 1979; Lind, 2020). The managerial elite acquire and reproduce their position through property and wealth rather than education, though university credentials are generally required. Despite the historical prominence of the hereditary elite and the social engineering potential of the monopolist entrepreneurs, by sheer numbers and dominance over organizations, the professional-managerial class (PMC) is the largest and perhaps most powerful part of the American overclass (Ehrenreich & Ehrenreich, 1979; Lind, 2020). Situated between the top 0.1% and the bottom 90%, this class controls more wealth and is more educated than the other segments combined (Mare, 2016).

This group of university-educated managers and professionals has been called the knowledge, professional, and creative class (Stewart, 2018), the professional-managerial class (Ehrenreich & Ehrenreich, 1979), the meritocratic class (Markovits, 2019), and, as I refer to them, the *relatively* advantaged. They make up the lower segment of the elite (Lasch, 1995) and part of the overclass (Lind, 2020). Despite being a minority, the professional-managerial class owns roughly half of all U.S. wealth, leaving the rest divided unequally between the top 1% or even the 0.1% and the bottom 90% (Stewart, 2018). Generally, this class is made up of highly educated and

decently paid people with social and familial connections with at least the mid-level business community (Ehrenreich & Ehrenreich, 1979). In 2019, only around 30% of Americans held a four-year university degree, and even fewer, between 10% and 15%, had earned graduate or professional degrees (U.S. Census Bureau, 2019).

Although their ranks have grown since the massive expansion of higher education in the 1960s, the PMC is not new (Pfeffer & Hertel, 2015). Well before Barbara and John Ehrenreich described this class in *Between Labor and Capital*, writer George Orwell observed that,

> […] modern industry is so complicated that it cannot get along without great numbers of managers, salesmen, engineers, chemists, and technicians of all kinds, drawing relatively large salaries. And these in turn call into being a professional class of doctors, lawyers, teachers, artists, etc. The tendency of advanced capitalism has therefore been to enlarge the middle class and not to wipe it out as it once seemed likely to do. (pp. 50–51)

For most of the twentieth century, the professional-managerial class in America primarily consisted of the types of professionals Orwell describes, including lawyers, doctors, accountants, engineers, and bankers, who worked in highly regulated specialties subject to licensing or board certification (Lind, 2020). With their specialized skills in high demand, the PMC provided services to private businesses and public institutions. As the economy grew and higher education expanded in the post-war period, the number of these white-collar positions increased, providing more Americans with job security and a comfortable lifestyle (Collins, 2019; Graeber, 2014). Despite the rise in state regulation across various sectors over the past 50 years, only a limited number of professions require state-regulated certification alongside a university degree (Department of the Treasury Office of Economic Policy et al., 2015; Lind, 2020). Those that do not are often fungible and, in many cases, essentially make work (Dean et al., 2022).

Overall, the comparatively advantaged PMC broadly includes governmental and non-governmental bureaucrats, human resource administrators, corporate executives,

teachers, doctors, scientists, professors, journalists, engineers, marketing specialists, lawyers, therapists, financial managers, architects, institutional administrators, and other 'knowledge workers' (Ehrenreich & Ehrenreich, 1979, 2013). Most work in large hierarchical organizations alongside managers and executives, often in administrative roles where they manage others (Ehrenreich & Ehrenreich, 1979). In sum, they are the credentialed professionals, experts, and bureaucrats who serve capital, living off the productive labor of others (Lind, 2020). The professional-managerial class, therefore, tends to live in cities and university towns, working in government, corporations, NGOs, media, non-profits, and universities (Kotkin, 2022; Lind, 2020).

Moreover, they use their disproportionate control over policymaking, culture, and social life through their predominance in government, NGOs, universities, and the media to defend their culture and undermine the traditional culture and values of the working class, where they threaten PMC interests (Lasch, 1995; Lind, 2020). In essence, education, socialization, and institutional influence serve as mechanisms through which the PMC maintains its advantage and power, shaping both its internal culture and society at large.

Professional managerial class culture and position are demonstrated through where they live and their dedication to education, ecologically fashionable lifestyle choices, and self-improvement in areas like diet, health, fitness, and personal growth[17] (Ehrenreich & Ehrenreich, 1979, 2013; Liu, 2021; Marchand & Ehrenreich, 1990; Markovits, 2019; Vagi, 2007). Notably, these forms of non-material wealth have some significant advantages over money. They are harder to imitate, requiring significant investments of time, energy, and self-discipline, particularly in education and childrearing (Ehrenreich & Ehrenreich, 2013). Thus, the advantages and position

[17] In addition to therapy, members of the PMC may seek personal growth through synthetic self-actualizing experiences. These are facilitated or deliberately created situations or environments designed to improve personal growth, self-discovery, and fulfillment, among other aims. They often include extreme sports, travel to remote or challenging locations, and so-called 'peak experiences,' which may involve using mind-altering substances outside of traditional religious practices (Craighead & Nemeroff, 2001, p. 1156). On the other hand, natural self-actualizing experiences often occur during religious observance, the birth of a child, or intense bonding with close friends and loved ones during childhood.

provided by education and socialization are intergenerationally transferable but not taxable. Essentially, they are forms of wealth not susceptible to economic redistribution.

As such, parents in the PMC pass this position to their children through how well and where their children are educated, but also their culture, values, social networks, and class-specific knowledge (Ehrenreich & Ehrenreich, 1979; Lawson & Wallerstein, 1978; Tilly, 1998). By sending their children to school with their class peers, they create social ties vital for their future success in higher education and professional employment (Tai et al., 2003). The socioeconomic makeup of schools or districts' student bodies facilitates these social ties and transmits class-specific knowledge, values, and culture (Markovits, 2019). It is, therefore, significant to PMC parents' decision-making. PMC families recognize the importance of a well-funded public school district or private education in reproducing their class status and ensuring their children's admission to selective universities (Rowe & Lubienski, 2017).

As such, districts with a substantial proportion of disadvantaged students may be viewed as undesirable, as PMC parents prioritize creating social ties among class peers who will have valuable connections and social resources (Rowe & Lubienski, 2017). Socioeconomic sorting in school districts may therefore, be attributed to competition within the professional-managerial class (PMC) seeking to subsidize their children's education through state transfers (Graeber, 2014). By out-competing families with lower economic, social, and cultural capital from well-funded public school districts, the PMC limited access to high-quality public education, increasing its value while limiting supply.

Nevertheless, professional careers often require costly and specialized education, which can be a challenge for families. However, combining intensive child-rearing efforts with public education can free up the family budget for other experiences that enhance their children's prospects (Ehrenreich & Ehrenreich, 2013). In addition to formal education, PMC mothers and fathers devote significant time and effort to cultivate creativity and self-direction and transmit class-specific knowledge, values,

and etiquette to enhance their children's chances of admission to universities and increase their competitiveness (Ehrenreich & Ehrenreich, 2013).

Meanwhile, bright students from less advantaged families often lack the class-specific knowledge and social connections that help them secure a place at highly selective universities and build professional careers (Alvero et al., 2021; Tai et al., 2003). Nevertheless, as Ehrenreich and Ehrenreich (2013) note, their position must be remade for each generation through education and socialization. They typically pass on their position to the next generation through educational qualifications that provide specific skills, social connections, and values (Ehrenreich & Ehrenreich, 1979). In doing so, they create a unique culture that differs from mainstream American society (Ehrenreich & Ehrenreich, 1979; Liu, 2021; Tai et al., 2003; Tilly, 1998). Along with education, the PMC's cultural and social reproduction efforts are also reflected in their dedication to class-specific lifestyle choices, child-rearing practices, and self-improvement (Liu, 2021; Marchand & Ehrenreich, 1990; Markovits, 2019). These efforts foster a unique culture that sets the PMC apart from other social classes and strengthens their advantages.

### *Relationship Between Educational Attainment and Socioeconomic Advantage*

The relationship between cognitive ability, educational attainment, and socioeconomic status (SES) is complex and significant to understanding mechanisms of socioeconomic stratification. Furthermore, differences in family structure and cognitive abilities are often theorized as symptoms rather than direct causes of socioeconomic stratification.

Research has shown that parents' socioeconomic status (SES), particularly parents' education and occupation, significantly influences children's cognitive abilities and educational outcomes (Hout et al., 1993; Pfeffer, 2018; Pfeffer & Hertel, 2015). Studies examining the relationship between educational attainment and a variety of indicators of class background, using occupation-based measures of parents' social class, consistently show stable class gaps in children's educational outcomes across much of the twentieth and early twenty-first centuries in the United States (Hout et al., 1993;

Pfeffer, 2018; Pfeffer & Hertel, 2015). Similarly, the association between students' educational attainment and their parents' educational attainment was largely stable over time (Michael Hout & Janus, 2011; Mare, 1981, 2016; Pfeffer, 2008), with growing gaps for more recent cohorts (Pfeffer, 2018). These patterns may partly reflect the influence of family environments, as Plug and Vijverberg (2003) show that children raised by their biological parents have greater similarity in educational attainment and intelligence levels compared to children raised by surrogate parents, at the same time that rates of children being raised in alternative family structures have risen (Melissa Schettini Kearney, 2022; Lundberg et al., 2016).

The reciprocal link between cognitive ability and educational outcomes is a key factor underlying this persistent relationship. Longitudinal work shows a reciprocal relationship between intelligence and educational attainment. Childhood intelligence predicts later educational attainment and mental ability, while educational experiences can positively influence cognitive development, underscoring the complex, two-way relationship between intelligence and education (Richards & Sacker, 2003). Cognitive ability at age 11 predicts test score outcomes (GCSE scores[18]) at age 16 (Deary et al., 2007). Moreover, cognitive ability measured before formal education correlates with educational attainment six years later (Richards & Sacker, 2003). Genetic factors add another layer of complexity to this important relationship, as genetic factors affect children's cognitive ability and future socioeconomic status (Trzaskowski et al., 2014). Moreover, the genetic effect on cognitive ability is similar among low- and high-SES families, but shared experiences among children appear to explain the greater variation in cognitive ability in lower-SES families (Hanscombe et al., 2012). This suggests that while genetics provides a baseline for cognitive abilities, children's environments shape how these abilities develop.

However, mothers' cognitive ability emerges as perhaps the strongest predictor of academic achievement. Marks and O'Connell (2021) confirm work by Luster and

[18] The General Certificate of Secondary Education (GCSE) is a standardized test taken by students in British schools, generally around age 16 (*General Certificate of Secondary Education*, 2008).

McAdoo (1994), building on Butler and colleagues (1985), which shows that maternal cognitive ability, as measured by IQ, strongly predicts children's test scores, surpassing other family characteristics, including socioeconomic status. They demonstrate that maternal cognitive ability significantly affects children's academic achievement, even after accounting for socioeconomic factors. They find little evidence for the intergenerational transmission of academic achievement through socioeconomic status independent of parents' cognitive ability. These findings suggest that parental cognitive traits substantially influence educational outcomes in addition to family background and environment.

Assortative mating reinforces this dynamic. Because people from these backgrounds tend to live in the same neighborhoods, socialize with one another, and intermarry—and because intermarriage is associated with higher household incomes among those with a university education, the resulting assortative mating tends to concentrate beneficial cognitive traits within this class, such that it contributes to enduring differences in educational attainment across social classes (Mare, 1991, 2016; Morris et al., 2016). Thus, assortative mating may contribute to the persistence of educational and socioeconomic stratification by concentrating human capital among the PMC and into certain areas. However, these advantages are also influenced by geographic, structural, and environmental conditions.

### *Conclusions*

In conclusion, socioeconomic advantage does not simply indicate the absence of disadvantage but constitutes a distinct class phenomenon with its own traits, values, beliefs, and behaviors. These, coupled with its own economic and class reproductive interests, make it the group most responsible for the socioeconomic stratification of U.S. public education, not a small group of wealthy capital owners, but the professionals and managers who comprise the professional-managerial class (PMC). The professional-managerial class (PMC) maintains its status and power through educational credentials, social networks, and cultural capital, distinct from economic wealth.

The PMC uses education, socialization, and institutional influence to maintain and reproduce its socioeconomic advantage across generations. Unlike the capital elite, who rely primarily on wealth and property, the PMC's position depends on educational credentials and professional networks. As the U.S. economy has produced deeper socioeconomic divisions, the PMC has further solidified its position through educational credentials (Bonica et al., 2013; Calarco, 2018; Collins, 2019). The PMC's economic and class reproductive interests are demonstrated through their pursuit of high-quality education for their children, contributing to the stratification of the education system.

By concentrating human, social, and cultural capital in specific areas, areas of concentrated advantage ensure that many PMC children have access to the best educational resources and opportunities (Ehrenreich & Ehrenreich, 1979; Tilly, 1998). The PMC's control over policymaking and cultural influence further reinforces this stratification, shaping education policy and funding to benefit their children (Lasch, 1995; Lind, 2020). Consequently, this concentration of resources and opportunities leads to socioeconomic stratification, leaving disadvantaged families with fewer educational opportunities and limited resources.

Furthermore, this group maintains its status through the transmission of cultural capital, values, and social networks. For instance, parents in the PMC tend to prioritize creating social ties among their peers who have valuable connections and social resources over maintaining proximity to family (Rowe & Lubienski, 2017). This is evident in the socioeconomic sorting of school districts, where PMC families aim to enroll their children in the best public schools or private institutions they can afford, with little consideration for staying near family (Graeber, 2014).

Socioeconomic advantage constitutes a distinct class phenomenon driven by the professional-managerial class (PMC). The PMC's reliance on educational credentials, social networks, and cultural capital, coupled with their economic and class reproductive interests, significantly contributes to the socioeconomic stratification of U.S. public education. This stratification is not merely a result of the absence of

disadvantages. It can instead be seen as a byproduct of the efforts made by members of the professional managerial class to transmit their socioeconomic status across generations, mainly by providing access to high-quality public education to their children.

## Chapter 3: Review of Literature

The spatial dynamics of socioeconomic stratification have shaped educational inequalities across urban, suburban, and exurban areas in the United States. Contemporary scholarship has extensively documented socioeconomic sorting in U.S. public education, driven by complex demographic, economic, and policy factors. To better understand these patterns, this chapter reviews the recent literature on demographic geography, the role of housing markets, spatial socioeconomic sorting, and the impact of historical policies on school district boundaries and socioeconomic disparities. A considerable body of literature exists concerning the geography of socioeconomic stratification across the United States. Most of this literature, as it applies to housing and education, focuses on understanding where disadvantaged students live and attend school, the segregation of disadvantaged students, and its negative impact on them. However, to design effective interventions for the educational inequalities that socioeconomic stratification can produce, we need a holistic understanding of the geography of socioeconomic stratification in relation to educationally relevant boundaries. This includes the geography of socioeconomic advantage. We also need to expand our understanding of the various patterns of stratification that occur beyond segregation. Despite this need, much of the existing research on spatial socioeconomic stratification in U.S. schools and school districts tends to focus on only one pattern of spatial sorting: socioeconomic segregation of disadvantaged households (Harvey, 2001).

In this chapter, I provide background information on recent demographic trends relevant to the parents of public school students, the relevance of the U.S. education system to spatial socioeconomic stratification, and the geography of the U.S. public school system. Then, I review the literature concerning socioeconomic sorting in housing, covering housing markets, the role of neighborhoods, school district geography, and school finance.

## The Role of Historical Policies in Spatial Stratification

Historical education, housing, and urban planning policies have played an important role in racial stratification in public education over the past century. Following *Brown v. Board of Education* (1954) and the Civil Rights Act (1964), legal segregation was officially dismantled, but *de facto* racial housing segregation continued via exclusionary zoning policies established after the Fair Housing Act (1968), reinforcing racial and economic segregation and racial sorting in education (Rothstein, 2017).

Key legal decisions further entrenched these disparities. The Supreme Court's ruling in *Milliken v. Bradley* (1974) prohibited mandated cross-district desegregation plans, which reduced desegregation in many states. This ruling also contributed to the maintenance of geographic inequalities in school resources, isolating educational opportunities from lower-income, racially diverse urban districts (Rothstein, 2017).

Moreover, the geographical expressions of racial inequality and segregation extend beyond policy frameworks to include everyday practices and institutional arrangements. Rothstein (2017) proposes that discriminatory housing policies and zoning practices shaped metropolitan regions to preserve racial and socioeconomic divides. This historical structuring of urban space affected access to educational opportunities. Contrary to the hope that gentrification would improve public schools by raising neighborhood socioeconomic status, Keels and colleagues (2013) show that despite socioeconomic revitalization, there was little to no improvement in neighborhood school quality, highlighting the complex relationship between educational opportunity and socioeconomic and racial geography.

In recent decades, however, spatial stratification has undergone significant shifts in many parts of the country. During the first decades of the 21st century, socioeconomic segregation has largely replaced racial segregation in many large U.S. metro areas (Bischoff & Owens, 2019; Bishop, 2009; Fry & Taylor, 2012; Watson, 2009).

### Demographic Geography and Socioeconomic Stratification

Shifts in U.S. metropolitan demographics have highlighted growing socioeconomic stratification as the makeup of urban, suburban, and exurban areas has undergone considerable changes over the last decade. Since 2012, suburbs and exurbs have attracted nearly 90% of all metropolitan population growth[19] (Cox, 2020). In the 2010s, gentrification brought wealthier populations back into urban cores, elevating housing prices and displacing lower-income residents to suburban and exurban locales (Kavanagh et al., 2016; Keels et al., 2013). As early as 2015, the population growth rate of America's hub cities (as defined as the 52 largest U.S. cities) decreased, while the move to suburbs, exurbs, and smaller cities began accelerating well before the COVID-19 pandemic lockdowns and restrictions began (Cox, 2020).

Millennials, in particular, have been drawn to suburban areas, driven by affordability and the space to raise families, reshaping the suburban socioeconomic geography (Cortright, 2020; Kotkin, 2022). Since 2010, the proportion of 25– to 34–year-old adults with a university education or higher living in central neighborhoods in hub cities grew by 7.5%, from 9.4 million to 10.1 million, which accounted for a majority of the net increase in population in central urban neighborhoods and accelerated through 2018, compared to earlier periods (Cortright, 2020, p. 2). Nevertheless, as millennials have aged, many have found hub cities unaffordable places to start their families (Kotkin, 2022). Between 2012 and 2017, Los Angeles, New York, and Chicago lost the most millennials, while suburban and exurban areas saw increases in the university-educated population among this cohort (Cortright, 2020). In light of these findings, rather than relying on twentieth-century models of spatial socioeconomic sorting, I address current class-based patterns of residential sorting that are relevant to school district sorting.

[19] Based on American Community Survey data from 2010 to 2018.

### Spatial Socioeconomic Stratification

Redevelopment patterns have significantly impacted educational opportunities, reinforcing segregation along economic lines. Rising housing costs and limited access to desirable neighborhoods have restricted the opportunities of lower-income families, exacerbating socioeconomic segregation (Bischoff & Owens, 2019; Reardon & Bischoff, 2011). The consequence is an educational system where affluent families strategically position themselves in districts with well-resourced schools, reinforcing cycles of educational advantage (Bishop, 2009; Fry & Taylor, 2012; Owens, 2018).

This redevelopment of American cities from the 1980s to the early 2020s significantly altered urban landscapes and housing markets, driving socioeconomic shifts, and impacting public school enrollment patterns. Many American cities were redeveloped to attract professionals, managers, and their families back into cities and immediate exurbs, squeezing beneficial opportunity structures into fewer and smaller areas (Kotkin, 2022; Lind, 2020). Using census data from 1970 to 2010, Solari (2012) found increasing rates of stability in wealth and poverty in neighborhoods until 2000, with declines in the last decade.

Then, around the mid-2010s, changes in the economic landscape also meant that children from well-off families had to move from their hometowns to urban areas to match their parents' earning potential, causing housing prices around cities to rise (Kotkin, 2022). As housing prices increased in urban and immediate exurban neighborhoods, the availability of low-income housing decreased, leading to the displacement of many low-income households to the suburbs (Kavanagh et al., 2016). Structural changes in housing and employment during the 2010s and early 2020s also limited access to urban housing markets, leading to declining public school enrollment in urban neighborhoods[20] (Pearman, 2020; Piekut et al., 2019).

[20] During the COVID-19 pandemic, restrictions impacted migration patterns and real estate markets in U.S. cities. The 12 largest metropolitan areas saw a roughly 8% population drop in central business districts, while low-density zones grew by about 1% (Ramani & Bloom, 2021), leading to diverging rent and home values between high-density and low-density areas (Ramani & Bloom, 2021).

School infrastructure may also play a role in the suburban shift for families with the means to relocate (Mary Filardo, 2021). As of 2021, more than 50% of public schools in the United States need repairs, renovations, or modernizations to be considered in good condition (Mary Filardo, 2021). Urban areas faced more significant challenges with school infrastructure than suburban and rural regions (Mary Filardo, 2021). Lack of basic facilities, such as functioning heating, ventilation, and air conditioning (HVAC) systems and safe drinking water, was particularly prevalent in urban schools (Mary Filardo, 2021). These issues may influence parents' decisions about where to live and educate their children and could contribute to socioeconomic sorting among school districts in urban and exurban areas.

Previous research on income and socioeconomic segregation in the U.S. generally finds housing segregation along either income or socioeconomic status within metropolitan areas[21] and between neighborhoods, schools, school attendance zones, and school districts.[22] Some studies indicate that income segregation increased between the 1970s and the 1980s, and again during the 2010s (Fry & Taylor, 2012; Owens et al., 2014). Furthermore, these socioeconomic sorting patterns reflect broader structural, economic, and demographic changes. Over the last few decades, the work on income-based housing segregation between U.S. census tracts, microdata areas, and neighborhoods suggests that economic segregation has increasingly added to or replaced racial segregation in many large U.S. metro areas (Bischoff & Owens, 2019; Bischoff & Reardon, 2014; Fry & Taylor, 2012; Owens, 2018; Reardon et al., 2018; Rusk, 2017; Watson, 2009).

More than a decade ago, Watson (2009) found that approximately 85% of people in American cities and suburbs lived in more economically segregated areas in 2009 than

[21] See Bailey, van Gent, and Musterd 2017; Dawkins 2007; Kawachi 2002; Kucheva and Sander 2018; Lobmayer and Wilkinson 2002; Owens 2016; Reardon and Bischoff 2011; Ross, Nobrega, and Dunn 2001; Watson 2009.
[22] See Bischoff and Owens 2019; Dalane and Marcotte 2022; Owens and Massey 2018; Owens, Reardon, and Jencks 2016; Richards and Stroub 2020; Saporito 2017; Taylor and Frankenberg 2021 and Bornstein et al. 2014.

in 1970. Bishop (2009) noted a similar trend; university-educated people were concentrating more in some places than in others—a pattern he called "the big sort" (p. 375). Then, Fry and Taylor (2012) showed that the population of high-income people living in high-income neighborhoods doubled between 1980 and 2010 compared to the population of low-income people living in low-income neighborhoods, which grew by just five percentage points. Reardon and Bischoff (2011) also noted that high SES families had begun to be more geographically separated than low SES families.

Over the last decade, the 'big sort' has become even more pronounced as cities have developed into wealthy islands among seas of lower-income exurbs, a phenomenon that Lind (2020) refers to as 'hub cities' (Florida et al., 2021). Because professional-managerial class reproduction depends on educational attainment, which must be remade for each generation, it is a crucial factor in residential sorting (Florida et al., 2021). Moreover, parental income alone does not explain housing segregation between school districts. Instead, educational attainment may be the primary driver of residential sorting, while wealth facilitates housing sorting. Still, income and occupational segregation are associated, but "[i]t appears that educational and occupational segregation are more serious dimensions of segregation than income segregation" (Florida & Mellander, 2017, p. 15). These findings suggest that residential sorting is not just a condition of low-income families but is characteristic of the highly educated, which enhances their lives and provides educational benefits to their children (Belley & Lochner, 2007; Conley, 2001b; Nam & Huang, 2009; Pfeffer, 2008, 2018).

However, Logan and colleagues (2018) refuted the findings of *increased* income segregation during this period, showing that differences in U.S. Census data collection methods reduced sample sizes and made census tract-level data unreliable for measuring income segregation. Nevertheless, Reardon and colleagues (2018) confirm their previous findings of increased income segregation among families with children in recent decades and that income inequality consistently predicts income-based

housing segregation. Although residential income segregation increased substantially in the United States between 1990 and 2010, there was no corresponding increase in school district segregation (Reardon et al., 2018). This suggests that while income segregation rose, its impact on school district segregation remained limited.

### *The Role of Housing Markets*

The literature on school district segregation reveals a complex relationship between housing submarkets and socioeconomic sorting across neighborhoods, schools, and districts. Nevertheless, the fact that households of varying socioeconomic status are distributed unevenly across various housing markets is the key factor driving residential segregation (Lloyd et al., 2014). Furthermore, the link between rising inequality and residential segregation established for income may be more robust for wealth because families' selection into housing markets directly influences residential segregation (Owens, 2016, 2019; Owens & Massey, 2018; Reardon, Bischoff et al., 2018; Watson, 2009). Parental homeownership, in particular, is also significantly associated with university completion (Conley, 2001a; Y. Kim & Sherraden, 2011).

Meanwhile, the degree and pattern of educational attainment differences by families' home values closely approximate those by families' net worth (Pfeffer, 2018). Although financial assets or home equity (home values minus mortgages) also approximate reported net worth gaps, Pfeffer (2018) asserts that homeownership is the best proxy for net worth because it is the primary asset in most families' wealth portfolios and is the easiest to measure. Because local property tax-based school funding provides a close link between school inputs and housing wealth, the extent to which residential segregation translates into differences in local school funding should depend more on a neighborhood's wealth distribution than its income distribution (Bateman, 2012; Husted & Kenny, 2014; Jordan et al., 2014). Overall, residential segregation, driven by uneven distribution across housing markets, is closely linked to local school resources, with wealth distribution, particularly homeownership, playing a more critical role than income in educational opportunities.

The connection between socioeconomic sorting and educational inequality is evident in the housing market, which tends to segregate high-income workers into neighborhoods with low crime rates, fewer environmental hazards, and better access to employment, amenities, and education (Brantingham et al., 2020; Kuminoff et al., 2013). However, Owens and colleagues (2014) show that housing submarket sorting alone does not fully explain socioeconomic segregation in school districts. Other factors like school choice policies[23] and attendance boundaries may also contribute (Bernal, 2005; Owens et al., 2014). While housing submarket sorting plays a significant role in socioeconomic segregation across neighborhoods, schools, and districts, other factors such as school choice policies and attendance boundaries contribute to the complex relationship between residential patterns and educational inequality.

### *The Role of Land Use Restrictions and Area Limitations*

Although I do not include zoning as a direct component in the studies, the discussion of the findings touches on zoning implications and provides policy recommendations. To contextualize this discussion, I provide a background on land use restrictions, area limitations, and their role in socioeconomic sorting. In the United States, land use restrictions refer to regulations governing permissible activities and development on land, encompassing aspects such as permitted activities, building construction standards, and maintenance requirements (Fischel, 2015). Area limitations, a subset of land use restrictions, specifically focus on the physical dimensions and spatial characteristics of land development, including building setbacks, lot coverage, building height, floor area ratios, and density controls (Fischel, 2015). These regulations apply to urban, suburban, and rural areas, shaping communities' physical layout and

[23] School choice policies generally refer to a set of educational reform efforts that include private school vouchers, school accountability programs, and charter schools (Carl, 2011). Although there is state-to-state variation in the funding specifics of private-school voucher programs, they provide taxpayer money to parents to send their children to private schools rather than to their local public schools. Voucher eligibility varies by state, but generally, students with disabilities, students whose local schools are underperforming, and students living in rural areas are the most common groups eligible for school voucher programs (Carl, 2011).

appearance. Both land use restrictions and area limitations influence socioeconomic sorting by affecting the choices available to households. This section provides an overview of these regulations and their implications, followed by a brief discussion of relevant literature on the impact of these regulations on socioeconomic sorting.

**Zoning regulations.** Zoning regulations are fundamental to urban planning, designating specific areas for residential, commercial, industrial, or mixed-use purposes. Commercial zoning designates areas for businesses, retail, and services, often with restrictions on building size, height, and types of use. Industrial zoning allocates space for manufacturing and warehousing, typically separating these areas from residential zones to minimize conflicts. Mixed-use zoning permits a combination of residential, commercial, and occasionally industrial uses. Residential zoning designates specific areas within a municipality for housing purposes, often regulating the type, density, size, use, occupancy, and other factors, such as setbacks and parking requirements, in these zones (Fischel, 2015). For instance, residential zoning can limit the type and density of housing, such as single-family homes versus multi-family apartments (Fischel, 2015). A variety of zoning practices effectively restrict affordable housing construction by including regulations that often result in unaffordable housing for low-income families (Hirt, 2015; Lens & Monkkonen, 2016; Verstegen & Barclay, 2018b; Ward, 2009).

In 1977, the Supreme Court upheld the legality of economic segregation produced by single-family zoning ordinances when a Chicago suburb established a zoning ordinance prohibiting multi-family housing except next to outlying commercial areas (Rothstein, 2017). That the ordinance excluded all low-income families, regardless of race, was considered evidence of non-discrimination (Rothstein, 2017). This ruling gave additional legal standing to widespread and already well-established single-family zoning ordinances, ensuring that few low-income families could afford to live in most residential areas zoned for single-family units, which are more expensive than multi-family housing (Rothstein, 2017). Single-family regulations can prevent low-income families from living in middle and upper-income communities, where such regulations

are not combined with efforts to incentivize affordable homes and school choice programs (Hirt, 2015; Mallach, 2012). Zoning regulations, particularly those favoring single-family housing, may contribute to economic segregation by restricting the availability of affordable housing units and limiting low-income households' access to suburban areas without efforts to expand the affordability of single-family homes.

**Land use, building standards, and density controls.** Effective management of population density and infrastructure requires land use and density controls. Density restrictions regulate the number of units or buildings per acre. At the same time, open space requirements ensure a designated amount of green space within developments to safeguard environmental quality and recreational amenities. Bulk limitations[24] serve as a form of land-use regulation by constraining lot sizes and building placement (Wild, 2006). Height restrictions maintain aesthetics, prevent overshadowing, and preserve sightlines, while setback requirements ensure safety, privacy, and accessibility by mandating minimum distances from streets, property lines, and other structures (Wild, 2006). Floor area ratios (FAR) regulate building density by setting a ratio of a building's total floor area to the size of the lot on which it stands, balancing development intensity with open space needs. FAR is also used to control housing density, creating areas that, in effect, can exclude low-income multi-family housing (Hall, 2012).

While single-family zoning restricts the types of residences that can be built in an area, and thus limits the residents to those who can afford to buy detached homes, the division of single-family districts by another type of zoning regulation, bulk limitations, creates additional finely-grained sorting (Hirt, 2015). These areas are then divided into several subcategories based on area and bulk standards (Hirt, 2015). Bulk standards can be used to ensure that different types of detached homes are located in different districts (Hirt, 2015). In effect, many types of bulk standards create

[24] Some common bulk limitations include minimum lot size, minimum floor space, setback requirements, and floor area ratios (FAR) (Wild, 2006).

neighborhoods containing houses of very similar square footage and price by preventing any other type of housing from being built.

In general, land use regulations, building standards, and density controls, such as bulk limitations and FAR, play a crucial role in shaping residential areas by maintaining aesthetics, safety, and environmental quality. They also contribute to socioeconomic sorting by restricting the development of affordable housing and creating finely grained sorting of neighborhoods based on housing types and prices.

**Impact of Area Limitations on Socioeconomic Sorting.** Zoning regulations often prevent the construction of multi-family or rental housing, contributing to economic segregation in housing (Collins et al., 2019). So-called 'exclusionary' zoning regulations exploit existing patterns of wealth and homeownership, resulting in neighborhoods of higher-value single-family homes that are unaffordable for low-income families (Collins et al., 2019), thereby laying the foundation for public school segregation (Rothwell, 2011). Attempts to mitigate this effect could focus on increasing the construction of affordable single-family homes to meet the needs of an increasingly suburban millennial working class, while avoiding the pitfalls of previous single-family regulations that concentrated the working class in undesirable and often substandard housing (Fry & Parker, 2019). Area limitations, particularly exclusionary zoning regulations, significantly contribute to socioeconomic sorting by preventing the construction of affordable multi-family housing and reinforcing economic segregation in both housing and public school systems.

Socioeconomic sorting in housing is partly driven by land-use regulations and area limitations, which create and reinforce economic segregation in American cities. Land use regulations, particularly exclusionary zoning, and density controls, restrict the availability of affordable housing, leading to the concentration of wealthier households in certain neighborhoods and the displacement of low-income families. Studies have shown that zoning regulations, such as single-family zoning and bulk limitations, effectively prevent the construction of affordable multi-family housing (Hirt, 2015). For example, the Supreme Court upheld economic segregation through single-family

zoning ordinances prohibiting multi-family housing, ensuring that only those who can afford single-family homes can reside in certain areas (Rothstein, 2017). This legal precedent supports single-family zoned areas, which can contribute to housing submarket sorting by making housing more expensive when paired with minimum floor and lot size requirements, thereby restricting low-income families from living in middle- and upper-income neighborhoods.

Limiting the types of housing that can be built in specific areas and land use regulations and area limitations can restrict socioeconomic integration within neighborhoods. These regulations can ensure that wealthier households have access to high-quality amenities, services, and schools, while low-income families are pushed to areas with fewer resources. This sorting impacts housing markets and contributes to disparities in educational opportunities and long-term social mobility. Therefore, addressing socioeconomic sorting in housing requires reforming zoning practices to increase the availability of affordable housing. In Chapter 7, I offer recommendations for potential areas of reform that can be implemented without significantly altering the neighborhood character and quality of life.

### Socioeconomic Stratification in the U.S. K-12 Public Education System

U.S. public education is a traditionally localized system that, although it has been associated with educational disparities, benefits local communities by providing an education that reflects their values, needs, and preferences (Owens & Massey, 2018). Most public schools have neighborhood-based enrollment policies, leading families to seek out neighborhoods with desirable socio-demographic characteristics and assuming a correlation between school quality and demographic makeup (Malin, 2016). This reinforces the association between student achievement and the composition of the student body, as wealthier communities generate more school funding through larger tax bases (Crosnoe, 2009; Langenkamp & Carbonaro, 2018; Sacerdote, 2011). Regardless of their values or political orientation, parents generally view schooling as a means to secure advantages for their children (Malin, 2016).

Market theory assumes that parents are rational actors who make schooling choices based on evidence of school effectiveness (Billingham, 2015; Ellison & Aloe, 2018). However, the assumptions of rational choice do not hold up in Local Education Markets (LEMs). While wealthier parents have more school options, parents' decision-making is influenced by reasoning instincts that have evolved to address adaptive parenting problems, not strict bounded rationality (Cosmides & Tooby, 2006). Parents are driven by the innate and beneficial instinct to prioritize their children's well-being over others, which influences their decisions about where to live and educate their children, even when it conflicts with other financial or logistical considerations and despite their values or commitments to education as a public good (Cosmides & Tooby, 2006). This instinct may lead to a high demand for homes in school districts with higher spending, increasing housing market competition, and potentially concentrating socioeconomically advantaged families in certain areas.

### *School District Geography*

The geography of education boundaries and school districts in the United States plays a crucial role in understanding socioeconomic stratification. Local and state governments typically define school districts, which can vary significantly in terms of size, population, and resources. These boundaries often reflect historical, political, and socioeconomic factors, and they can greatly influence the distribution of educational opportunities. Public education in the United States is characterized by a complex system of more than 13,000 public school districts, with around 10,000 unified school districts encompassing primary through high school education (National Center for Education Statistics, 2023). A unified public school district typically includes primary schools, kindergarten through middle school or junior high school, and high schools, generally covering grades 9–12 (National Center for Education Statistics, 2023).

Unified school district geography varies by state and region, and districts that share the name of a county, city, or town or operate schools for these areas may or may not follow the political boundaries of those areas (National Center for Education Statistics, 2023). Districts in the Mid-Atlantic and New England states tend to follow

county, township, or city boundaries. In contrast, districts in the Midwest, Great Plains, and Western states tend to be independent of municipal boundaries. School district boundaries and catchment areas can be quite irregular, and neighborhoods are divided by socioeconomic factors (Golding, 2016; Iceland & Wilkes, 2006).

Most states' public school systems are unified districts that operate regular, special, or vocational programs for students from pre-kindergarten through 12th grade. Unlike schooling in many other countries, public elementary and secondary education in the United States occurs within a traditionally localized system. School assignments depend on a family's local residence, school district boundaries, and catchment areas.

This localized system was designed to provide an education that reflects the values and preferences of the local community, with some notable exceptions regarding attempts at national standards and various types of federal funding for education. Additionally, local property taxes partially finance public schools in most states (Verstegen, 2018). Nevertheless, the localized nature of public education has been blamed for contributing to socioeconomic sorting across districts. Suburbs are particularly susceptible to this charge as school districts in these locations often play a critical role in determining surrounding property values and their socioeconomic makeup (Altenhofen et al., 2016).

Since the quality of public school districts (as measured by student performance) varies considerably, advantaged families strive to send their children to schools in a desirable district (Boterman et al., 2019; Chetty, Friedman et al., 2020; Nieuwenhuis & Xu, 2021)However, they have to live within specific school districts or even school catchment areas in many states and metropolitan areas. This creates demand for housing in these areas, which in turn increases property values and house prices. As Lind (2020) describes, this competition primarily occurs in urban, exurban, and suburban areas rather than rural areas. As a result, the interplay between school district boundaries, local residence requirements, and socioeconomic factors can significantly shape property values and, therefore, local housing markets.

### *State Education Finance*

The structure of K-12 education funding in the United States reflects a complex interplay among federal, state, and local contributions. Each level of government influences how educational resources are allocated, and differences in local student populations, local property values, funding formulas, and disparities in contributions shape funding inequality across districts. This section provides background on public education finance to contextualize the literature reviewed in the following section and the analyses presented in Chapters 5 and 6.

Local funding, primarily from property taxes, constitutes the largest share of public school financing, averaging about 40–45%. Because property wealth varies widely between districts, this system produces significant disparities in available resources (B. Baker et al., 2014).

Federal funding contributes a comparatively small portion, typically around 8–10% of total K-12 education spending (U.S. Department of Education, 2005). The federal government provides funding primarily through specific programs and grants rather than general funding (Brewer & Picus, 2016). Key federal funding sources include Title I grants aimed at improving education for low-income students; the Individuals with Disabilities Education Act (IDEA), which supports special education; the National School Lunch Program (NSLP) that offers meal assistance for low-income students; Every Student Succeeds Act (ESSA) which funds efforts to close achievement gaps, and Impact Aid that compensates districts losing property tax revenue due to federal properties (U.S. Department of Education, 2005). These funds are distributed based on formulas that consider factors such as the number of low-income students and special education needs, with specific guidelines and requirements that states and districts must follow (Verstegen, 2018).

States generally contribute roughly 45-50% of the total funding (Verstegen, 2018). State funding primarily comes from income, sales, and specific education taxes, often considering the wealth of local districts to equalize funding between wealthy and less wealthy areas (Verstegen, 2018). Their systems vary but usually include foundation

programs, categorical grants, and state-level taxes. Foundation programs establish a minimum per-pupil funding level and adjust for factors like student need and local cost of living (Verstegen, 2018). Categorical grants are allocated for specific purposes, such as transportation or special education. State funding is often designed to offset local disparities by accounting for district wealth through equalization efforts (Verstegen, 2018).

### Formula Types

Three main frameworks structure how federal, state, and local dollars are distributed to schools: student-based formulas, equalization formulas, and centralized funding models (Verstegen, 2014). This blend of federal, state, and local funding mechanisms influences resource allocation across schools and districts through various funding formulas, which differ by state and are outlined below.

**Student-based formulas.** The most widely used of these is the student-based formula, which establishes a base per-student amount and adjusts it based on student and district characteristics (EdBuild, 2019). It considers costs associated with school district characteristics to provide limited-use funding for specific programs that impact particular student groups (Verstegen, 2018). Under this formula type, states may provide additional funding to target schools based on the concentration of students with a particular or disadvantaging characteristic (EdBuild, 2019). Another form or modification of a student-based formula, the state-level equalization formula, is calculated based on the cost of educating students and the available local funding, which is then matched by state funding (EdBuild, 2019). A third formula type, recapture programs, seeks to equalize funding between wealthy and low-income districts by redistributing the 'surplus' funding from wealthier districts (EdBuild, 2019). Each of these formulas is analyzed below.

Student-based formulas are applied to the entire state, regardless of economic differences between areas, using a base formula calculated as the cost of educating a student without special needs or certain disadvantaging characteristics (Chingos &

Blagg, 2017b). Adjustments to the base formula for most states using these formulas are calculated from overall student counts and counts of students with particular characteristics (Verstegen, 2018a). These adjustments consider factors like English language learner status, special education needs, low-income status (e.g., eligibility for free or reduced-price lunch), rural or remote location, and giftedness (Verstegen, 2018; EdBuild, 2019). After determining a base amount, states calculate each district's local contribution and provide state aid to bridge the remaining gap. This structure allows poorer districts—those with weaker property tax bases—to receive proportionally more state support (Chingos & Blagg, 2017b).

However, because wealthier districts can generate more local revenue, they often outspend poorer districts, even when state funding lifts lower-income districts to the minimum threshold. If state budgets are insufficient to meet required contributions, the per-pupil minimum may be lowered, widening the funding gap (Blagg et al., 2017)

To reduce these disparities, some states supplement base funding with weighted formulas that provide additional resources to districts serving high-need students (Verstegen, 2018). States like Delaware, Maryland, and Colorado have implemented large grants targeted at low-income districts. Where such grants are not feasible, states rely on smaller adjustment mechanisms (Papa & Armfield, 2018).

Incentive-based funding is also used to encourage specific educational priorities such as higher graduation rates, equity-focused innovations, or achievement gap reductions (Verstegen, 2018). Additionally, some formulas adjust for regional cost differences, granting higher per-student funding in areas with elevated living expenses.

While student-based funding models can partially equalize resources, persistent disparities in local revenue capacity mean that wealthy districts have greater per-pupil spending without robust state aid or redistributive mechanisms.

**Program-based formulas.** Program-based funding formulas for state education allocate resources to school districts based on specific educational programs and needs (Verstegen, 2018). This approach replaces lump sum or per-pupil funding with a more

targeted allocation (Verstegen, 2016). These formulas are designed to allow funds to be targeted toward specific needs, which can help address disparities and support vulnerable student populations (Verstegen, 2018). Additionally, these formulas allow for adjustments to be made to reflect changing needs and priorities. Program-based formulas attempt to redistribute educational opportunities by providing additional resources to students with greater needs. However, challenges include complexities in design and administration, variability in effectiveness between states, and ensuring that total funding is adequate to meet identified needs, especially with budget constraints.

Key components of program-based funding formulas for education include foundation programs, categorical grants, weighted student formulas, and incentive-based funding (Verstegen, 2018). Foundation programs establish the base funding amount per student to cover essential education costs, which can be adjusted for factors such as regional cost differences, grade levels, and specific student needs (Verstegen, 2018). Categorical grants are earmarked for specific programs or student populations, addressing needs that the base funding might not fully cover, such as special education, bilingual education, and transportation (Verstegen, 2018).

**State-funded finance adjustments.** In addition to the base amount, under student- and program-based formulas, states can provide supplemental funding for specific student groups to address their unique needs and circumstances, such as hiring additional staff, coordinating with social support services, offering counseling, or implementing second language programs (EdBuild, 2019). Because states can provide funding in other ways, the proportion of state funding distributed through a typical formula varies. For example, North Carolina and Arizona allocate approximately 98% of their total state funding through formulas, Connecticut allocates 38% of its funding through formulas, and South Carolina allocates just 24% of its funding through a formula (Chingos & Blagg, 2017a).

State-funded finance adjustments mitigate the differences in revenue-raising capacities, such as property taxes, parental contributions, or levies, and address cost variations

due to district characteristics and students' needs (Picus et al., 2015). The size of the property-tax base often measures a district's revenue-raising capacity and can be supplemented by income and wealth measurements (Duncombe & Yinger, 1998). District size is often considered in costs, as is the share of students from specific populations requiring additional educational support (Duncombe & Yinger, 1998). Specific student populations include gifted and talented students, students from rural areas, special-education needs students (SPED), English language learners (ELLs), and students who qualify for free or reduced-price lunch, generally because their family income meets a certain percentage of their state's poverty threshold (Blagg et al., 2019; Rubenstein, 2002).

In states with resource-based formulas, however, district funding is allocated based on estimated program and staff costs rather than on student needs or community demographics and, therefore, does not provide adjustments for students with certain needs or schools with students from a particular demographic (Verstegen, 2014). Consequently, while state-funded finance adjustments aim to balance educational resources by addressing the higher costs associated with certain districts and educating students with specific demographic characteristics, the differences in how states apply these adjustments can lead to variations in the degree of funding redistribution between states.

**State equalization formulas.** In contrast to student-based formulas, state-level equalization formulas aim to equalize access to a minimum level of funding, based on revenue generated at a given tax rate (Papa & Armfield, 2018). This type of formula allows each district to tax and spend as if it had the same local property tax base, thereby reducing the inequality that student-based formulas can produce (Blagg et al., 2017). Rather than ensure a minimum overall funding level, the state instead provides a minimum amount for each percentage of property tax, regardless of the amount of district tax revenue that districts raise (Blagg et al., 2017).

In student-based formulas, wealthier districts exceed the per-pupil minimum by a greater amount than poorer districts. In contrast, under equalization formulas, all

except the wealthiest districts exceed the minimum by the same amount (Blagg et al., 2017). Under equalization formulas, poor districts have an incentive to raise local taxes since each additional dollar of local money raises more money from the state (Blagg et al., 2017). However, this type of formula still allows the wealthiest district to outspend poorer districts due to high levels of local fundraising without caps on district spending.

Some states attempt to address the inequality produced by equalization formulas and student-based formulas by withholding state-level funding from wealthy districts because their per-student property wealth exceeds the minimum level established by the state (Chingos & Blagg, 2017a). Other states recapture this extra funding by setting a cap on spending for these unaided districts rather than by providing equal funding for all districts (Downes, 2010). Therefore, while state equalization formulas aim to level the playing field by standardizing funding relative to local tax efforts, they cannot fully eliminate disparities between wealthy and poor districts.

Because state-equalization formulas can change incentives for districts, states that use a state-equalization formula may combine it with a student-based formula to match spending above a minimum funding amount (Chingos & Blagg, 2017a). Therefore, while recapture programs aim to redistribute excess funds from wealthy districts to support poorer ones, they face significant political resistance and practical challenges, such as the potential decline in property values and the need for continually adjusting thresholds.

**Centralized school finance systems.** States can either guarantee a minimum level of adequate spending through student-based formulas or ensure a minimum tax base for poorer districts through state-level equalization formulas (Papa & Armfield, 2018). In both types of formulas, districts can set property tax rates to raise local funding (Papa & Armfield, 2018). However, some states have moved to centralize their school finance system rather than trying to outspend wealthy districts or equalize the impact of property value disparities across districts.

Under a centralized school finance system, the state sets a standard property tax rate for all districts (Blagg et al., 2017). In return, the state guarantees a roughly equal amount per student across districts. This model resembles the student-based formula, where the state guarantees a minimum funding amount; however, with centralized finance, districts cannot raise more than the minimum amount from local tax sources. Just like other formulas, states that use the centralized school finance formula have to decide how to treat wealthy districts that can fundraise above the minimum state per-pupil amount from sources other than local property taxes, such as parental contributions (Brown et al., 2017; Posey-Maddox, 2016). States can use recapture programs to redistribute excess funding from wealthy districts to low-income districts (Papa & Armfield, 2018).

However, in states using centralized school finance without recapture programs, wealthy districts are still able to raise local funding above the state per-pupil minimum (Papa & Armfield, 2018). Thus, while centralized school finance systems aim to standardize per-student funding across districts, they still face challenges in addressing the additional fundraising capabilities of wealthier districts.

**Recapture programs.** Under recapture programs, additional dollars in property taxes above the minimum threshold are not allocated to local students but are redistributed to poorer districts (Owens et al., 2016). Recapture programs are often not politically popular, as voters in districts that highly fund their local schools tend to be less supportive (Malin, 2016). The primary drawback of recapture programs is that states must lower the recapture threshold each year to maintain the same level of funding (Chingos & Blagg, 2017b). Lowering recapture thresholds may cause property values to decline, leading to ever-decreasing thresholds for recapture, which in turn further damages property values (Verstegen, 2018).

### Limitations of Funding Equalization

While equalizing school funding is a core strategy for reducing disparities between districts, its effectiveness is shaped by several structural and political realities. States

that employ equalization formulas often combine them with student-based funding systems to match spending above a base threshold, attempting to provide a more equitable distribution of resources (Chingos & Blagg, 2017a). Recapture programs, which redistribute surplus local revenue from affluent districts to less wealthy ones, face significant political resistance. They are often challenged by fears of declining property values and the administrative complexity of continuously adjusting contribution thresholds.

Moreover, economic segregation in states with high baseline education funding allows affluent communities to maintain advantages even within equalization frameworks. Wealthier districts often supplement state funds with substantial local revenue, further widening spending disparities (Malin, 2016). Equal funding alone does not offset the cumulative advantages that economically segregated districts can generate legal and policy constraints, particularly those preventing cross-district redistribution, further limit the reach of equalization efforts.

Data from the U.S. Department of Education illustrate the magnitude of inequality. For instance, Pennsylvania has the highest school funding disparity in the nation, with a 33.5% gap between high- and low-poverty districts (U.S. Department of Education, 2015). Other states with notable inequities include Illinois, Missouri, Vermont, and Virginia. These examples underscore the limitations of current funding policies in addressing entrenched structural disparities.

The ineffectiveness of equalization alone is compounded by diminishing returns on educational investment. According to the 2018 PISA Insights and Interpretations report, increased education spending correlates with improved outcomes only up to a certain point—approximately $50,000 in cumulative spending per student from ages 6 to 15. Beyond this threshold, additional investment yields little to no improvement in student performance (Schleicher, 2019). The report also found that the correlation between socioeconomic background and academic outcomes persists even in countries with high per-student spending. What matters more is how resources are allocated

once the threshold is met. Countries that distribute their resources more effectively tend to have stronger educational equity (Schleicher, 2019).

Despite high aggregate education spending, the U.S. continues to underperform internationally. The country ranks 25th out of 72 in combined reading, math, and science scores (Schleicher, 2019). This suggests that structural issues—such as how and where resources are allocated—play a larger role than aggregate spending levels. Equalization measures that do not address broader issues, such as housing policy, district boundaries, and access to opportunities, are unlikely to close the achievement gap tied to spatial socioeconomic stratification.

In sum, while funding equalization is a necessary component of education reform, it is insufficient on its own, without complementary strategies to address the root causes of educational inequality, including spatial and economic segregation, equalization risks becoming a superficial solution to a deeply entrenched problem.

### *Funding Disparities and Student Achievement*

The relationship between education funding disparities and student achievement is central to understanding how financial inequality contributes to broader patterns of socioeconomic sorting in public education. Substantial evidence shows that low-income students are more likely to attend schools with fewer resources and lower academic outcomes. For instance, funding disparities between high- and low-poverty schools contribute directly to socioeconomic sorting and lower achievement in underfunded schools (Lafortune et al., 2018). These disparities often stem from overreliance on local property taxes and persist even in states with substantial education budgets (Baker, 2014; Chingos & Blagg, 2017b; U.S. Department of Education, 2015)

Efforts to equalize per-pupil funding within states or districts can somewhat reduce sorting. Chakrabarti and Roy (2015) demonstrated that equalization reforms in Michigan decreased socioeconomic sorting in lower-spending districts. However, they also found that such policies did not significantly diminish the advantage in the

highest-spending districts. This suggests that while financial equalization may mitigate disadvantage, it does little to disrupt entrenched advantage.

Wealthy districts often benefit from non-financial factors that enhance their academic outcomes, including high levels of parental education and involvement, greater social capital, and access to private or extracurricular enrichment opportunities (Chingos & Blagg, 2017b; Owens et al., 2014). These advantages persist even when funding inputs are held constant. Equalizing funding can narrow gaps in basic educational inputs but is unlikely to erase differences in academic achievement across socioeconomic strata.

Indeed, research shows mixed outcomes when examining the relationship between funding formulas and segregation. While some studies, such as Owens et al. (2014), have found that equalized funding systems are associated with reduced income-based school segregation, others, including Dalane and Marcotte (2022), have found no significant relationship between school finance policy and segregation patterns. These mixed results suggest that financial equalization may be necessary but is insufficient on its own.

### *Legal Challenges to District Funding Disparities*

The efficacy of court-ordered state finance reform in addressing inequality for disadvantaged school districts has been a topic of considerable debate. Notwithstanding the numerous legal challenges and rulings aimed at rectifying funding disparities, these efforts frequently prove inadequate in addressing the disparity in opportunity that many low-income students face. This section examines the shortcomings of court-ordered finance reforms, emphasizing pivotal cases that exemplify the inconsistency and provisional nature of these solutions. By examining landmark decisions and their outcomes, without addressing the root causes of socioeconomic stratification and stable political and taxpayer support, such reforms are likely to be ineffective in addressing the material and immaterial disparities in educational opportunities for students outside of advantaged districts.

While overall state funding levels have been mixed,[25] state finance reform over the past few decades has increased the proportion of state funding, thereby equalizing the allocation of funds between local, state, and federal sources (Corcoran & Evans, 2015). State education funding formulas have been challenged in court in numerous states over the past several decades.

A list of relevant state and Supreme Court school finance cases is summarized in Table 1. Please note that this list is not exhaustive; rather, it summarizes the most important early cases relevant to spatial socioeconomic stratification. Cases were included based on the following criteria: (1) they concern school funding at the state level, (2) the cases were decided after within-district court-ordered desegregation of schools had begun, that is, after 1954, and (3) they are considered landmark school finance cases. These cases provide decisions on the constitutionality of state funding distribution through funding formulas for low-income public school students. The legal precedents established by the decisions in these cases are discussed further in the following section.

Table 1. Overview of Court Decisions Impacting School Funding Distribution

| Year | Case | Location | Decision |
|---|---|---|---|
| 1971 | *Serrano v. Priest* | California | The Supreme Court of California ruled that the state's school funding structure violated the Equal Protection[26] Clause because it resulted in funding inequality that disadvantaged students in low-income districts (Downes, 2012). |

[25] Overall total funding levels for public education increased over the last twenty years (Rothstein, 2017) until 2009, when overall funding levels for public education, except for Washington, DC, and Wyoming, experienced growth, and Florida remained flat (Chingos & Blagg, 2017a).

[26] The Equal Protection Clause of the Fourteenth Amendment to the United States Constitution took effect in 1868 and provides "nor shall any State [...] deny to any person within its jurisdiction the equal protection of the laws"(*14th Amendment, U.S. Constitution*, 1868). This clause validated the equality provisions in the Civil Rights Act (1866), which guaranteed the right of all citizens to equal protection under the law and formed the basis for *Brown v. Board* (1953) (Johnson & Johnson, 2014).

| | | | |
|---|---|---|---|
| 1972 | *Robinson v. Cahill* | New Jersey | The New Jersey Supreme Court found that the state's school funding structure, which disadvantaged students in low-income districts, violated the state's constitution (*Robinson v. Cahill*, 1972). |
| 1973 | *San Antonio Independent School District v. Rodriguez* | Texas (U.S. Supreme Court) | The U.S. Supreme Court found that Texas's school funding structure, which disadvantaged students in low-income districts, did *not* violate the Equal Protection Clause (McCoy Family Center for Ethics in Society, 2006). |
| 1982 | *Levittown v. Nyquist* | New York | The New York Court of Appeals ruled that the inequality in the state's school funding structure, which relied on local property taxes, was insufficient to render the system unconstitutional (McCoy Family Center for Ethics in Society, 2006). |
| 1985–2011 | *Abbott v. Burke* | New Jersey | The New Jersey Supreme Court declared the state's school funding structure unconstitutional and ordered the state to implement a program to provide comparable funding between low-income and wealthier districts ("New Jersey," 2019). |
| 1989 | *Rose v. Council for Better Education* | Kentucky | The Kentucky Supreme Court ruled that the state's school funding structure violated the Kentucky Constitution, formally recognizing adequate education as a fundamental constitutional right (McCoy Family Center for Ethics in Society, 2006). |
| 1997 | *DeRolph v. State*<br>*DeRolph II*<br>*DeRolph III* | Ohio | The Ohio Supreme Court decided through a series of cases that Ohio's school finance system, which relied heavily on local property taxes, was unconstitutional (*DeRolph v. State I*, 1997; *DeRolph v. State II*, 2000; *DeRolph v. State III*, 2001). The Court ultimately relinquished jurisdiction over Ohio's finance reform (*DeRolph v. State*, 2002). |
| 2001–2006 | *Campaign for Fiscal Equity v. State of New York* | New York | The New York Supreme Court ruled that the state's school funding structure was unconstitutional because it failed to adequately fund public schools (Stiefel et al., 2005). |

A decade after significant attempts at court-ordered racial desegregation plans began, *Serrano v. Priest* (1971), a landmark case for school funding inequality, established that California's heavy reliance on local property taxes to fund public schools violated the Equal Protection Clause of the Fourteenth Amendment of the U.S. Constitution (U.S. Const. Amend. XIV). The Court determined that because the state's funding formula relied heavily on local property taxes, it created inequality in funding levels between low-income and wealthier districts, which disadvantaged students in low-income districts (McCoy Family Center for Ethics in Society, 2006). This case represents the beginning of state Supreme Court decisions that determined that state funding formulas may disadvantage low-income students.

Following reforms mandated by *Serrano v. Priest* (1976), Downes (2012) demonstrated that among 170 school districts in California where per-pupil funding was equalized, the impact of equalization has been limited. Following per-pupil funding equalization, there was no sign that the relative increases in funding for low-income districts narrowed the economic achievement gap or that the funding constraints placed on wealthy districts changed the achievement gap between poor and wealthy districts (Downes, 2012). Even though California implemented court-ordered school finance reform, funding equalization failed to narrow the economic achievement gap significantly (Downes, 2012). This may indicate that funding equalization without economic desegregation in housing and schools is inadequate to close the economic achievement gap and democratize education for low-income students.

The year after the California Supreme Court ruled in *Serrano v. Priest*, another case, *Robinson v. Cahil* (1972), was brought before the New Jersey Supreme Court. Before this case was decided, the New Jersey public school system, like systems in many other states, had a funding system that relied heavily on local property taxes (McCoy Family Center for Ethics in Society, 2006). In *Robinson v. Cahill* (1972), the Court found that New Jersey's system violated the state's constitutional guarantee of access to a 'thorough and efficient' public education system, striking another blow against

state funding formulas' heavy reliance on local property taxes (*Robinson v. Cahill*, 1972). The Court found New Jersey's finance system unconstitutional because it affected students' access to adequate public education, not because it violated the Equal Protection clause and was, therefore, discriminatory in and of itself (McCoy Family Center for Ethics in Society, 2006). The basis of the decision is significant because it was based on access, rather than group discrimination. The decision determined that restricting students' access to adequate public education through funding inequality was unconstitutional. However, they did not recognize that the formula hurt students because they belonged to a disadvantaged group.

Both *Robinson v. Cahill* and *Serrano v. Priest* (1971) were important decisions that led to school finance reform in California and New Jersey. Rather than being confined to a state Supreme Court*, San Antonio Independent School District v. Rodriguez* (1973) was brought before the U.S. Supreme Court. Like *Serrano v. Priest* and *Robinson v. Cahill,* in *San Antonio Independent School District v. Rodriguez* (1973), plaintiffs claimed that the state's funding formula disproportionately drew from local property taxes, creating funding inequality and disadvantaging students in low-income districts (McCoy Family Center for Ethics in Society, 2006). Unlike *Serrano v. Priest* and *Robinson v. Cahill*, however, in *San Antonio Independent School District v. Rodriguez* (1973), the U.S. Supreme Court found that Texas' finance system did not violate the Equal Protection Clause because "it did not intentionally or substantially discriminate against a class of people" refusing to recognize low-income students as such a class (McCoy Family Center for Ethics in Society, 2006). This Supreme Court decision established that the unequal distribution of school funding based on local property taxes was constitutional because it did not discriminate against a class of people, since low-income students did not constitute such a class. Without recognizing that funding inequity constitutes discrimination against low-income students, state funding formulas can produce unequal funding levels so long as they do not affect low-income students' access to an adequate (not equal quality) education. That is, the funding formulas alone do not necessarily prevent a low-income student's family from moving

to a better-funded district.

Similar to previous cases, *Levittown v. Nyquist* (1982) also centered around the reliance of the New York school funding system on local property taxes. While the New York Court of Appeals recognized that the reliance on local property taxes to fund public schools created inequality in per-pupil spending between districts, it decided that the inequality was not large enough to affect students' constitutional right to education (McCoy Family Center for Ethics in Society, 2006). In *San Antonio Independent School District v. Rodriguez,* the Supreme Court ruled that the inequality and negative impact of the state's funding formula on low-income students was not unconstitutional because low-income students do not represent a class of people.

Conversely, the ruling in *Levittown v. Nyquist* (1982) focused on the degree of inequality experienced by low-income students, determining that the magnitude of the impact imposed by that inequality on low-income students in economically segregated schools was insufficient to warrant reform (*Levittown UFSD v. Nyquist 57 N.Y.2d 27*, 1982).

By focusing on the impact imposed by funding formulas, the decision creates a threshold of tolerable inequality based not on discrimination against low-income students as a group, but on the negative impact of funding inequality. Based on this decision, one might assume that unequal funding for low-income students would be tolerated if the harm did not exceed a certain threshold or create a significant gap in academic achievement. It is unclear what the threshold of impact would have to be for a Court to determine that the negative impact of inequality on low-income, segregated students caused by a state's funding formula was sufficient to put low-income students' right to education at risk. Thus, the Court recognized that discrimination against low-income students by denying them equitable funding was not a problem, only if it affected their right to education.

The next significant school finance case, *Abbott v. Burke,* stretched from 1985 to 2018. This case centered around the claim that New Jersey's school finance system

disadvantaged students in low-income districts and contributed to significant differences in the quality of education offered in low-income districts compared to wealthy districts (McCoy Family Center for Ethics in Society, 2006). The New Jersey Supreme Court declared the system unconstitutional and ordered the state to implement reforms to provide comparable funding between low-income and wealthier districts ("New Jersey," 2019). Based on this ruling, the new school funding plan allocated a 7% increase from 2008, and funding was increased in all districts from 2% to 20% during the first two years of its implementation ("New Jersey," 2019). The Abbott plaintiffs claimed that, under the base funding proposed in the new formula, districts affected by the original case (Abbott districts) would receive funding amounts closer to the state average, rather than the levels of the wealthiest districts, as mandated by the Supreme Court. Though Abbott districts would still receive more than half of all state aid under the new plan, 22 out of these 32 districts will receive only a 2% increase ("New Jersey," 2019).

In 2009, the New Jersey Supreme Court ruled that the state's new education funding system meets the constitutional requirement to provide all students with a "thorough and efficient education" (*Robinson v. Cahill*, 1972) required by the state constitution, which was challenged in *Robinson v. Cahill* (1973). The court's decision ended the remedies they had ordered for the Abbott districts, including parity funding and funding for supplemental programs. The court's order permits implementing the funding system statewide, including in the 31 poor urban school districts previously covered by the Abbott orders. Past levels of additional funding for Abbott districts form the guaranteed minimum base level; however, since districts face unavoidable cost increases, the flat funding provided under the new formula will become inadequate to maintain their current programs ("New Jersey," 2019). When the New Jersey legislature cut education funding in 2010 (Abel & Deitz, 2019), the Education Law Center (ELC) requested the Court block the 2010-2011 budget because it failed to fund schools at the levels required by the 2008 School Funding Reform Act (SFRA) created in response to the *Abbott v. Burke* (1985) decision ("New Jersey," 2019). The

Court found that the state failed to provide New Jersey students with a "thorough and efficient education" as mandated in the state constitution and ruled (*Robinson v. Cahill*, 1972) that the Abbott districts be funded at the level mandated by SFRA ("New Jersey," 2019). Although the plaintiffs sought to reinstate full SFRA funding for all school districts in the state, the court limited its order for funding reinstatement to the original 31 urban Abbott districts. *Abbott v. Burke* concluded in 2018, and the Court's decisions regarding sufficient funding for the state's underprivileged urban districts are still applicable ("New Jersey," 2019).

In a similar case concerning access to adequate education, in *Rose v. Council for Better Education* (1989), the Kentucky Supreme Court ruled that the state's funding formula violated the state's constitution (McCoy Family Center for Ethics in Society, 2006). Although the Court determined that Kentucky's school funding formula was unconstitutional, it was not because the system discriminated against low-income students as a class, but because it limited their access to an adequate education (Paris, 2011). The Court's decision recognized adequate education as a fundamental constitutional right in Kentucky without recognizing that funding inequality discriminated against low-income students as a group (Paris, 2011). This decision ruled that the state's funding formula was unconstitutional because it limited access to adequate education by creating unequal conditions between low-income and wealthier schools. The Court did not acknowledge that, given the extent of Kentucky's economic school segregation, the state's funding formula produced unequal conditions between poor and wealthy schools, systematically discriminating against low-income students (McDermott et al., 2015; Paris, 2011).

Kentucky's funding formulas' reliance on local property taxes for a large proportion of school funding created inequality between economically segregated schools, producing unequal conditions for low-income students. However, while unrecognized by the Court, the finance system also discriminated against low-income students as a group by denying them equitable funding on the basis that they were living in low-income districts with less capacity to generate funding from property taxes than wealthier

districts (Paris, 2011). However, the Kentucky Supreme Court did not recognize that low-income students constitute a class of people and should be protected from discrimination. Without addressing that underlying economic discrimination against low-income students produced unequal school quality, funding inequality, and economic segregation, it cannot be proven to be a form of discrimination against low-income students as a group.

*DeRolph v. State* (1997)*, DeRolph II* (2000)*, DeRolph III* (2001), and *DeRolph IV* (2002) represent one of the most well-known series of school finance cases concerning the equitable distribution of school funding. The plaintiffs in these cases claimed that the Ohio school funding system, which heavily relied on local property taxes, contributed to inequality between wealthier and lower-income districts (*DeRolph v. State I*, 1997). In *DeRolph v. State* (1997)*,* the Ohio school funding system was found to be unconstitutional because it violated Section 2, Article VI of the Ohio Constitution, which requires "a thorough and efficient system of common schools throughout the state" (*DeRolph v. State I*, 1997, p. 2).

Subsequently, in *DeRolph II* (2000), the Court acknowledged that the state's funding system was unconstitutional but declined "to appoint a special master to oversee the state's further efforts to comply with Section 2, Article VI" (*DeRolph v. State II*, 2000, p. 1). *DeRolph III* called for a decrease in formula reliance on property taxes, as well as other reforms (*DeRolph v. State III*, 2001). Finally, in *DeRolph IV* (2002), the Ohio Supreme Court ultimately relinquished jurisdiction, and court-ordered finance reform did not take place in Ohio at that time (McCoy Family Center for Ethics in Society, 2006; *DeRolph v. State IV*, 2002). Because the Court decided to relinquish jurisdiction and not to order a reform of the state's funding formula, the underlying problems, among them the formula's reliance on local property taxes, remain (Sugarman & Geary, 2018). *DeRolph v. State* (2002) demonstrates that, given the inequality in per-pupil funding, property values, and average district incomes, Ohio's funding formula negatively impacts low-income students as a class in economically segregated schools, and this inequality has increased (Sugarman & Geary, 2018; Sweetland, 2014).

Similar to *Rose v. Council for Better Education* (1989), in *DeRolph v. State* (1997), the Ohio Supreme Court declared Ohio's funding system unconstitutional because it did not produce "a thorough and efficient system of common schools throughout the state" not because it discriminated against low-income students as a group (DeRolph v. State, 1997, p. 2). In another similar ruling, the New York Supreme Court declared New York's school funding system unconstitutional because it failed to provide adequate funding to public schools, denying students the constitutionally guaranteed right to basic education (*Levittown UFSD v. Nyquist 57 N.Y.2d 27*, 1982). As a result, the Court of Appeals ordered New York to reform its funding formula to ensure students' equal opportunity for adequate education (*Levittown UFSD v. Nyquist 57 N.Y.2d 27*, 1982). These court cases confirm that a failure to provide adequate funding to public schools amounts to denying students the constitutionally guaranteed right to basic education. The decisions in these cases, however, did not address the underlying economic discrimination that produced unequal school quality (Rothbart, 2019).

Court-ordered state finance reform relies on the Court's determination of whether the inequality produced by state funding formulas discriminates against low-income students as a group or affects students' access to adequate education by preventing schools from providing adequate learning materials or environments. State finance reform may not effectively mediate all forms of discrimination against low-income students because it relies on decisions that state funding formulas and segregation discriminate against low-income students as a class and require state legislatures to implement reform. The decisions in *Campaign for Fiscal Equity v. State of New York* (2006), along with *Rose v. Council for Better Education (1989), Levittown v. Nyquist* (1982), and *Robinson v. Cahil* (1973), established that students in New York, Kentucky, and New Jersey have the right not to be deprived of access to adequate education as a result of state funding formula's reliance on local property taxes. State legislatures are also required to implement any court-ordered finance reform based on these decisions, and thus, reform is vulnerable to political disruption (Malin, 2016). However, there has yet to be a U.S. Supreme Court decision establishing that inequality produced

from the structure of a state funding formula is unconstitutional because it discriminates against low-income students as a class or violates the Equal Protection Clause of the 14th Amendment. On occasion, state courts and the U.S. Supreme Court have acknowledged that funding formulas contravene state constitutions by impeding low-income students' access to an adequate education. However, courts have not yet ruled against state funding formulas that deny low-income students equal opportunities because they discriminate against low-income students as a class. The lack of U.S. Supreme Court recognition that low-income students are a disadvantaged group leaves them vulnerable to discrimination.

Addressing systemic socioeconomic sorting in the K-12 education system may necessitate recognizing low-income students as a disadvantaged group. Without legal recognition as a protected class, low-income students face systematic discrimination related to school funding structures and socioeconomic sorting (Ayscue & Orfield, 2015; Fryer, 2011; Owens, 2018). Despite various court-ordered state finance reforms aimed at addressing funding disparities, the legal challenges and subsequent decisions have often failed to fully recognize and address the underlying economic discrimination against low-income students, resulting in ongoing inequities in educational funding and access.

In summary, court-ordered state finance reform is unlikely to effectively mediate inequality in disadvantaged school districts resulting from spatial socioeconomic stratification across school districts. Court decisions often fail to recognize and address the deeper issue of economic discrimination against low-income students, leading to limited and inconsistent reforms. As discussed, the rulings in *Serrano v. Priest* (1971) and *Robinson v. Cahill* (1972) identified funding inequality but did not explicitly recognize it as discrimination against low-income students (Downes, 2012; McCoy Family Center for Ethics in Society, 2006). Similarly, in *San Antonio Independent School District v. Rodriguez* (1973), the U.S. Supreme Court ruled that funding inequality did not violate the Equal Protection Clause because it did not intentionally discriminate against a class of people (McCoy Family Center for Ethics in Society, 2006).

Moreover, legal reforms often result in temporary or incomplete solutions, as seen in *DeRolph v. State* (1997), where the Ohio Supreme Court ruled the state's funding system unconstitutional but ultimately relinquished jurisdiction, leaving underlying problems unresolved (Sugarman & Geary, 2018). The *Abbott v. Burke* (1985–2011) case in New Jersey led to significant reforms, but subsequent budget cuts and political challenges undermined these efforts (New Jersey, 2019). Additionally, the implementation of court-ordered reforms is vulnerable to political disruption. It lacks consistency across states, as demonstrated by the outcomes of *Campaign for Fiscal Equity v. State of New York* (2006) and *Rose v. Council for Better Education* (1989) (Malin, 2016).

Consequently, while court-ordered state finance reforms aim to address funding disparities, their limited recognition of economic discrimination and vulnerability to political and financial instability hinders their ability to effectively remedy the inequalities produced by spatial socioeconomic stratification across school districts (Duncan et al., 1994; Jencks & Mayer, 1990; Klebanov et al., 1998). For instance, the U.S. Supreme Court ruling in *San Antonio Independent School District v. Rodriguez* upheld school financing inequities as not violating the Fourteenth Amendment's equal protection clause (Supreme Court of the United States, 1972). Without significant changes in policy and legal interpretations, equalizing funding may remain an insufficient solution to address socioeconomic stratification in U.S. public education.

**Socioeconomic Stratification and U.S. Educational Geography**

During the latter half of the 20th century and the early 21st century, major U.S. cities experienced a shift from productive economic activity to one almost entirely centered on capital accumulation through financialization and rent-seeking (Krippner, 2005; Lind, 2020; Tomaskovic-Devey, 2011). This led to much of the remaining productive labor relocating to less densely populated areas with lower land costs for manufacturing, warehousing, and food processing (Lind, 2020). As a result, the most

significant geographical divide is between high-density urban areas[27] where knowledge or service industries dominate and low-to-medium-density suburban[28] areas, which have become the primary locations for productive labor (Lind, 2020). The transformation of urban areas during the twentieth century, from being the center of most of the productive economy, except for agriculture, to becoming non-productive spaces such as apartments or offices, is a significant backdrop to the discussion on socioeconomic status and education (Hirt & Robinson, 2014; Kavanagh et al., 2016; Shields & Stettner, 2020). This shift highlights the evolving spatial dynamics between urban and suburban areas, emphasizing the growing disparity in economic roles and their impact on educational opportunities.

### *The Role of Educational Boundaries*

The relationship between housing markets and educational boundaries plays a crucial role in shaping socioeconomic sorting across educational boundaries. Overall, housing competition and housing prices sort families across housing submarkets and into school districts (Chakrabarti and Roy 2010; Houston and Henig 2023; Rowe and Lubienski 2017). As such, higher-performing schools are associated with higher home prices (DiSalvo & Yu, 2021). Despite this, while housing submarket sorting contributes to the socioeconomic segregation of school districts, Owens, Reardon, and Jencks (2014) found that it does not fully explain the phenomenon, and other factors, such as public school choice policies and attendance boundaries, may also play a role.

According to Lubienski and Lee (2017), attendance boundaries play a critical role in enrollment and are often influenced by local demographics, employment, and household income in relation to housing patterns. A substantial body of GIS research on school attendance boundaries employs geospatial techniques to create hypothetical

[27] The U.S. Census defines Urbanized Areas (UAs) as having 50,000 or more people and urban clusters (UCs) as having at least 2,500 and less than 50,000 people (U.S. Census Bureau, 2022)
[28] Areas with densities of 1,000 to 5,000 people per square mile or below are characteristic of suburban areas, which account for 81% of the population (U.S. Census Bureau, 2022). Areas with less than 1,000 people per urban square mile are characteristic of rural areas, accounting for less than 4% of the U.S. population (U.S. Census Bureau, 2022).

catchment areas, which are then used to model their effects on student sorting and school access (Gulosino, 2011; Yoon et al., 2018). These educational boundaries can also be changed or manipulated in reality, not just in models, a practice often referred to as 'gerrymandering,' reflecting a similar practice with congressional and state legislative districts.

In their analysis of School Attendance Boundary Information System (SABINS) data,[29] Richards and Stroub (2015) assessed school attendance zones based on two spatial dimensions: dispersion (boundary elongation) and indentation (boundary irregularity). They found that school attendance zones were gerrymandered nearly as much as legislative districts. Richards (2017) also shows that educational gerrymandering has increased, exacerbating socioeconomic inequalities. In contrast to this finding, through an analysis of the 2009–2010 SABINS data, Saporito (2017) found that irregularly shaped districts, often linked with gerrymandering, do not necessarily lead to higher levels of economic segregation. Rather, on average, school districts with irregularly shaped attendance zones have lower levels of income segregation, even after accounting for income segregation within the residential areas of these districts.

Socioeconomic segregation across educational boundaries has been connected to similar sorting across housing submarkets, with household wealth playing a significant role (Ihlanfeldt & Mayock, 2019). This literature suggests that socioeconomic residential sorting is not merely a condition affecting low-income families but is also characteristic of affluent families who use their resources to buy better educational environments for their children (Florida & Mellander, 2017). Therefore, understanding and addressing the factors that link housing markets to school district boundaries is crucial for mitigating socioeconomic stratification across districts. Attempts to break the link between housing submarket sorting and school district

[29] The School Attendance Boundary Information System (SABINS) consists of GIS data of thousands of school attendance zones from 2009–2010 (Saporito, 2017).

catchment areas, such as inter-district school choice programs, have been associated with home prices and residential location decisions. Specifically, districts offering desirable out-of-district schooling options have been found to have higher home prices and greater population density (Brunner et al., 2012).

**Schools and Neighborhoods**. A neighborhood's socioeconomic status influences the resources available to children who live and attend school there, with significant implications for their educational and life outcomes. Economic segregation of neighborhoods creates varied educational environments that impact children's academic success. Nevertheless, parental income plays a vital role in children's educational attainment and contributes to the economic segregation of neighborhoods (Fry & Taylor, 2012; Reardon, Bischoff et al., 2018; Reardon & Bischoff, 2011). The environment in which children spend a significant amount of time impacts their educational aspirations and behaviors, which are crucial for their academic success. As children grow older, peer groups and neighborhood dynamics become increasingly influential compared to the family environment. Older children spend more time outside the home, and peer groups and neighborhood contexts become more significant (Bukowski et al., 2020; Carbonaro & Workman, 2016; Elliott et al., 1996; Leventhal et al., 2009; Sacerdote, 2011). Educational milestones like high school graduation are also shaped by the home, school, and neighborhood environments (Bronfenbrenner, 1979; Crowder & South, 2011; Fischer & Kmec, 2004). In this way, the socioeconomic status of the neighborhoods, in addition to family, peer, and school environments, influences students' educational and life outcomes.

The socioeconomic sorting of neighborhoods has also been linked to inequalities in educational opportunities. Economic segregation results in differential access to educational resources and educational opportunities for children, as resources are concentrated in affluent areas. While Reardon & Bischoff (2011) and Fry & Taylor (2012) show how parental income and neighborhood economic segregation affect children's educational attainment, Owens & Massey (2018) find that the income achievement gap is larger in highly segregated metropolitan areas due to better

performance by high-income students. This suggests that in highly segregated metropolitan areas, the disparity in educational achievement between students from high-income and low-income families is more pronounced because high-income students perform exceptionally well. Specifically, they demonstrate that the superior performance of high-income students, rather than the poorer performance of low-income students, contributes to the larger income achievement gap in these areas.

While individual advantaged families offer many benefits to their children, area-level socioeconomic advantage also provides its benefits, such as safety, good schools, proximity to jobs, and local economic stability, which collectively create a distinct and meaningful form of socioeconomic stratification in public education (Miller, 2012; Owens & Candipan, 2019). Studies focusing on the association between advantage and educational outcomes in the United States have found a mixed relationship between socioeconomic sorting and educational performance for advantaged students at various levels of education. Schools serving high-income neighborhoods, which have greater social, financial, and instructional resources, tend to have higher performing students than those serving low-income neighborhoods (Owens and Candipan, 2019a). However, attending a school with high-achieving peers may not necessarily increase the probability of enrolling or graduating from university because schools, although critical for many aspects of students' mobility, have limited influence on post-graduation choices (Carbonaro & Workman, 2016; Dobbie & Fryer, 2011, 2014; Langenkamp & Carbonaro, 2018). The connection between school and neighborhood disadvantage is well-documented, but the spatial impact of area-level advantage beyond the school district level has been less studied. Thus, concentrated socioeconomic advantage may significantly shape educational outcomes, further entrenching socioeconomic stratification within the U.S. public education system.

In summary, the connection between school and neighborhood disadvantage, connected to patterns of socioeconomic sorting in housing, is fairly well-understood (Owens & Candipan, 2019). However, our understanding of the spatial impact of

concentrated advantage among districts has been less studied, and its impact on educational outcomes is less understood.

### *Neighborhood Influences on Educational Opportunities*

While schools play a significant role in students' educations, surprisingly, neighborhoods may be more consequential than individual school composition in shaping long-term outcomes such as income mobility and educational attainment (Chetty et al., 2016; Chetty & Hendren, 2018a; Chyn, 2018; Laliberté, 2021). Through an investigation of the neighborhood spatial opportunity structures, Miller (2012) also finds that the environments influencing children's learning extend beyond the schools themselves and include homes and neighborhoods.

In their foundational review of neighborhood effects, Jencks and Mayer (1990) propose five theoretical frameworks for linking individual behavior with neighborhood effects: (1) Neighborhood institutional resource models propose that neighborhood resources such as police presence, access to stimulating learning and social environments (e.g., schools or libraries), and community services promoting child development may affect children, (2) Collective socialization models of neighborhoods suggest that neighborhood influences impact children through community social organization, adult role models, supervision, and monitoring, as well as structure and routines, (3) Contagion models focus on problem behavior and are based on the premise that negative behavior of neighbors and peers influences or spreads to the behavior of others, (5) Models of competition suggest that neighbors or peers compete for scarce community resources, (5) Relative deprivation models propose that neighborhood conditions affect people through their evaluation of their own situation relative to neighbors or peers.

Since their introduction, these models have guided theoretical discussions of neighborhood influences on children and youth (Brooks-Gunn et al., 1993). Brooks-Gunn et al. (1993), Duncan and colleagues (1994), and Klebanov and colleagues (1998), using Jencks and Mayer's (1990) theoretical models, laid the foundation for the literature on neighborhood effects. Their work focused on the relative influence of

neighborhood socioeconomic advantage versus disadvantage on the well-being of children, adolescents, and families. They hypothesized that different mechanisms are at play depending on whether neighborhood socioeconomic advantage confers benefits or costs to residents, compared with middle-income neighborhoods, or whether low-income neighborhoods confer benefits or costs to residents, compared with middle-income neighborhoods.

Neighborhoods, therefore, play a crucial role in shaping educational outcomes in various ways. Firstly, they provide access to institutional resources that directly impact educational attainment. Moreover, collective socialization within neighborhoods significantly influences children's social behaviors and academic aspirations. A neighborhood's socioeconomic status also affects peer influences and contagion effects, potentially leading to inequities in educational opportunities. Additionally, neighborhood effects interact with biological and cognitive factors, further influencing educational outcomes. Neighborhoods with higher socioeconomic status offer better access to quality institutions vital for child development. Institutional resource models suggest that neighborhood resources, such as a police presence, stimulating learning environments (for instance, schools and libraries), and community services are essential for children's development, indicating that neighborhoods with more resources foster better educational outcomes (Jencks & Mayer, 1990).

Second, collective socialization within neighborhoods shapes children's social behaviors and academic aspirations. A neighborhood's social fabric, including community organizations and adult role models, plays a crucial role in shaping children's behaviors and aspirations. Collective socialization models suggest that community organization, supervision, adult role models, and structured routines impact children's development (Jencks & Mayer, 1990). Brooks-Gunn et al. (1993) highlighted how neighborhood influences shape children's behaviors and socialization processes. Diamond (2016) and Sharkey (2016) show that children benefit from living in safer neighborhoods with better healthcare services and schools, and the neighborhood where a child grows up plays a significant role in their future social

mobility. Moreover, neighborhood socioeconomic status interacts with peer influences and contagion effects, which influence educational outcomes.

As Jencks and Mayer's (1990) contagion models suggest that negative behaviors among peers and neighbors can spread, affecting children's own behaviors and academic performance; therefore, peer influences and behavioral contagion within neighborhoods can significantly impact children's educational trajectories and life outcomes (Jencks & Mayer, 1990). Nevertheless, the availability of resources and positive influences in socioeconomically advantaged neighborhoods can foster educational success by providing a protective effect against potential negative outcomes. Protective models of socioeconomically advantaged neighborhoods suggest that these neighborhoods can positively impact educational attainment by providing social networks and beneficial social environments. Better schools, enriching opportunities, exposure to successful role models, and access to resource-rich social networks in advantaged neighborhoods can motivate students to graduate and pursue higher education (Jencks & Mayer, 1990; Leventhal et al., 2009; Leventhal & Brooks-Gunn, 2000; 2004).

However, the benefits of living in a socioeconomically advantaged neighborhood may not be uniformly experienced by all students, which could lead to disparities in educational outcomes. Socioeconomically advantaged neighborhoods can positively and negatively impact children's educational attainment. While these neighborhoods often provide better schools and enriching opportunities, they also can lead to increased competition and relative deprivation among students (Dupere et al., 2010; Leventhal & Brooks-Gunn, 2000). The mismatch between a student's background and the neighborhood environment can lead to negative educational outcomes, highlighting the complex interplay between individual and environmental factors. The relationship between neighborhood socioeconomic status and educational attainment varies based on individual characteristics. Person-environment fit models suggest that socioeconomically advantaged neighborhoods may harm some students, particularly in terms of risky behavior (Kupersmidt et al., 1995; Lund & Dearing, 2013).

Neighborhood advantages often benefit more advantaged adolescents, compounding disadvantages for at-risk youth.

Ultimately, neighborhood effects interact with cognitive factors, which influence educational outcomes and residential choices when combined with neighborhood socioeconomic status (SES). Using housing data from the Los Angeles Family and Neighborhood Survey, Schachner and Sampson (2020) show that the cognitive abilities of parents, when combined with neighborhood socioeconomic status, have a significant effect on residential choices and are crucial in predicting selection based on public school test scores, particularly among advantaged families. This effect is greater than that of race, income, education, housing market conditions, and proximity (Schachner & Sampson, 2020). These findings suggest that inherited cognitive ability interacts with assortative mating and spatial socioeconomic stratification to produce better educational outcomes in advantaged areas.

In contrast to Schachner and Sampson (2020), due to data limitations, most studies cannot account for variations in cognitive ability, school pedagogy, and curriculum, which may be associated with area-level differences in student achievement. Furthermore, most limit their analysis to segregation and do not look at spatial concentration. The interaction between the concentration of parents' cognitive ability and spatial socioeconomic stratification underscores the importance of neighborhood contexts, including spatial patterns of assortative mating, in shaping long-term educational and social mobility outcomes (Mare, 2016; Morris et al., 2016).

## Preface to Chapter 4

This chapter presents the first of three empirical manuscripts that make up the core of this dissertation. Each study builds conceptually and methodologically on the foundation established in this chapter. To deepen our understanding of area-level socioeconomic advantage, the manuscript in Chapter 4 focuses on its spatial distribution, introducing a novel approach to measuring and mapping concentrated advantage across U.S. school districts.

This study accomplishes two main objectives that inform the subsequent analyses. First, it addresses a gap in the literature regarding how socioeconomic advantage is conceptualized and measured. While prior research offers various definitions, existing metrics often lack a clear theoretical rationale for selecting their components. To address this, I propose a theoretically grounded composite measure that evaluates the socioeconomic positioning of school districts based solely on households with children attending public schools within the district, compared to those nationwide.

Second, using this measure, I identify areas of concentrated advantage among socioeconomically advantaged school districts that are statistically significant and spatially contiguous. Employing hotspot analysis, I use choropleth maps to analyze clustering and isolation patterns among advantaged and disadvantaged districts. These patterns include segregation between high- and low-advantage districts, isolation of advantaged districts, and clustering within each group.

Findings from this analysis suggest that concentrated advantage is distinct from and more widespread than socioeconomic segregation. Whereas socioeconomic segregation appears to be more limited in geographic scope and often concentrated in urban centers, areas of concentrated advantage are typically situated outside the core city boundaries. These advantaged clusters are especially prevalent in the Northeast, Mid-Atlantic, and Midwest, where local housing markets, zoning policies, and population densities may amplify socioeconomic sorting. This spatial variation allows for regional comparisons.

# Chapter 4: A New Perspective on Spatial Inequality in U.S. Public Education: Areas of Concentrated Advantage

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**Abstract**

This study maps areas of concentrated socioeconomic advantage among U.S. public school districts, which represent a distinct form of spatial inequality with important implications for educational opportunity. Drawing on data from the American Community Survey Education Tabulation (ACS-ED) on PK/K–12 school districts, I use hotspot analysis to identify areas where advantaged districts are significantly clustered. While existing research has extensively documented patterns of socioeconomic segregation, particularly concentrated disadvantage, this study highlights how concentrated advantage operates through school district boundaries to reproduce educational inequality. Mapping shows that areas of concentrated advantage are widespread across U.S. regions but are not consistently co-located with socioeconomically segregated districts. These findings suggest that concentrated advantage is not merely the inverse of socioeconomic segregation but constitutes a durable and spatially distinct form of stratification with distinct underlying mechanisms.

*keywords*: spatial inequality, socioeconomic stratification, socioeconomic advantage, GIS, segregation, school districts

## A New Perspective on Spatial Inequality in U.S. Public Education: Areas of Concentrated Advantage

The neighborhoods and school districts where students grow up shape their educational outcomes, health, and long-term mobility (Aaronson et al. 2021; Chetty et al. 2020; Graham 2018; Owens and Massey 2018). These spatial contexts are central to how opportunity and inequality are organized and reproduced. Over the last several decades, despite considerable reform, U.S. housing and educational systems have become increasingly socioeconomically stratified[30] and "the rise of economic segregation [has] become an increasingly important dimension of urban inequality," with direct consequences for educational inequality (Galster and Sharkey 2017:7). A growing body of research has documented economic segregation in urban and suburban areas over this time (Bischoff and Owens 2019; Fry and Taylor 2012; Owens and Candipan 2019; Owens, Reardon, and Jencks 2016; Reardon et al. 2018). Fry and Taylor (2012) show a doubling in the share of high-income households living in high-income neighborhoods between 1980 and 2010, and more recent work highlights the intensification of this sorting pattern, with wealthy enclaves surrounded by lower-income areas (Florida, Mellander, and King 2021; Lind 2020). These changes reflect not only shifts in income distribution but also deeper patterns of educational and occupational sorting (Florida and Mellander 2017), connected to differences in parental education, wealth, and access to resources and educational opportunities (Belley and Lochner 2007; Nam and Huang 2009; Owens and Massey 2018; Pfeffer 2018; Sims 1999). Furthermore, during this time, economic segregation has added to, and in some areas, replaced racial segregation in many large U.S. cities (Rusk 2017).

[30] Spatial socioeconomic stratification refers to the geographic organization of households into different areas based on socioeconomic characteristics, often resulting in unequal access to resources, opportunities, and outcomes across those spaces. Socioeconomic stratification in U.S. public education refers to the division across schools and districts based on the socioeconomic status (SES) of families in those areas. This division is shaped by housing markets, residential zoning, and local funding mechanisms, particularly since schools often rely heavily on local property taxes (Verstegen 2018).

Socioeconomic segregation is typically understood as the uneven spatial distribution of income and related resources across neighborhoods or districts within metropolitan areas (Owens et al. 2016; Reardon and Bischoff 2011). While often framed through the lens of socioeconomic segregation, concentrated advantage—clusters of high-income, highly educated households—may play an equally powerful role in shaping the geography of opportunity (Butler and Sinclair 2020; Chetty, Friedman, and Hendren 2018; Connor and Storper 2020; Green, Sánchez, and Germain 2017; Tate 2008). This focus connects to sociological theories of opportunity hoarding (Tilly 1998) and to exclusionary practices in education, housing, zoning, and political fragmentation (Ball 2003; Bischoff 2008; Freidus 2016; Owens and Candipan 2019; Roda and Sattin-Bajaj 2024; Sattin-Bajaj and Roda 2018). This is significant because, as of 2019, socioeconomically advantaged students in the U.S. were more segregated (segregation index = 0.19) than in many other wealthy nations, while disadvantaged students were segregated at the OECD average (0.16) (Schleicher 2019).[31]

This paper builds on and contributes to this literature by focusing not on overall patterns of segregation or disadvantage, but on spatial concentrations of affluent school districts—areas of concentrated advantage—and examining whether these clusters reflect broader processes of socioeconomic segregation or represent a distinct form of spatial inequality. Though imperfect as spatial units, school districts are central in structuring educational access and funding, particularly where local property taxes and zoning intersect to reinforce advantage. Districts with concentrated socioeconomic advantage offer a set of public and community-level goods—including greater education spending, school quality, safety, and housing stability—that can amplify educational inequalities (Chetty et al. 2020; Owens and Candipan 2019).

[31] The coefficients refer to the isolation index. To measure segregation between students with different levels of socioeconomic status (SES), the 2018 PISA employs the isolation index to distinguish between high SES students in the top quarter of the ESCP Index of economic, social, and cultural status and low SES students in the bottom quarter (Schleicher, 2019).

Using hotspot analysis, this study identifies clusters of advantaged districts and compares them to other patterns of socioeconomic sorting across states and Census regions. While much research has rightly emphasized within-district inequalities and intra-urban segregation, this study contributes a complementary perspective: that geographic concentrations of advantage between districts—often overlooked in work centered on disadvantage—may play an outsized role in shaping educational opportunity and inequality. The particular geography of concentrated school district advantage suggests that it stems from distinct mechanisms from those underlying socioeconomic segregation.

## Data and Methods

### *Data Availability*

Demographic data on parents with children enrolled in their residential school districts comes from the U.S. Census Bureau American Community Survey-Education Tabulation (ACS-ED) Parent Tabulation data (2016-2020), publicly available via the National Center for Education Statistics (NCES). Occupational data and prestige scores are sourced from the 2020 American Community Survey (ACS) and U.S. Bureau of Labor Statistics. School district boundary shapefiles are derived from the U.S. Census TIGER State-Based Data Files, as of January 1, 2020. Uninhabited land shapefiles come from the U.S. Geological Survey's (USGS) Gap Analysis Project (GAP) Protected Areas Database (PAD-U.S.) 3.0 data release.

ACS-ED 5-year estimates for educational attainment, median household income, occupational prestige, maternal marital status, and homeownership for parents whose children are enrolled in the district where they live were cleaned, reshaped, and transformed into variables using R version 4.3.1. I coded white-collar occupations as those requiring at least a bachelor's degree.

Joining ACS-ED data to PK/K-12 school district boundary files highlighted missing data in states without unified public school districts, including California, Alabama, Arizona, Texas, Montana, and New Mexico. To address this, elementary or

secondary district boundaries were substituted where unified school districts were absent, followed by geometry corrections and joins in QGIS 3.28.1. Despite these adjustments, data for many districts in Missouri, South Dakota, Colorado, New Mexico, and Montana remain missing. The final sample comprises 10,766 of the 18,452 unified PK/K-12 public school districts. The sociodemographic characteristics of the sample are detailed in Appendix Table 4.

***Estimating School District Socioeconomic Advantage***

I estimate the level of socioeconomic advantage of households with children enrolled in the U.S. public school district where they live with a socioeconomic advantage index. The index assigns each district a score based on the presence of households that exhibit characteristics associated with the professional-managerial class (Ehrenreich and Ehrenreich 2013). A higher score indicates a greater concentration of these households, while a lower score indicates a smaller share and is referred to here as "non-advantaged." This measure applies only at the aggregate (district) level and does not reflect the socioeconomic status of individual households. For example, high-income or highly educated households may live in non-advantaged districts, and vice versa.

Components are chosen based on the theoretical and conceptual framework outlined above. Weights are determined based on the results of principal component factor analysis, where the percentage of parents with a bachelor's degree or higher loaded most strongly on the first component. The index covers parents with children enrolled in public school in the district where they live. Each component reflects a distinct but related dimension of socioeconomic advantage:

1) Parental university attainment (0.4) is a central indicator of socioeconomic status. It is the primary pathway through which the professional-managerial class transmits status across generations, particularly through access to selective colleges and professional occupations (Bloome, Dyer, and Zhou 2018;

Ehrenreich and Ehrenreich 2013; Hout and Janus 2011; Mare 1991; Pfeffer 2008; Pfeffer and Hertel 2015)

2) Higher household income (0.3) enables families to meet basic needs and secure housing in desirable school districts. Because income is closely tied to education and occupational prestige, it reinforces access to resources that support children's educational success (Geverdt 2019; Ream and Palardy 2008).

3) Occupational prestige (0.15) captures access to stable, high-status jobs in managerial and professional sectors. These occupations tend to require higher education and provide greater flexibility, social capital, and long-term security (Ehrenreich and Ehrenreich 2013; Oakes et al. 2003). I coded white-collar jobs according to the categorizations of the U.S. Bureau of Labor Statistics, 2018 Standard Occupational Classification Manual (U.S. Bureau of Labor Statistics 2018).

4) The percentage of married mothers (0.1) reflects stable family structures associated with better educational and life outcomes for children, including better educational outcomes, higher graduation rates, and greater emotional stability (Bernardi et al. 2019; Kearney and Haskins 2020; Shriner, Mullis, and Shriner 2010). Marriage is increasingly stratified by education and is more common among university-educated parents due to declining rates among the non-university-educated (Kearney 2022; Lundberg, Pollak, and Stearns 2016).

5) The percentage of owner-occupied housing units in a district (0.05) is a proxy for financial stability and neighborhood investment. Although it is associated with long-term benefits such as residential stability and school access, its effect is more indirect than other index components and contingent on income and education (Conley 2001; Kim and Sherraden 2011).

***Relationships Between Components of Socioeconomic Advantage***

The strongest correlations among the components of the school district socioeconomic advantage index are between parental educational attainment—measured as the percentage of parents with a bachelor's degree or higher—and both occupational prestige (percentage in white-collar occupations, $r = .817$, $p < .001$) and median household earnings ($r = .812$, $p < .001$). This indicates that districts with more well-educated parents tend to have higher-skilled, better-paid professionals.

Marriage rates are moderately correlated both district-level homeownership ($r = .585$, $p < .01$) and parental educational attainment ($r = .415$, $p < .001$), reflecting established links between social class and family structure (Bernardi et al. 2019; Kearney and Haskins 2020; Kearney 2022; Lundberg et al. 2016; Simpson et al., 2012). In New Jersey, the relationships between homeownership and household earnings ($r = .414$, $p < .001$) and between homeownership and parental education ($r = .365$, $p < .001$) suggest the influence of mediating variables.

Table A3 in the Appendix summarizes these correlations. Regionally, New England states, such as Massachusetts (.51) and New Jersey (.50), have the highest socioeconomic advantage index scores, while East South-Central states, including Mississippi (.27) and Louisiana (.28), have the lowest. However, a Kruskal-Wallis rank sum test shows no significant differences in median socioeconomic advantage index scores among individual states ($\chi^2 = 50$, $df = 50$, $p = .473$) and significant regional variation ($\chi^2 = 29.86$, $df = 8$, $p = .0002$) suggests shared geographic, structural, or economic conditions that transcend state boundaries.

***Spatial Relationships Among Advantaged and Non-Advantaged School Districts***

To examine spatial sorting among school districts based on family socioeconomic advantage, I assessed the overall spatial relationships of school districts across the contiguous United States by identifying four patterns of socioeconomic sorting among U.S. PK/K-12 school district: (1) areas where advantaged districts are concentrated, (2) areas where non-advantaged district are concentrated, (3) isolated advantaged districts, and (4) segregated non-advantaged districts.

### *Estimating Overall Advantage Clustering Among Districts*

I assessed the overall spatial autocorrelation of school districts based on their socioeconomic advantage using Global Moran's I statistic with Queen's contiguity weights. Calculations were performed with the Moran's I tool from the Spatial Analysis Toolbox in QGIS 3.28.1. Global Moran's I is defined as:

$$I = \left(\frac{n}{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}}\right)\left(\frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^{n}(x_i - \bar{x})^2}\right)$$

where:

$n$ is the number of school districts,

$x_i$ and $x_j$ are the socioeconomic advantage index scores of school districts $i$ and $j$, respectively,

$\bar{x}$ is the mean socioeconomic advantage index score across all school districts,

$w_{ij}$ are spatial weights between school districts $i$ and $j$, based on Queen's contiguity, which considers districts as neighbors if they share any common boundary point.

Global Moran's I ranges from $-1$ (negative spatial autocorrelation) to $+1$ (positive spatial autocorrelation), with zero indicating no significant spatial autocorrelation.

### *Estimating Overall Advantage Clustering*

To estimate the extent to which advantaged school districts are clustered, I employed the Getis-Ord General G statistic. Using Queen's contiguity-based neighbor lists, districts sharing a boundary and corners are considered neighbors. Due to empty neighbor sets, 49 districts were excluded, resulting in a sample size of 9,943 districts. Binary spatial weights were applied, assigning a weight of 1 to neighboring districts and 0 to all other districts.

The spatial concentration of advantaged districts (those in the top 20th percentile of socioeconomic advantage index scores), in line with Berman and Milanovic (2020)

was evaluated using the globalG.test function from the spdep package with a Monte Carlo simulation in R 4.3.1. The Getis-Ord General G statistic is defined as:

$$G = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{i,j}\ x_i x_j}{\sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j}, \forall j\ \neq i$$

where:

$x_i$ and $x_j$ are socioeconomic advantage index values for districts $i$ and $j$,

$w_{i,j}$ is the spatial weight between districts $i$ and $j$.

$n$ is the number of districts in the dataset,

$\forall j\ \neq i$ indicates the districts $i$ and $j$ cannot be the same district.

The z-score for the Getis-Ord G statistic was calculated to assess the statistical significance of spatial clustering patterns:

$$z_G = \frac{G - E[G]}{\sqrt{V[G]}}$$

where:

$$E[G] = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{i,j}}{n(n-1)}, \forall j\ \neq i$$

$$V[G] = E[G^2] - E[G]^2$$

Here, ($E[G]$) is the expected value of $G$ under spatial randomness, and ($V[G]$) is the variance. The term $w_{i,j}$ captures the spatial weights representing the relationships between school districts $i$ and $j$. Positive $z_G$ scores indicate the clustering of advantaged districts; negative scores suggest the clustering of non-advantaged districts, and a score near zero indicates no clustering.

***Local Indicators of Spatial Association Analysis***

To pinpoint specific locations where districts are clustered together (advantage clustering/non-advantaged clustering), where advantage districts exist in isolation,

and socioeconomic segregation, I conducted a hotspot analysis using Local Moran's I based on Queen's contiguity. This method identifies areas where districts with similar levels of socioeconomic advantage index scores are spatially related to one another if they share edges and vertexes more than expected by chance. Calculations were performed using the Local Moran's I tool from the Spatial Analysis Toolbox in QGIS 3.28.1. Local Moran's I is defined as:

$$I_{\mathrm{i}} = \frac{(\Delta X_{\mathrm{i}} \times W\Delta X_{\mathrm{i}})}{(S^0 \times S^1)}$$

where:

$I_{\mathrm{i}}$ is the Local Moran's I for district $i$,

$\Delta X_{\mathrm{i}}$ is the deviation of a binary district socioeconomic advantage index variable from the mean (taking 1 for an advantaged district in the top 20$^{\mathrm{th}}$ percentile and a 0 otherwise,

$W\Delta X_{\mathrm{i}}$ is the spatially lagged value of $\Delta X_i$,

$S^0 = \sum_j w_{i_j}$ is the sum of the spatial weights ($w_{\mathrm{ij}}$) for for district $i$,

$S^1 = \sum_{i=1}^{n} (\Delta X_{\mathrm{i}})^2$ is the sum of the squared deviations for all districts.

Each district's Local Moran's I value is interpreted using the Local Moran's p-value (LMP) and Quadrant (LMQ):

LMP > 0.05: No significant clustering.

LMQ = 1: Advantaged district surrounded by advantaged districts (concentrated advantage).

LMQ = 2: Non-advantaged districts surrounded by advantaged districts (segregation).

LMQ = 3: Non-advantaged district surrounded by non-advantaged districts (concentrated non-advantage).

LMQ = 4: Advantaged district surrounded by non-advantaged districts (advantage isolation).

This analysis reveals spatial patterns of socioeconomic advantage, highlighting areas of clustering and isolation among school districts.

## Results

### *Clustering of Socioeconomic Advantage in Public Education*

Results confirm that the locations of socioeconomically advantaged school districts are not randomly distributed in relation to one another. Significant clustering occurs, with advantaged districts more likely to neighbor other advantaged districts (Global Moran's I = 0.46, Z = 63.87, $p < 0.001$). The Getis-Ord General G statistic also shows strong clustering of advantaged districts (G = .0015, SD = 47.88, $p < 0.001$), surpassing what would be expected by chance. This indicates the presence of socio-spatial stratification of advantage in the public school system.

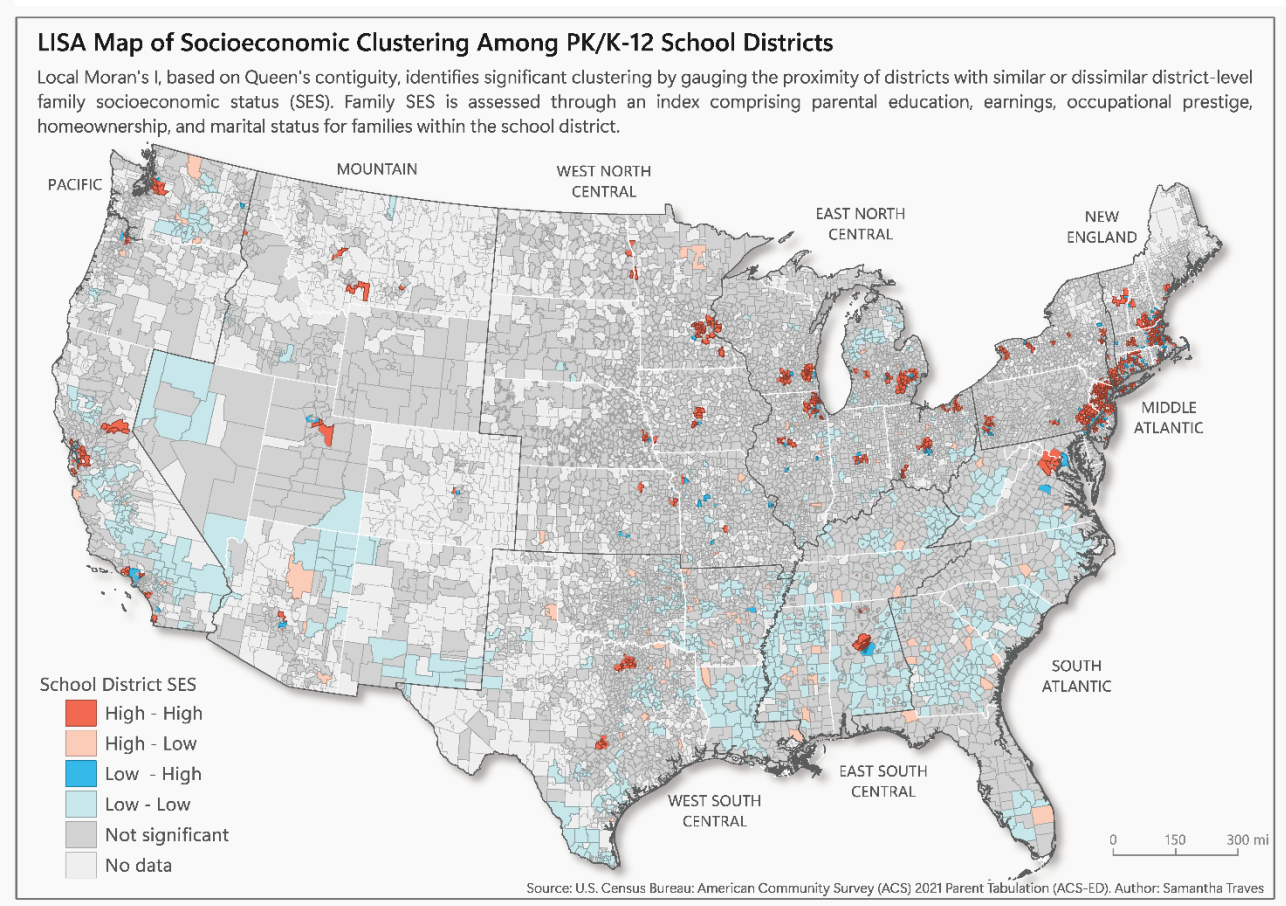
### *Areas of Concentrated Advantage are More Prevalent than Segregation*

Local Moran's I hotspot analysis highlights four distinct patterns of socioeconomic sorting (see Table A1 in the Appendix):

1) Concentrated Advantage: Advantaged districts surrounded by similar districts.
2) Concentrated Non-advantage: Non-advantaged districts surrounded by similar districts.
3) Advantage Isolation: Advantaged districts surrounded by non-advantaged districts.
4) Non-advantage Segregation: Non-advantaged districts surrounded by advantaged districts.

Figure 1 shows that areas of concentrated advantage appear more prevalent across the United States than segregated districts.

Figure 1. Patterns of Socioeconomic Sorting PK/K-12 School Districts Nationwide, 2021




*Note*. Figure 1 is a LISA map showing the spatial relationship between school districts and their neighbors based on family socioeconomic advantage. Red indicates advantaged districts surrounded by advantaged districts (advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey indicates districts not significantly related to neighbors. The map was created in QGIS 3.28.1.

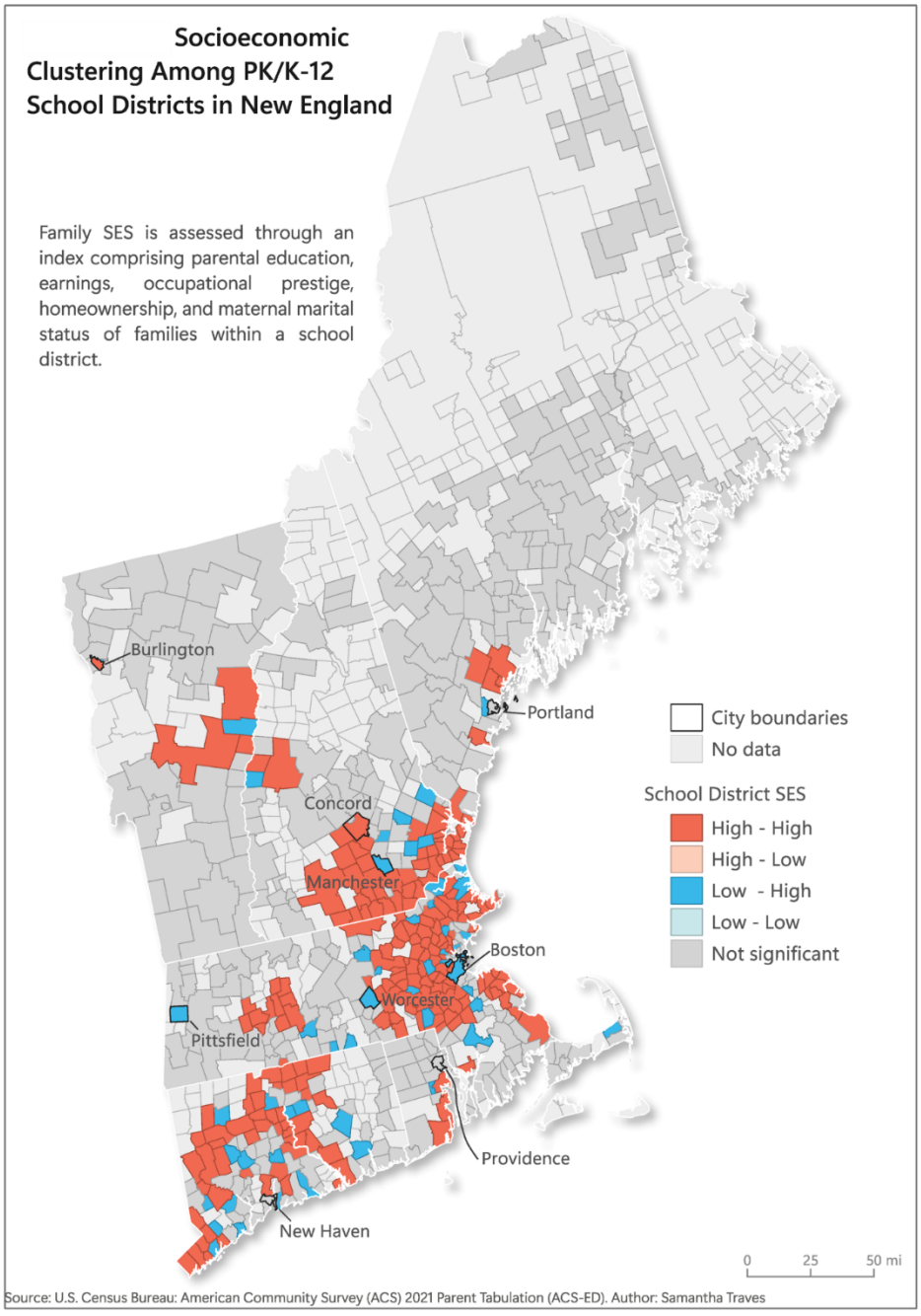
### *Regional Variations in Socioeconomic Sorting Patterns*

There are two general variations: (1) the Eastern Corridor Pattern characterized by extensive areas of advantage clustering intermingled with non-advantaged segregation, particularly along the Eastern Corridor encompassing New England and the Mid-Atlantic, and (2) the Suburban Ring Pattern characterized by advantage clustering immediately around, but not within, city boundaries, common in the Midwest in metropolitan areas like Chicago, Cleveland, and Minneapolis. Substantial regional differences exist in the prevalence of the four patterns of socioeconomic sorting identified by the hotspot analysis, particularly across the Eastern Corridor, the Midwest, and the West.

#### Eastern Corridor

Clusters of advantaged school districts are widespread across the large population centers along the Eastern Corridor. In New England, significant areas of advantage are found around the Boston metropolitan area, extending to Worcester and Manchester, Massachusetts, as well as Concord, New Hampshire. There is also evidence of advantage clustering in Burlington and around Montpelier (see Figure 2). In the Mid-Atlantic region, advantaged districts cluster primarily around the New York metropolitan area, including Long Island, but excluding New York City and areas west of Newark, New Jersey (see Figure 3). New Jersey has clusters of advantaged districts throughout the state, except in the southeastern region.

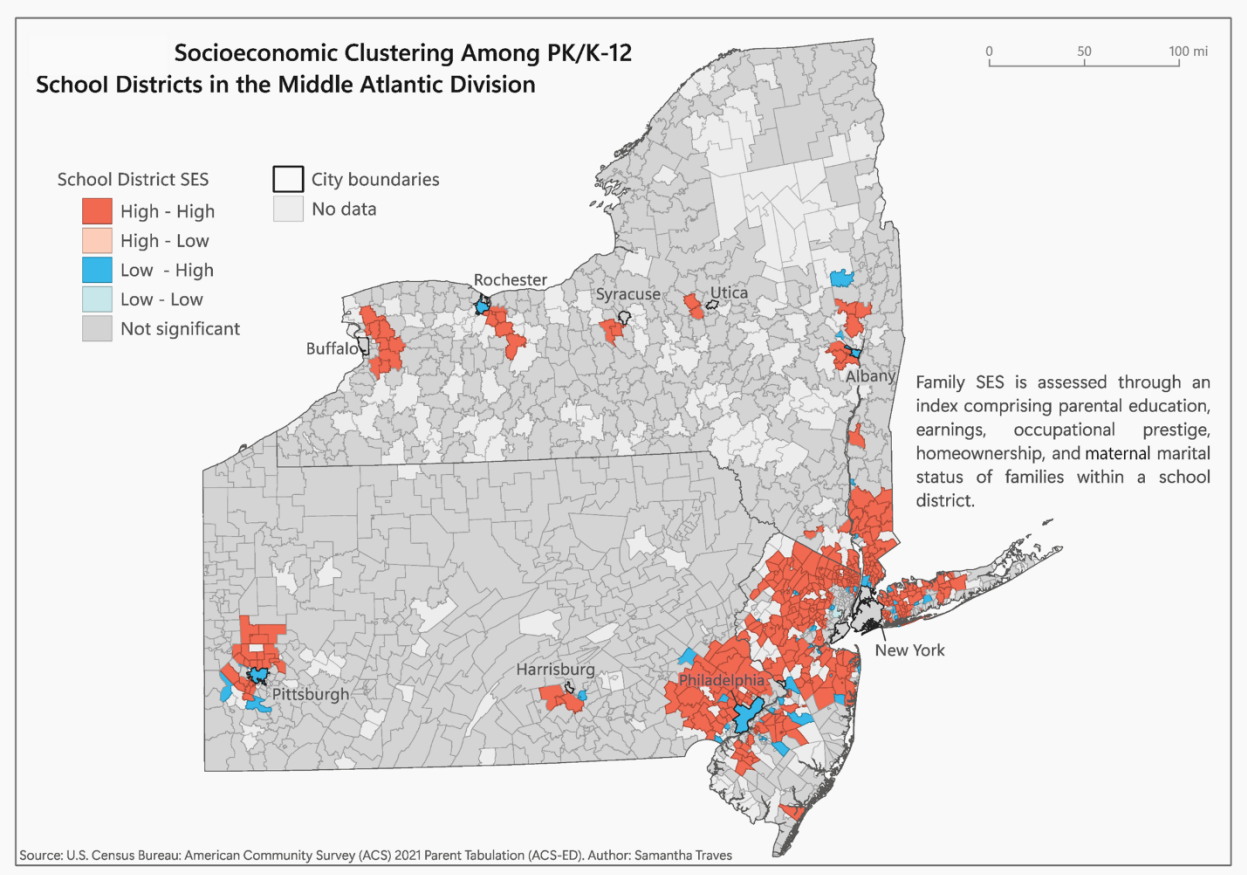
Figure 2. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in New England, 2021




*Note*. Figure 2 is a LISA map illustrating how New England school districts relate to neighbors based on family socioeconomic advantage, with major city boundaries shown. Red indicates advantaged districts surrounded by advantaged districts

(advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey indicates districts with no significant relation to neighbors. The map was created in QGIS 3.28.1.

Figure 3. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the Middle Atlantic Division, 2021



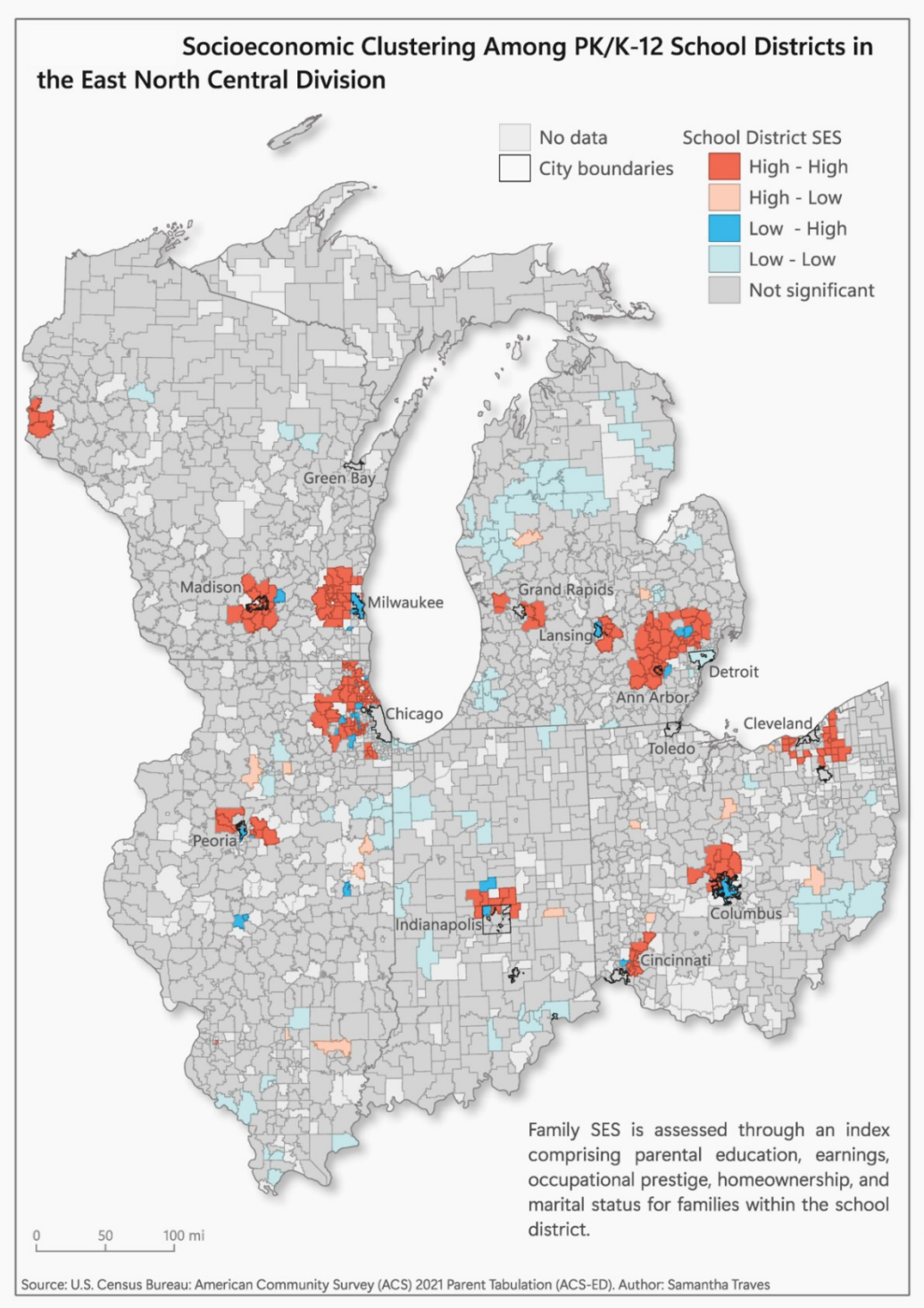

*Note*. Figure 3 is a LISA map of the Middle Atlantic census division, illustrating relationships between school districts and their neighbors based on family socioeconomic advantage. Major city boundaries are shown. Red indicates advantaged districts surrounded by advantaged districts (advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-

advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey indicates districts with no significant relation to neighbors. The map was created in QGIS 3.28.1.

**Midwest**

Figure 4 shows that the East North Central division, particularly Ohio, Cleveland, Columbus, and Cincinnati, tend to have significant areas of concentrated advantage around, but not within, city boundaries. Michigan shows similar suburban patterns around Detroit, Lansing, and Grand Rapids, aligning with findings that Grand Rapids was the second-least segregated metropolitan area in 2014 by home price, highlighting the need to examine suburban clustering to understand stratification. The Chicago metropolitan area, Peoria, Illinois, and Milwaukee, Wisconsin, display the same pattern. However, Indianapolis, Indiana, deviates by showing both advantage clustering and non-advantage segregation within city boundaries.

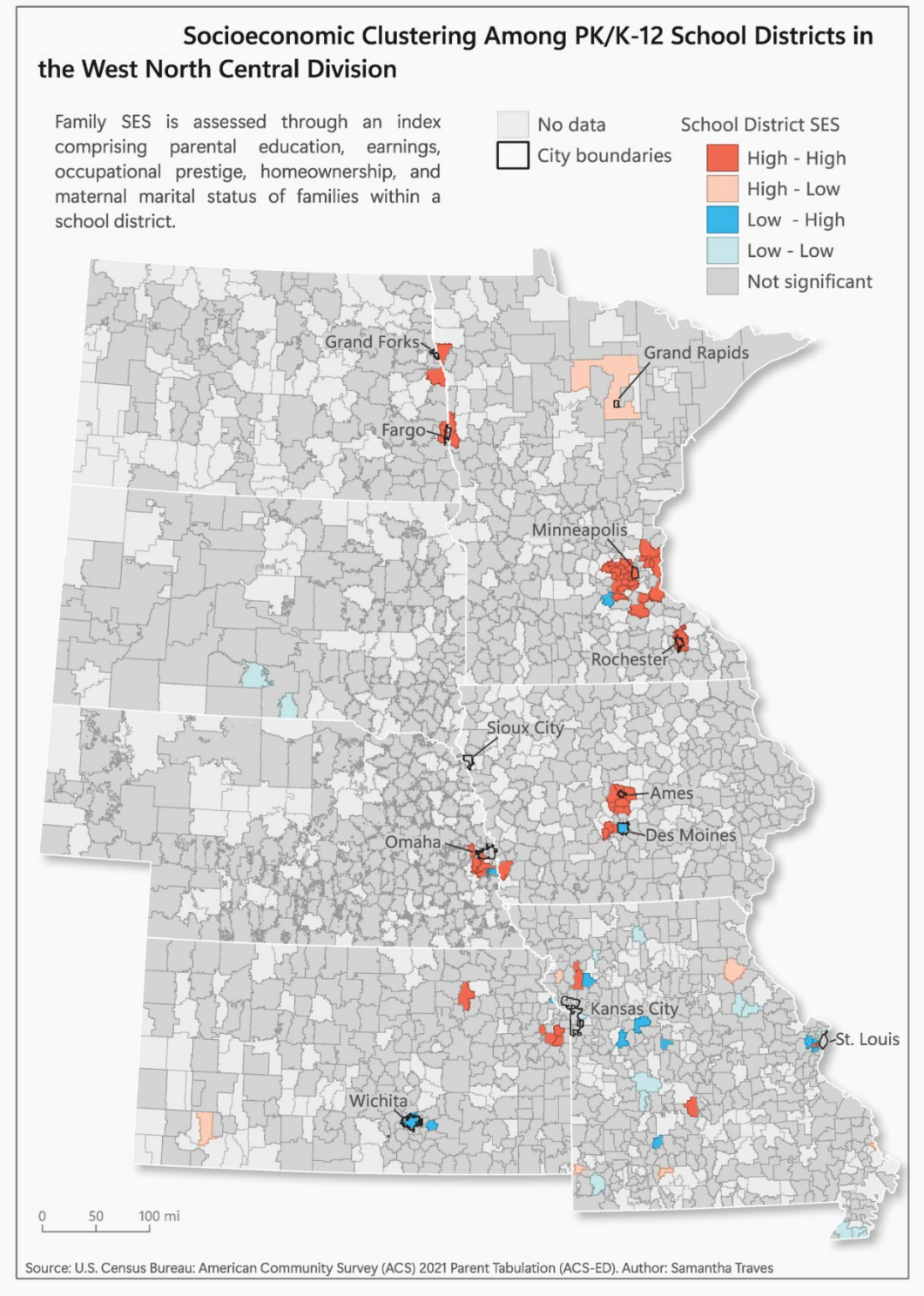
Figure 4. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the East North Central Division, 2021



*Note*. Figure 4 is a LISA map of the East North Central census division, showing how school districts relate to their neighbors based on family socioeconomic advantage, with major city boundaries included. Red indicates advantaged districts surrounded by advantaged districts (advantage clustering); light blue represents non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink shows advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey marks districts with no significant spatial relationship to neighbors. The map was created in QGIS 3.28.1.

The East North Central division (Figure 4) has more extensive areas of concentrated advantage in general than the West North Central division (Figure 5). Nonetheless, the West North Central division exhibits advantage clustering in Omaha, Nebraska; Fargo and Grand Forks, North Dakota; and within the city boundaries of Minneapolis, Rochester, and Ames, Iowa. Des Moines, Iowa, mirrors Indianapolis with both advantage clustering and non-advantage segregation.

Figure 5. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the West North Central Division, 2021

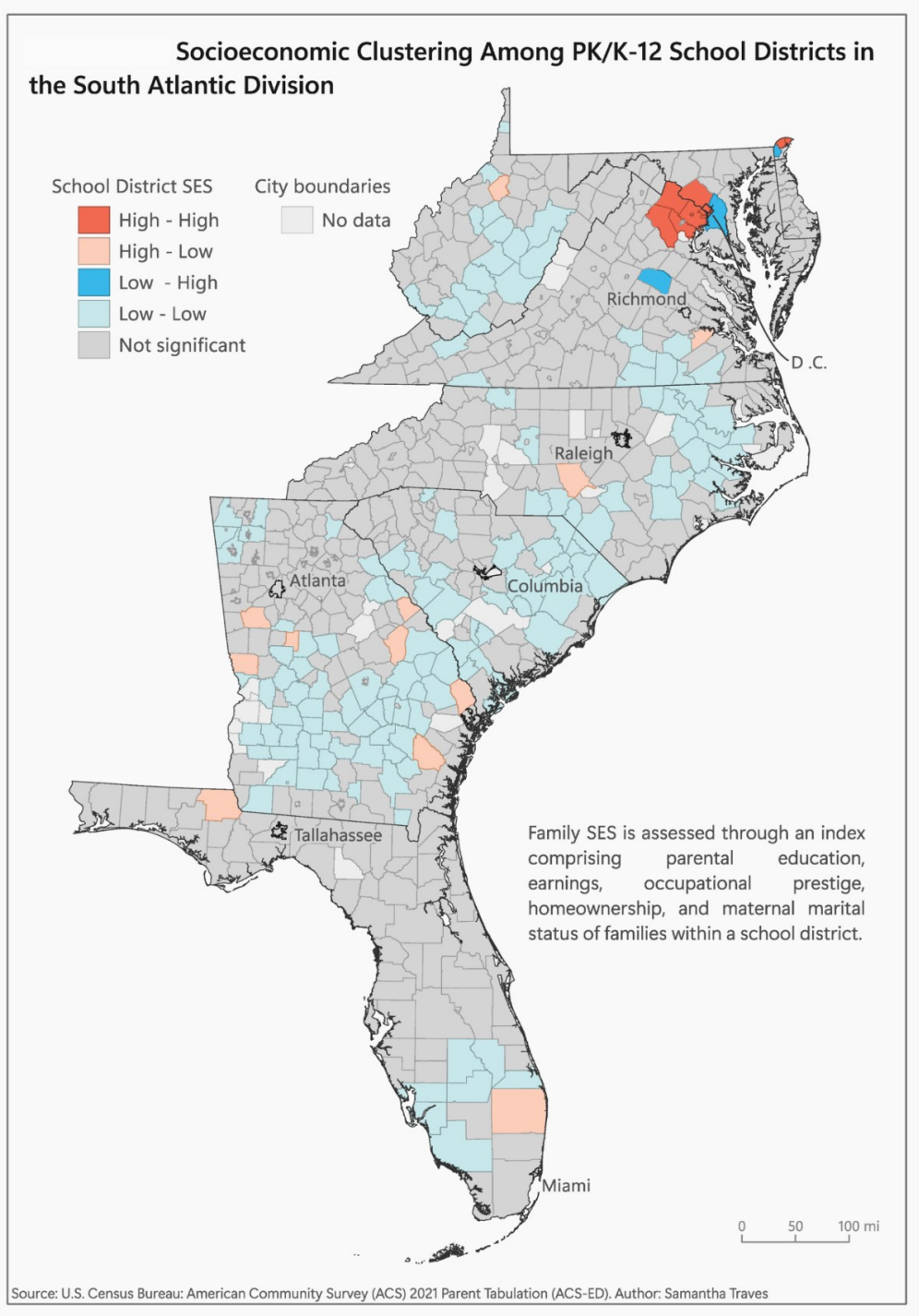


*Note*. Figure 5 is a LISA map of the West North Central census division, showing relationships between school districts and their neighbors based on family socioeconomic advantage, with major city boundaries included. Red marks advantaged districts surrounded by advantaged districts (advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue indicates non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey denotes districts with no significant relation to neighbors. The map was created in QGIS 3.28.1.

**Southeast**

The Southeast has the fewest districts in areas of concentrated advantage. Where such clustering occurs, in the District of Columbia (DC) and Birmingham, Alabama areas, it is found both in and around city boundaries, as is common in the Midwest (see Figure 6 and Figure 7). However, unlike the Midwest pattern, where concentrated advantage is present in the Southeast, it is also found alongside non-advantaged segregation in DC and Birmingham. Notably, Atlanta, a major metropolitan area, shows no significant spatial socioeconomic sorting of any kind within or immediately around the city boundaries.

Figure 6. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the South Atlantic Division, 2021

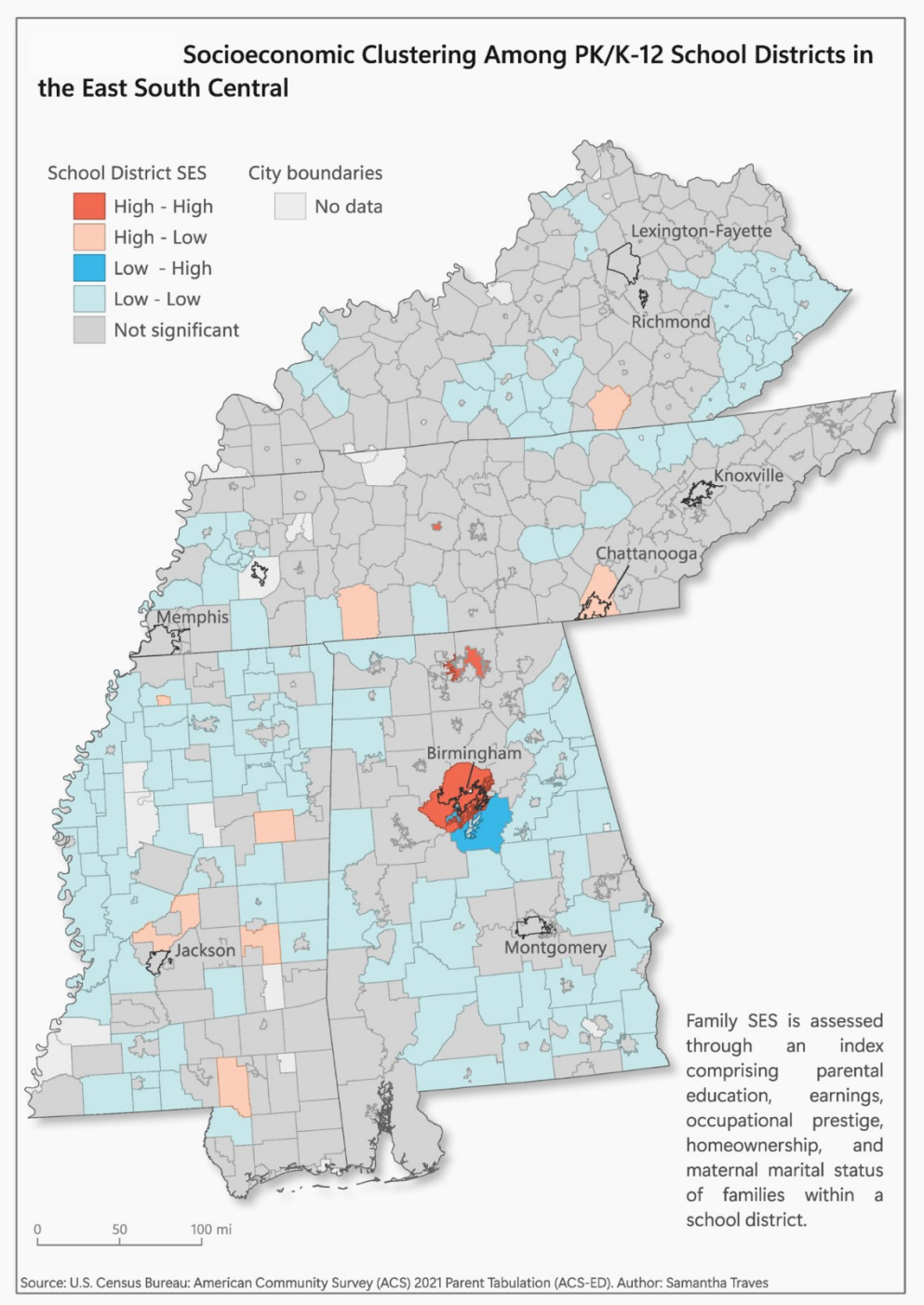



*Note*. Figure 6 is a LISA map of the South Atlantic census division, illustrating relationships between school districts and their neighbors based on family

socioeconomic advantage, with major city boundaries displayed. Red indicates advantaged districts surrounded by advantaged districts (advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey indicates

districts with no significant relation to neighbors. The map was created in QGIS 3.28.1.

Figure 7. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the East South Central Division, 2021



*Note*. Figure 7 is a Local Indicators of Spatial Association (LISA) map of the East South Central census division showing how school districts in the region are related to their neighboring districts based on the level of family socioeconomic advantage. The map also shows the city boundaries of some major regional cities. Red indicates advantaged districts surrounded by other advantaged districts, known as advantage clustering. Light blue indicates non-advantaged districts surrounded by other non-advantaged districts, referred to as non-advantage clustering. Pink districts are advantaged districts surrounded by non-advantaged districts, indicating advantage isolation. Blue indicates non-advantaged districts surrounded by advantaged districts, referred to as non-advantage segregation. Grey indicates that a district is not statistically significantly related to another district. The map was made in QGIS 3.28.1.

The prevalence of non-advantaged clustering in regions like the Appalachian states suggests that broader systemic factors probably contribute to differences in educational stratification.

**West**

In the Mountain and Pacific regions, advantaged districts are clustered around high-density metropolitan areas within vast tracts of low-density or uninhabited land. Clusters are also found east of Seattle, Washington, but not within the city boundaries. In the West South Central region (Figure 5) areas of concentrated advantage are located north of the Dallas metropolitan area and around Austin, Texas. The Mountain division, depicted in Figure 9 shows clusters of advantaged school districts around Lake City, Utah; Colorado Springs, Colorado; Phoenix, Arizona; Bozeman, Helena, and Billings, Montana. In the Pacific division, widespread advantage clustering is observed around the San Francisco Bay Area, including San Jose, Santa Cruz, and northeast of Sacramento in California (see Figure 10). However, there are many 'missing' school districts in California, which limits this observation. Alaska, due to its low population density, and because Hawaii has only one school district, are excluded from the analysis.

### *Socioeconomic Segregation is Rare Compared to Concentrated Advantage*

#### Non-advantaged Segregation

Surprisingly, non-advantaged districts surrounded by advantaged districts are relatively rare. When it does occur, it is primarily within city boundaries, particularly in areas of advantage clustering, such as the New England, East North Central, Middle Atlantic, and East South Central divisions. Rochester, New York; Philadelphia and Pittsburgh, Pennsylvania; Columbus, Ohio; Lansing, Michigan; Milwaukee, Wisconsin; Des Moines, Iowa; and Wichita, Kansas reflect this pattern. The proximity of non-advantaged segregation to advantage clustering suggests potential asymmetry in socio-spatial dynamics, possibly influenced by unique local policies underlying economic geography.

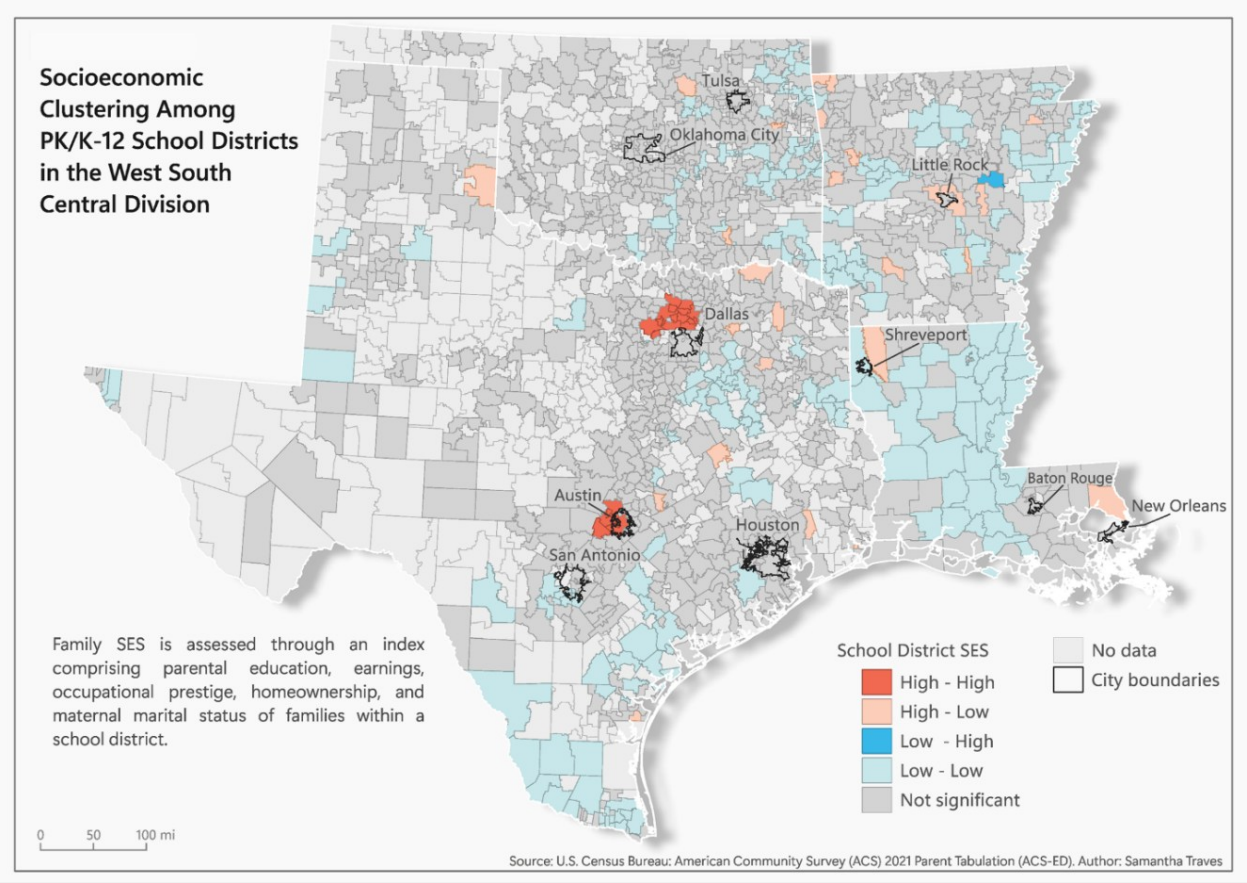
#### Advantage Isolation

Isolated advantaged districts, namely advantaged districts surrounded by non-advantaged districts, are less common than areas where non-advantaged districts are concentrated. These isolated advantaged districts tend to occur outside urbanized areas among clusters of less advantaged districts. They are most prevalent in the South Atlantic and the East and West South Central divisions.

### *Prevalence of Areas of Concentrated Non-advantage*

Clusters of non-advantaged school districts are the most widely observed pattern of socioeconomic sorting and may have significant consequences for students in these areas. Non-advantaged clustering is most prevalent in the South Atlantic, East South Central, and West South Central divisions (Figures 5-7), as well as in California, Northern Michigan, and Eastern Washington. This pattern may result from persistent intergenerational transmission of low socioeconomic status, spatial mismatch between workers and job opportunities, economies based on lower-wage industries, and historical underdevelopment or discriminatory practices.

Figure 8. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the West South Central Division, 2021

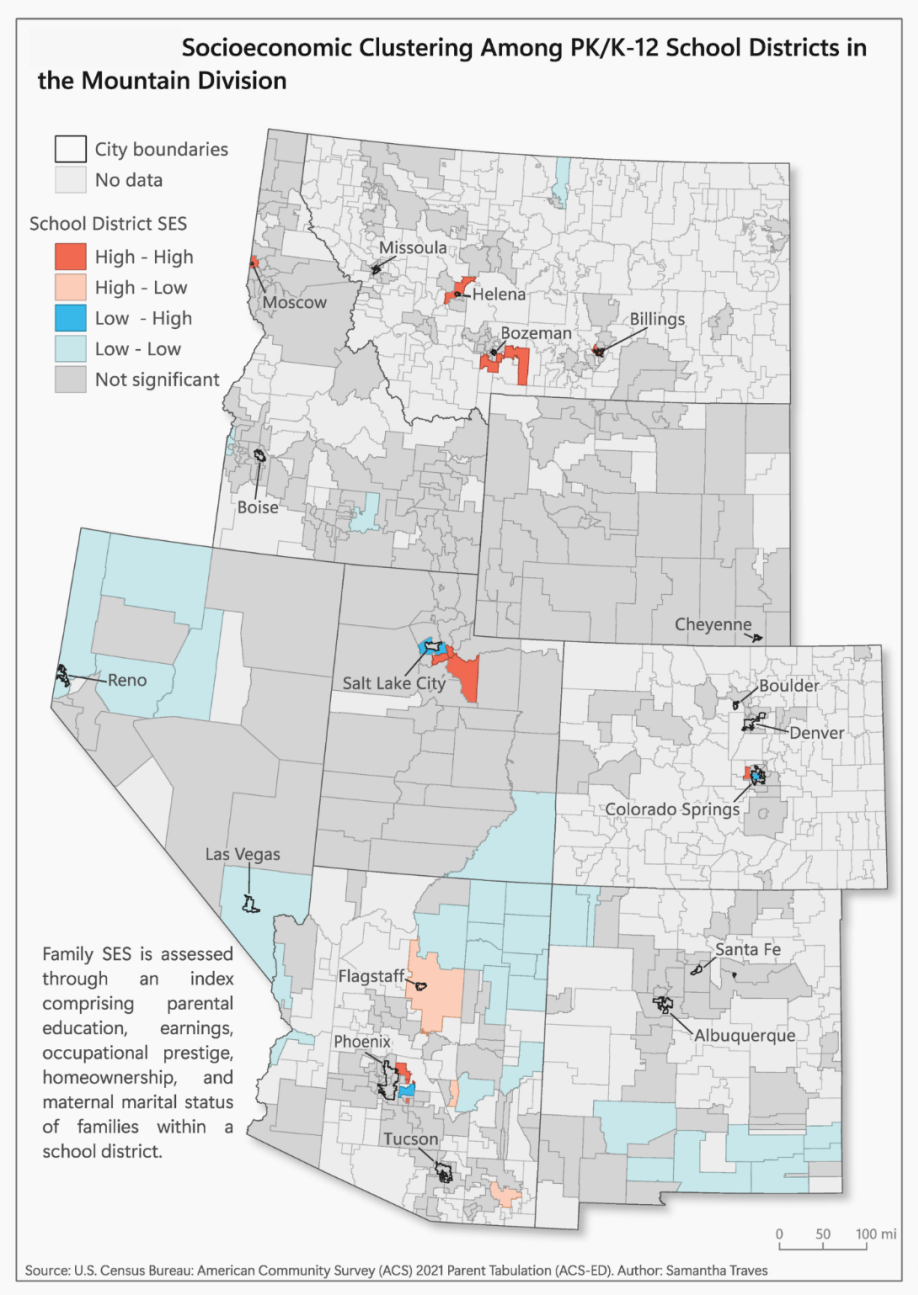



*Note*.

Figure 8 is a LISA map of the West South Central census division, illustrating how school districts relate to their neighbors based on family socioeconomic advantage, with major city boundaries displayed. In this map, red indicates advantaged districts surrounded by advantaged districts (advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by

advantaged districts (non-advantage segregation); and grey indicates districts not significantly related to neighbors. The map was created in QGIS 3.28.1.

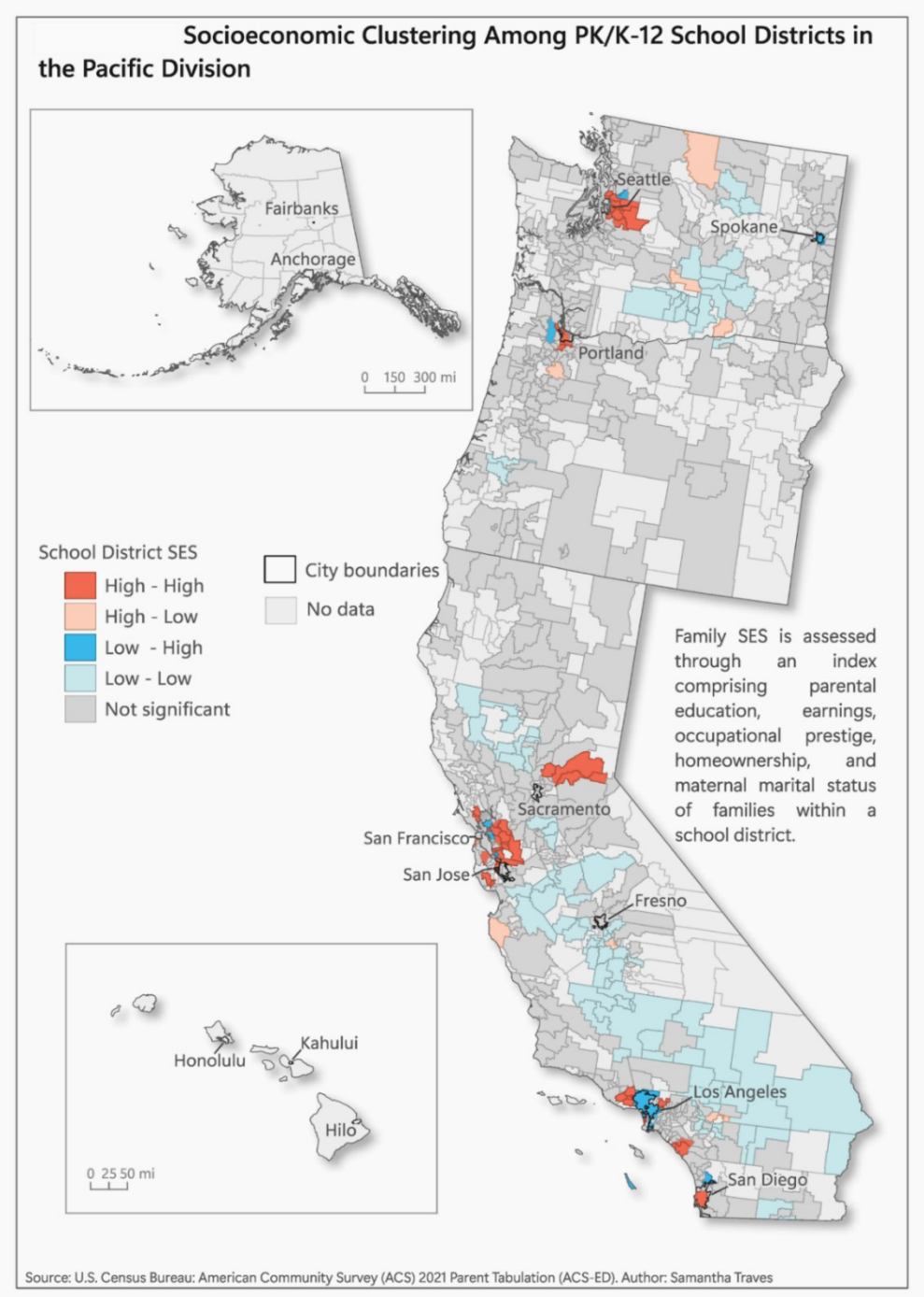
Figure 9. Patterns of Socioeconomic Sorting Among PK/K-12 School Districts in the Mountain Division, 2021




*Note*. Figure 9 is a LISA map of the Mountain census division, illustrating how school districts relate to their neighbors based on family socioeconomic advantage. Major city

boundaries are displayed. Red indicates advantaged districts surrounded by advantaged districts (advantage clustering); light blue shows non-advantaged districts surrounded by non-advantaged districts (non-advantage clustering); pink represents advantaged districts surrounded by non-advantaged districts (advantage isolation); blue denotes non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey indicates districts not significantly related to neighbors. The map was created in QGIS 3.28.1.

Figure 10. Patterns of Socioeconomic Sorting Among PK-12 School Districts in the Pacific Division, 2021




*Note.* Figure 10 is a Local Indicators of Spatial Association (LISA) map of the Pacific census division, showing school districts' relationships to neighboring districts based

on family socioeconomic advantage. City boundaries of major regional cities are included. Red indicates advantaged districts clustered with other advantaged districts; light blue, non-advantaged districts clustered with non-advantaged districts; pink, advantaged districts isolated among non-advantaged districts; blue, non-advantaged districts surrounded by advantaged districts; and grey, districts with no statistically significant relationship to their neighbors. The map was created in QGIS 3.28.1.

## Discussion

### *Reframing Concentrated Advantage within Spatial Inequality*

This study examined the geography of concentrated socioeconomic advantage among U.S. public school districts and found that such areas are widespread and have distinctive spatial patterns. Unlike socioeconomic segregation, which refers to the uneven distribution of socioeconomic groups across space, concentrated advantage captures clusters of affluent, high-SES districts whose proximity may reinforce shared access to educational, economic, and political resources. These findings complement existing work on segregation by highlighting how advantage clusters may operate as engines of exclusion and opportunity hoarding (Tilly 1998), rather than the inverse of disadvantage.

Mapping revealed that concentrated advantage is more geographically prevalent than statistically significant socioeconomic segregation and follows regional patterns that diverge from established urban development trends. While much research has focused on the deleterious effects of concentrated poverty, the clustering of advantaged public school districts may also broadly reproduce inequality by shaping access to educational opportunities, resources, housing markets, and institutional advantages tied to location.

### *Zoning, Development, and the Geography of Advantage*

Contrary to the assumption that areas of concentrated advantage mirror urban development patterns, it does not appear to be reducible to urban density or development patterns. Many large metropolitan areas in the Southeast and the West

South Central, such as Atlanta and Houston, lack significant concentrations of advantaged districts. In contrast, concentrations of advantaged districts are prevalent in parts of the Northeast, Midwest, and West, particularly in states and regions with restrictive zoning and high housing costs. These findings align with research linking zoning to economic segregation (Glaeser and Gyourko 2018; Herkenhoff, Ohanian, and Prescott 2018; Hsieh and Moretti 2019; Wendell Cox 2015) and suggest that land-use policies may play a role in shaping where areas of concentrated advantage form.

In cities like New York and Boston, strict zoning combined with limited land availability appears to contribute to areas of concentrated advantage in housing (Glaeser and Gyourko 2002; Trounstine 2018). In contrast, cities with more flexible zoning policies, such as Houston, do not seem to show widespread areas of concentrated advantage among school districts, even though housing affordability remains a challenge (Cox 2023). Variations in zoning restrictiveness may, therefore, interact with housing demand to influence where areas of concentrated advantage are located.

***School District Fragmentation and Regional Variation***

The scale and organization of school districts may mediate the regional differences in patterns and prevalence of areas of socioeconomic advantage. In regions like the Northeast and Midwest, districts are typically smaller and more fragmented, with irregular boundaries. This fragmentation may encourage clustering of advantaged districts by allowing affluent communities to organize politically and institutionally, and insulate themselves (Bischoff 2008; Frankenberg 2009). In contrast, larger countywide districts in the Southeast and West may mask internal variation and limit visible clustering, even where socioeconomic inequality exists at the neighborhood level. Moves toward smaller, localized districts in Alabama, California, Indiana, Iowa, Louisiana, New Jersey, North Carolina, Maine, Tennessee, Texas, and Wisconsin contribute to greater fragmentation, which may exacerbate socioeconomic sorting (EdBuild 2019).

This distinction reinforces the importance of geographic scale in analyzing spatial inequality. While intra-district variation remains a critical area for future research, particularly using school attendance boundaries, this study highlights how district-level sorting can operate independently of broader metropolitan segregation patterns. Smaller, more fragmented districts may reinforce exclusionary dynamics by enabling wealthier communities to secure distinct administrative and funding arrangements.

***Regional Variations in Concentrated Advantage***

In certain areas of the West, high demand for housing combined with more restrictive zoning environments may be responsible for the widespread areas of concentrated advantage in areas of density, particularly in California, where home prices are notably high (Gyourko and Krimmel 2021). I find similar patterns of concentrated advantage in the Northeast, where areas of concentrated advantage seem to follow areas identified as having more restrictive zoning and higher home prices (Cox 2023). The Midwest, which generally has lower population densities and more flexible zoning, still has pockets of concentrated advantage around cities like Cleveland and Cincinnati, despite generally having more affordable housing (Cox 2023). This could mean that regional variation in land availability, population density, and local economic conditions could mediate the relationship between zoning restrictiveness, housing affordability, and areas of concentrated advantage.

In regions like the Southeast and Southwest, with some of the most flexible zoning laws and most new construction, areas of concentrated advantage are rare except outside the District of Columbia and Birmingham. For instance, Houston, Texas, with its unique approach to land use that lacks a conventional zoning code, ranks 87th in housing affordability and does not have significant socioeconomic sorting among school districts in my analysis (Cox, 2023). This suggests that the flexibility in land use and development, as well as more affordable housing, may limit the concentration of advantaged districts in these regions. However, it remains uncertain whether cities like Houston and Atlanta, which lack significant areas of concentrated advantage, are

anomalies or share underlying characteristics with places that have little socioeconomic sorting across districts.

### *The Role of Regional Economic Geography in Areas of Concentrated*

While areas of concentrated advantage seem to occur in areas with district fragmentation and high population density, patterns of non-advantage concentration may also highlight broader structural challenges. Economic shifts, including deindustrialization and financialization, have exacerbated difficulties for non-university-educated workers to support families, complicating efforts to reduce socioeconomic stratification through housing policy alone (Marley 2016; Reeves and Pulliam 2020; Tomaskovic-Devey 2011).

The prevalence of non-advantaged clustering, particularly in the Appalachian states of Kentucky, Tennessee, and West Virginia, may be attributed to spatial mismatch, where workers are far from suitable job opportunities (Gobillon, Selod, and Zenou 2007). The shift from productive manufacturing to a service-oriented, financialized economy and more suburban jobs reflects this mismatch and may contribute to widespread non-advantaged clustering in areas with historically marginalized populations in the Deep South, Appalachia, and Western states (Gobillon et al. 2007; Shields and Stettner 2020; Theys et al. 2019). However, non-advantaged clustering is also evident in rural areas across other census divisions, suggesting that multiple factors influence these patterns.

### *Implications for Policy and Future Research*

Recognizing concentrated advantage as a key dimension of spatial stratification calls for a more comprehensive understanding of how educational inequality is produced and maintained. School districts where affluent families cluster often benefit from greater political influence, stronger tax bases, and higher public investment—advantages that extend beyond the household to shape the educational landscape at a structural level.

Policy responses must therefore move beyond targeting concentrated poverty and consider how institutional arrangements—such as zoning, district fragmentation, and funding formulas—enable and sustain advantage. This aligns with recent calls for integrating housing and education through land use reform by Siegel-Hawley (2024) which could expand beneficial opportunity structures to students in disadvantaged areas.

Future research should extend to smaller geographic units, such as school attendance boundaries, through the School Attendance Boundary Survey (SABS) conducted by NCES-EDGE and the U.S. Census Bureau, due to the heterogeneity within school districts relating to income and wealth accumulation, and student academic outcomes. Future research should also examine the regional dynamics that contribute to advantage clustering. This includes exploring the demographic and policy conditions that mediate its relationship with population density and other contextual factors. Comparing the maps from this study with comprehensive zoning data, such as the forthcoming national zoning atlas from Cornell University's Legal Constructs Lab, could provide critical insights into the relationships between zoning types and patterns of socioeconomic sorting. Additionally, detailed case studies of metropolitan areas are necessary to identify the specific local conditions that facilitate advantage sorting.

Research should also investigate whether less restrictive zoning is consistently associated with areas of concentrated advantage. This line of inquiry could help clarify the relationship between zoning policies, housing affordability, and spatial inequality. However, the absence of a comprehensive national dataset on local zoning codes complicates evaluating these relationships. Current analyses rely on surveys of local planning officials, which provide valuable insights but highlight the need for more standardized and comprehensive data.

**Limitations**

Using school districts as the primary spatial unit of analysis limits comparability. School districts vary widely in size, as large districts, particularly those spanning both

urban and suburban areas, are more likely to contain substantial internal heterogeneity (Bischoff 2008; Clotfelter 2004).

Using Queen's contiguity to define neighboring districts in the spatial analysis, considering districts as neighbors if they share boundaries and corners, may not fully capture functional relationships between geographically proximate districts that do not share borders. Alternative spatial weighting schemes, such as distance-based measures or k-nearest neighbor methods, may provide different insights into spatial clustering patterns.

Additionally, 49 school districts were excluded from the Getis-Ord General G analysis due to empty neighbor sets, which may have affected the overall assessment of clustering. Omitting these districts might introduce bias, especially if they possess unique socioeconomic characteristics or are situated in geographically isolated areas. Moreover, setting the threshold for advantaged districts at the top 20th percentile of socioeconomic advantage index scores provides a clear cutoff but may influence the observed patterns of clustering and segregation. Using different thresholds in sensitivity analyses could enhance the robustness of the findings.

Excluding uninhabited land can distort spatial analyses by creating a false impression of clustering and exaggerated sorting patterns. The Modifiable Areal Unit Problem (MAUP) further complicates interpretations, potentially causing misconceptions about the extent of clustering. Including uninhabited land might offer a more accurate representation of relationships between neighboring school districts, but could also skew averages, affect spatial weight calculations, and lead to inaccurate assessments of spatial association.

## Conclusions

This study highlights the geographic concentration of socioeconomically advantaged school districts as a persistent and underexamined dimension of spatial inequality in U.S. public education. While existing research has emphasized socioeconomic segregation patterns, particularly the isolation of disadvantaged students, these

findings show that clusters of affluent, high-SES districts are more widespread than statistically significant patterns of socioeconomic segregation. This form of concentrated advantage is not simply the inverse of disadvantage but reflects distinct spatial dynamics and institutional mechanisms, including housing markets, zoning regimes, and the organization of school district boundaries.

The spatial patterns uncovered here do not align neatly with conventional urban development or density models. Instead, regional variation suggests that local policy environments play a decisive role. In the Northeast, Midwest, and parts of the West, clusters of advantaged districts are often found just beyond major metropolitan centers, reflecting the interaction of restrictive zoning, housing demand, and school district fragmentation. In contrast, regions such as the Southeast and Southwest—where zoning is more flexible, and districts are often larger—have fewer such clusters. These patterns suggest that concentrated advantage arises not solely from density, but from how access to high-quality public education is structured and limited across space.

Recognizing concentrated advantage as a key mechanism of spatial sorting helps expand the policy conversation beyond disadvantage alone. The clustering of advantaged districts reflects opportunity hoarding processes that concentrate public investment and institutional benefits in select communities while excluding others. These dynamics are unlikely to be addressed through poverty alleviation efforts alone. Instead, they point to the need for modifications in land-use, housing policy, and district governance.

Ultimately, the persistence and prevalence of concentrated advantage underscore the enduring significance of place in shaping educational opportunities. Students in advantaged clusters benefit from cumulative public goods—stronger schools, safer neighborhoods, higher local revenues, and greater access to social networks—while students outside these areas are systematically excluded. The findings underscore the urgent need to address the root causes of spatial socioeconomic inequality in U.S.

public education, ensuring that all students, regardless of their socioeconomic background and location, have access to high-quality educational environments.

**Research Ethics Statement**

I confirm that the research presented in this study adhered to ethical principles consistent with the Declaration of Helsinki of 1964 and its subsequent revisions, as well as Section 12 ("Informed Consent") of the American Sociological Association's Code of Ethics. Since the research did not involve human subjects, it does not qualify as human subjects research according to established guidelines. The data used were sourced from publicly available datasets, with no direct interaction with human subjects, thereby eliminating potential ethical concerns regarding their welfare and privacy. Consequently, approval from an Institutional Review Board (IRB) or similar ethics committee was not required.

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## Appendix

Table 2. School District Descriptive Statistics, 2016-2020

| Variable | Mean | Median | SD |
|---|---|---|---|
| Total households | 20,380.48 | 8,275.00 | 50,929.39 |
| Married couple households in the total population (%) | 51.93 | 52.10 | 9.7138 |
| Population 25 years and older | 37,590.93 | 15,149.00 | 97,264.82 |
| Population 25 years+ with a bachelor's degree (%) | 17.30 | 15.70 | 8.18 |
| Population 25 years+ with graduate or professional degree (%) | 10.34 | 8.00 | 7.619522 |
| Population 25+ with a bachelor's degree or higher (%) | 27.61 | 23.50 | 15.10 |
| Total pop median household income (2020 dollars) | | | 27,254.99 |
| Total pop household income (2020 dollars) | 15,943.03 | 6,182.00 | 41,355.81 |
| Total families | 13,428.19 | 5,633.50 | 31,655.88 |
| Total pop median family income (2020) | | | 30,212.02 |
| Relevant Sample | | | |
| Housing units among relevant families | 4,736.46 | 1,957.50 | 11,253.33 |
| Owner-occupied housing units among relevant families | 2,928.30 | 1,295.00 | 5,877.45 |
| Owner-occupied housing units among relevant families (%) | 67.25 | 68.90 | 15.17 |
| Owner-occupied housing units among the total population | 12,974.43 | 5,916.00 | 27,280.25 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Owner-occupied housing units among the total population (%) | 70.32 | 72.10 | 12.36 |
| Total population | 55,370.76 | 22,188.00 | 140,446.68 |
| Total white population | 37,974.45 | 17,778.50 | 83,159.10 |
| Total white population (%) | 77.30 | 81.90 | 17.72 |
| Total non-Hispanic white population | 30,968.07 | 15,094.50 | 58,122.64 |
| Total non-Hispanic white population (%) | 68.33 | 74.75 | 23.97 |
| School Districts | | | |
| Relevant children (3+) enrolled in school | 9,313.15 | 3,720.00 | 22,744.82 |
| Population enrolled in high school | 2,499.67 | 965.00 | 6,454.98 |
| Population enrolled in high school (%) | 26.08 | 27.70 | 9.02 |
| Relevant parents | 7,517.75 | 3,062.50 | 17,779.31 |
| Relevant married fathers of public school students | 2,918.84 | 1,202.50 | 6,760.55 |
| Relevant married fathers of public school students (%) | 87.30 | 88.20 | 7.13 |
| Relevant married mothers of public school students | 2,912.06 | 1,210.00 | 6,679.38 |
| Relevant married mothers of public school students (%) | 71.09 | 72.60 | 12.93 |
| Population of relevant parents of public school students (25+) | 7,433.17 | 3,007.50 | 17,599.92 |
| Relevant parents of public school students with a bachelor's degree | 1,577.45 | 515.00 | 3,951.55 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Relevant parents of public school students with a bachelor's degree (%) | 18.98 | 16.90 | 10.15 |
| Relevant parents of public school students with a graduate or professional degree | 986.78 | 275.00 | 2,693.55 |
| Relevant parents of public school students with a graduate or professional degree (%) | 11.58 | 8.80 | 9.64 |
| Relevant parents of public school students with a bachelor's degree or higher | 2,564.22 | 800.00 | 6,570.72 |
| Relevant parents of public school students with a bachelor's degree or higher (%) | 30.46 | 25.60 | 18.33 |
| Relevant parents of public school students working (16+) | 5,945.46 | 2,435.00 | 13,887.08 |
| Relevant parents of public school students working in management/business/science/arts | 2,538.66 | 955.00 | 5,865.25 |
| Relevant parents of public school students working in management/business/science/arts (%) | 40.36 | 38.60 | 14.20 |
| Relevant parents of public school students working in service occupations | 942.64 | 350.00 | 2,622.69 |
| Relevant parents of public school students working in service occupations (%) | 15.48 | 14.70 | 6.59 |
| Relevant parents of public school students working in sales/office | 1,141.18 | 460.00 | 2,762.21 |
| Relevant parents of public school students working in sales/office (%) | 18.70 | 18.60 | 5.22 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Relevant parents of public school students working in natural resources/construction/maintenance | 599.55 | 255.00 | 1,484.46 |
| Relevant parents of public school students working in natural resources/construction/maintenance (%) | 11.60 | 10.50 | 7.24 |
| Relevant parents of public school students working in production/transport/materials | 723.53 | 320.00 | 1,829.11 |
| Relevant parents of public school students working in production/transport/materials (%) | 13.98 | 13.20 | 7.52 |
| Median age of relevant parents of public school students | 40.89 | 40.60 | 2.46 |
| Relevant parents of public school students non-Hispanic White | 3,839.15 | 1,975.00 | 6,433.59 |
| Relevant parents of public school students non-Hispanic White (%) | 65.36 | 72.40 | 26.96 |

*Note*. N = 3,634 unified PK/K-12 school districts. The table presents descriptive statistics for both the total population by school districts, where specified, and the relevant sample of parents with children enrolled in the district where they reside. Data come from the 2016-2020 American Community Survey (ACS) Parent tabulation. A child or parent is considered relevant to a school district if they live within the district's boundaries and their assigned grade falls within the grade range for which the district is financially responsible.

## Preface to Chapter 5

Chapter 5 builds upon the findings from Chapter 4 by looking into the factors underlying the formation of areas of concentrated advantage. While Chapter 4 maps the locations of these areas, Chapter 5 seeks to explain why they emerge. In Chapter 4, I presented a series of choropleth maps illustrating the clustering patterns of socioeconomically advantaged school districts—referred to as areas of concentrated advantage—at local, state, and regional levels. These areas often appear in predictable patterns around metropolitan regions in the Northeast and Midwest. Notably, they do not typically align with socioeconomically segregated districts, suggesting that different mechanisms may drive the concentration of socioeconomic advantage compared to socioeconomic segregation.

This observation led to the hypothesis that the factors contributing to areas of concentrated advantage may differ from those driving segregation of disadvantaged districts, a commonly discussed form of socioeconomic sorting in the housing and education literature. I propose that competition among socioeconomically advantaged families may contribute to the clustering of these families, potentially elevating home values in districts with desirable schools, even when the housing stock is similar.

Chapter 5 expands on this by examining whether the factors associated with disadvantage segregation also apply to areas of concentrated advantage or if factors specific to advantage, intra-elite competition, state political orientation, density, and home values, play a more significant role. My analysis reveals that the factors influencing areas of concentrated advantage differ from those typically linked to socioeconomic segregation.

# Chapter 5: The Role of Intra-Elite Competition in the Socioeconomic Stratification of U.S. School Districts

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## ABSTRACT

Recent research has significantly enhanced our understanding of spatial inequality and its impact on educational opportunities. However, the factors driving spatial stratification in U.S. public education remain poorly understood. Policies aimed at expanding educational opportunities in these areas are often less effective due to this knowledge gap. Combining using spatial, political, economic, and demographic data, I estimate the association between factors commonly linked to socioeconomic segregation and those tied to economic competition and areas of concentrated advantage among U.S. school districts. This analysis aims to determine whether areas with significant spatial clustering of advantaged school districts are driven by the same mechanisms underlying socioeconomic segregation or if these areas represent a distinct form of spatial stratification. Surprisingly, factors associated with socioeconomic segregation, such as funding inequality, per-pupil spending, state political ideology, school district fragmentation, homeownership, and race, are not linked to concentrated advantage. Instead, intra-elite competition and higher home values emerge as key potential drivers. This suggests that areas with concentrated advantaged districts have a distinct form of spatial inequality primarily associated with intra-elite competition and local housing markets, rather than through processes typically linked to socioeconomic segregation.


*keywords*: spatial stratification, educational opportunity, spatial opportunity structure, intra-elite competition, socioeconomic advantage, segregation, educational inequality

## The Role of Intra-Elite Competition in the Socioeconomic Stratification of U.S. School Districts

Understanding how spatial inequality shapes educational opportunities in U.S. public education has long been a central focus of research and policymaking. Despite decades of work identifying the factors that produce unequal educational landscapes—where some school districts provide clear advantages and others disadvantage their students—progress toward reducing these disparities has been limited.

Previous work has shown that isolated pockets of highly concentrated advantage in certain parts of a city can significantly affect the overall level of segregation, or unevenness, within a local area. Reardon and Bischoff (2011) demonstrate this relationship, while Owens (2016) attributes it to individual-level sorting processes. Scholars have also theorized why this pattern is especially pronounced at the higher end of the income distribution, pointing to competition among families for access to schools understood as "positional goods" that convey social status (Goldstein & Hastings, 2019). This dynamic builds on a longer tradition of work on Tiebout sorting, which explains how local geography and housing markets influence residential choices and patterns of socioeconomic stratification (Tiebout, 1957; Bayer et al., 2008).

Other work on socioeconomic spatial stratification[32] in educational contexts has identified factors such as funding inequality, school district fragmentation, and the racial and ethnic composition of districts as primary contributors to educational inequality (Ayscue & Orfield, 2015b; Boterman et al., 2019; Frankenberg et al., 2017). Others emphasize the differences in SES characteristics between districts and the

[32] Socioeconomic sorting in housing and education is the result of uneven spatial distribution of traits, abilities, economic resources, social status, access to education, and opportunities that are inherited across generations (Belsky et al., 2016; Bowles et al., 2009; Sniekers et al., 2017). One's position in the social hierarchy can be described as socioeconomic status (SES) based on education, occupation, economic resources, and family structure (Australian Bureau of Statistics, 2018; Shuttleworth & Lloyd, 2014). Social class also conveys one's position in the social hierarchy based on one's relationship to production, status, or ability to exercise power and control social resources (Weber, 1946).

variation or inequality in socioeconomic status within districts (Bischoff & Owens, 2019).

International comparisons add further complexity to this picture. According to the 2018 Program for International Student Assessment (PISA), high-income students in the United States are more socioeconomically segregated[33] than their peers in other wealthy nations (Schleicher, 2019). However, this does not mean that advantaged districts are simply spatially isolated from disadvantaged ones. In many U.S. metropolitan areas, advantaged districts cluster into contiguous areas of concentrated advantage. Previous work has shown that areas of concentrated advantage are not necessarily located near socioeconomically segregated districts (Author, TBD). This pattern suggests that the concentration of advantage may operate through distinct mechanisms that are not reducible to the processes driving disadvantage segregation.

Surprisingly, I find that factors associated with socioeconomic segregation, such as funding inequality, per-pupil spending, state political ideology, school district fragmentation, homeownership, and race, are not linked to these areas of concentrated advantage. Instead, intra-elite competition and higher home values emerge as key potential drivers. This suggests that areas with concentrated advantaged districts constitute a distinct form of spatial inequality which may be driven in part by economic competition among advantaged households for limited educational and community resources and local housing markets, rather than through processes typically linked to socioeconomic segregation.

**Patterns of Concentrated Socioeconomic Advantage**

Areas of concentrated socioeconomic advantage—clusters of geographically contiguous, socioeconomically advantaged school districts—are a widespread and persistent feature of the U.S. public education landscape. These clusters of advantaged

[33] The PISA used the isolation index to measure segregation, distinguishing between 'advantaged students' in the top quarter of the PISA index of economic, social, and cultural status and 'disadvantaged students' in the bottom quarter (Schleicher, 2019).

districts are typically located in suburban and exurban regions surrounding major metropolitan areas, but vary regionally (Traves, TBD). Unlike isolated advantaged districts, these areas represent larger, spatially connected ecosystems where students benefit not only from the resources of their own district but also from access to the shared social, economic, and educational benefits embedded within broader clusters of advantaged districts.

The segregation of disadvantaged students has been extensively documented (Ayscue & Orfield, 2015a; Boterman et al., 2019; Drake, 2020), along with work examining how parental school choices influence local sorting patterns (Ellison & Aloe, 2018). However, to my knowledge, no existing literature has integrated these processes into a unified explanation of how concentrated advantage forms and persists through underlying competition in education-linked housing markets.

To better understand the mechanisms underlying these areas, I offer a novel theoretical contribution by introducing a framework that links three processes: (1) the formation and persistence of areas of concentrated socioeconomic advantage, (2) the operation of local housing markets as competitive arenas for school district access, and (3) intra-elite competition—a dynamic in which socioeconomically advantaged families compete against one another for positional advantage within the public education system.

**Socioeconomic Sorting and the Limits of Segregation Models**

Existing frameworks for understanding spatial inequality in education have focused heavily on the segregation of disadvantaged students, emphasizing exclusionary processes that isolate low-income and minority students into lower-quality districts. These processes are often linked to school funding disparities, district fragmentation, and the racial and ethnic composition of districts (Ayscue & Orfield, 2015; Frankenberg et al., 2017; Richards & Stroub, 2014). While these studies have improved understanding of how spatial inequality harms disadvantaged students, they

offer limited insight into how advantaged districts cluster together into broader regions of concentrated socioeconomic advantage.

This distinction is critical: concentrated advantage is not simply the inverse of disadvantaged segregation. In fact, in many metropolitan areas, clusters of advantaged districts form without significant spatial isolation from disadvantaged districts (Author, TBD). This pattern suggests that the formation of concentrated advantage is driven by distinct mechanisms rooted in economic competition among advantaged households.

### Housing Markets, Parental Preferences, and Socioeconomic Sorting

Within this context, local housing markets play a central role in translating educational advantage into spatial patterns of concentrated socioeconomic advantage. In the United States, public school assignment is primarily tied to residential location, meaning that families compete for access to desirable districts through the housing market(Graeber, 2014; Markovits, 2019; Schleicher, 2019; U.S. Department of Education, 2021). This process creates local education markets (LEMs), where the desirability of neighborhoods is closely linked to perceived school quality.

Traditional rational choice theories suggest that families select neighborhoods based on objective indicators of school effectiveness (Ellison & Aloe, 2018). However, research increasingly shows that wealthier families, who have greater flexibility in their housing choices, make decisions that reflect perceptions of social and demographic desirability rather than purely academic considerations (Caetano, 2019; Chakrabarti & Roy, 2010; Cucchiara & Horvat, 2014; Ellison & Aloe, 2018; Holme, 2002; Jennings et al., 2015; Nieuwenhuis & Xu, 2021; Posey-Maddox et al., 2014; Rich & Jennings, 2015; Rowe & Lubienski, 2017). These families tend to prioritize neighborhoods with favorable socioeconomic and demographic profiles, using these attributes as proxies for educational and social quality (Malin, 2016; Owens & Massey, 2018).

Furthermore, high-income families rely heavily on social networks when making decisions about schools and housing. The presence of other high-SES families is itself a desirable neighborhood characteristic, not only for the presumed educational benefits but also for the social capital and network effects that come with living in proximity to other advantaged families (Altenhofen et al., 2016; Chetty et al., 2022). These social network effects further reinforce the clustering of advantage, as families seek access not just to good schools, but to entire advantaged social environments.

### Intra-Elite Competition and the Formation of Concentrated Advantage

To conceptualize mechanisms underlying areas of concentrated advantage among school districts, I draw on the concept of intra-elite competition proposed by Turchin and Korotayev (2020). Intra-elite competition refers to competition among relative socioeconomic elites for access to limited resources, whether desirable jobs or educational opportunities. In the context of public education, the relevant scarce good is not admission to an exclusive private school, but residential access to high-status public school districts within spatially concentrated regions of advantage.

Although public school districts may not be commonly viewed as sites of elite competition, they increasingly serve as arenas for positional struggles among socioeconomically advantaged families. Affluent families with children in public schools compete to secure their place within the highest-status clusters of advantaged districts, which offer strong educational outcomes and valuable peer networks, reputational benefits, and pathways to future opportunities (Schleicher, 2019). This positional competition drives up housing prices within these areas, pricing out less-advantaged families and further reinforcing the spatial concentration of advantage (Lubienski et al., 2022; Rowe & Lubienski, 2017).

Critically, this reframes concentrated advantage not as a byproduct of segregation but as the spatial manifestation of intra-elite competition within local education-linked housing markets. Concentrated advantage reflects the geographic outcome of high-SES families competing for relative positional advantage, not merely the exclusion of

lower-income families. Rather than structural exclusion alone, this competitive dynamic helps explain why advantaged districts tend to cluster together in certain areas, even in the absence of segregation between advantaged and disadvantaged districts.

## Data and Methods

### *Data*

Data on student, parent, and school district demographics come from the National Center for Education Statistics (NCES) 2016-2020 American Community Survey (ACS) Parent Tabulation. I obtained School district expenditure data from the 2021 Common Core of Data (CCD) School District Finance Survey (F-33) provided by the National Center for Education Statistics (NCES). School district fragmentation data come from the 2020-2021 NCES Common Core of Data (CCD).

Data on state GDP in millions of 2019 dollars were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts SAGDP1: Gross Domestic Product (GDP) summary, annual by state for 2019. Data on state political orientation come from the NOMINATE Political Values for the United States, the District of Columbia, and Puerto Rico: 2019 to 2020 compiled by the Americans for Democratic Action (ADA) and the AFL-CIO Committee on Political Education (COPE) (Berry et al., 2010). These data are only available at the state and not the school district levels.

### *Estimating Socioeconomic Advantage*

I use an index to measure the relative level of socioeconomic advantage of families with children attending the schools in the district compared to other districts. This comparative area measure provides a numerical score indicating the district's position based on the relative family socioeconomic advantage of families in that district compared to other districts. The index comprises university attainment (0.4), median household earnings (0.3), white-collar employment (0.15), married mothers, and owner-occupied housing units (0.05) of parents with children enrolled in the district

where they live. Weights were chosen based on the theoretical and conceptual framework outlined above and the results of a principal component factor analysis, where the percentage of parents in a school district with a bachelor's degree or higher is represented by Principal Component 1.

I conceptualize the relatively socioeconomically advantaged parents of public school students who make up the population in areas of concentrated advantage as members of a distinct group analogous to Lind's (2020) concept of the professional bourgeois[34] and as Ehrenreich & Ehrenreich's (1979) professional-managerial class (PMC). Generally, this group comprises individuals with university degrees who work in professional or managerial jobs and pass their position to their children through education rather than wealth or property (Ehrenreich & Ehrenreich, 1979). However, despite the cultural, bureaucratic, or technocratic power they wield, many live on moderate incomes (Ehrenreich & Ehrenreich, 1979). High-quality private school tuition can be a significant expense for these families, who often rely on state subsidies to cover the cost of their children's education (Standing, 2014). This creates competition within the public system, as socioeconomically advantaged parents compete for homes in the best school districts, they can reasonably afford to prepare their children for university and professional life (Altenhofen et al., 2016).

University attainment is measured by the presence of at least one parent in the household who holds a bachelor's degree or higher. This factor is given more weight due to its significant role in intergenerational reproduction. According to Lind (2020), university educational attainment is the defining line between the working class and the overclass, including the professional-managerial class, who pass their class position to children primarily through education (Ehrenreich & Ehrenreich, 2013). It also motivates enrichment-focused parenting behaviors and decisions about where to

[34] Lind (2020) provides a model of the contemporary American class structure, which divides society into the university-educated overclass and the underclass, based on education and geography. In his model, overclass members have university degrees and tend to live and work in and around hub cities. In contrast, the non-university-educated underclass is divided between those serving the hub city overclass and the heartland working class.

live and send children to school (Belsky et al. 2016; Bloome et al. 2018; Hout & Janus 2011; Mare 1991, 2016; Pfeffer 2008; Pfeffer and Hertel 2015; Roksa et al. 2007).

Household earnings are measured as income and benefits in 2020 inflation-adjusted dollars (Geverdt, 2019). Higher earnings indicate greater advantage and are intrinsically linked to educational attainment and occupational prestige. They provide better security, stability, and access to high-quality education and enriching experiences. Homeownership is measured by housing tenure, whether the unit is occupied by its owner. It contributes to a family's socioeconomic advantage, is linked to financial security, family stability, and better outcomes for children, and shapes residential patterns within and across districts (Conley, 2001; Kim & Sherraden, 2011)

Occupational prestige is measured as whether one or both parents in a household hold a white-collar job, which I coded according to the categorizations of the U.S. Bureau of Labor Statistics, 2018 Standard Occupational Classification Manual (U.S. Bureau of Labor Statistics, 2018). Managerial and professional roles are considered the most prestigious, requiring high levels of education, training, knowledge, and social connections (Oakes et al., 2003). They are generally compensated with higher social status, stability, benefits, flexibility, and income (Oakes et al., 2003).

Family structure is captured by maternal marital status. Being born to married parents confers significant benefits to children's lives (Bernardi et al., 2019). One of the most beneficial aspects of socioeconomic advantage for children is family stability, given the marriage patterns for members of this group, particularly considering the positive impact of being raised by married biological parents (Jeynes, 2023; Reeves & Pulliam, 2020; Shriner et al., 2010). Therefore, family structure, whether children are raised by their married parents or in another arrangement, is an important indicator and determinant of socioeconomic advantage.

### *Estimating Areas of Concentrated Socioeconomic Advantage*

I use Local Moran's I (LMI) with Queen's contiguity to estimate spatial sorting patterns. For each district, LMI produces a score that indicates whether the district is

part of a cluster of similar advantage index scores—a hotspot—or an outlier with differing values—a cold spot. I use the Local Moran's I tool from the Spatial Analysis Toolbox in QGIS 3.28.1. LMI is calculated on a binary socioeconomic advantage index variable, indicating whether a district is in the top 20% of socioeconomic advantage index (or not):

(2)

$$I_{\mathrm{i}} = z_i \Sigma_{\mathrm{j}} w_{ij} z_j$$

Where:

$z_i$ and $z_j$ are the standardized values of the school district socioeconomic advantage index at school districts $i$ and $j$, respectively (i.e., the value minus the mean, divided by the standard deviation).

$w_{ij}$ is the spatial weight between $i$ and $j$ based on Queen's contiguity criterion. This type of spatial weights matrix considers a school district to be a neighbor with any other district that shares a border, whether at an edge or a corner.

Positive values of Local Moran's I indicate spatial autocorrelation of high or low school district socioeconomic advantage values. Negative values indicate dispersion or segregation, with higher absolute values indicating stronger spatial autocorrelation. Values closer to 0 indicate no spatial autocorrelation. Local Moran's I results are interpreted through a Local Spatial Indicators of Association (LISA) map.

The LISA map is interpreted as follows:

High-High (HH) Clusters: Areas where other advantaged districts surround advantaged districts are shown in red.

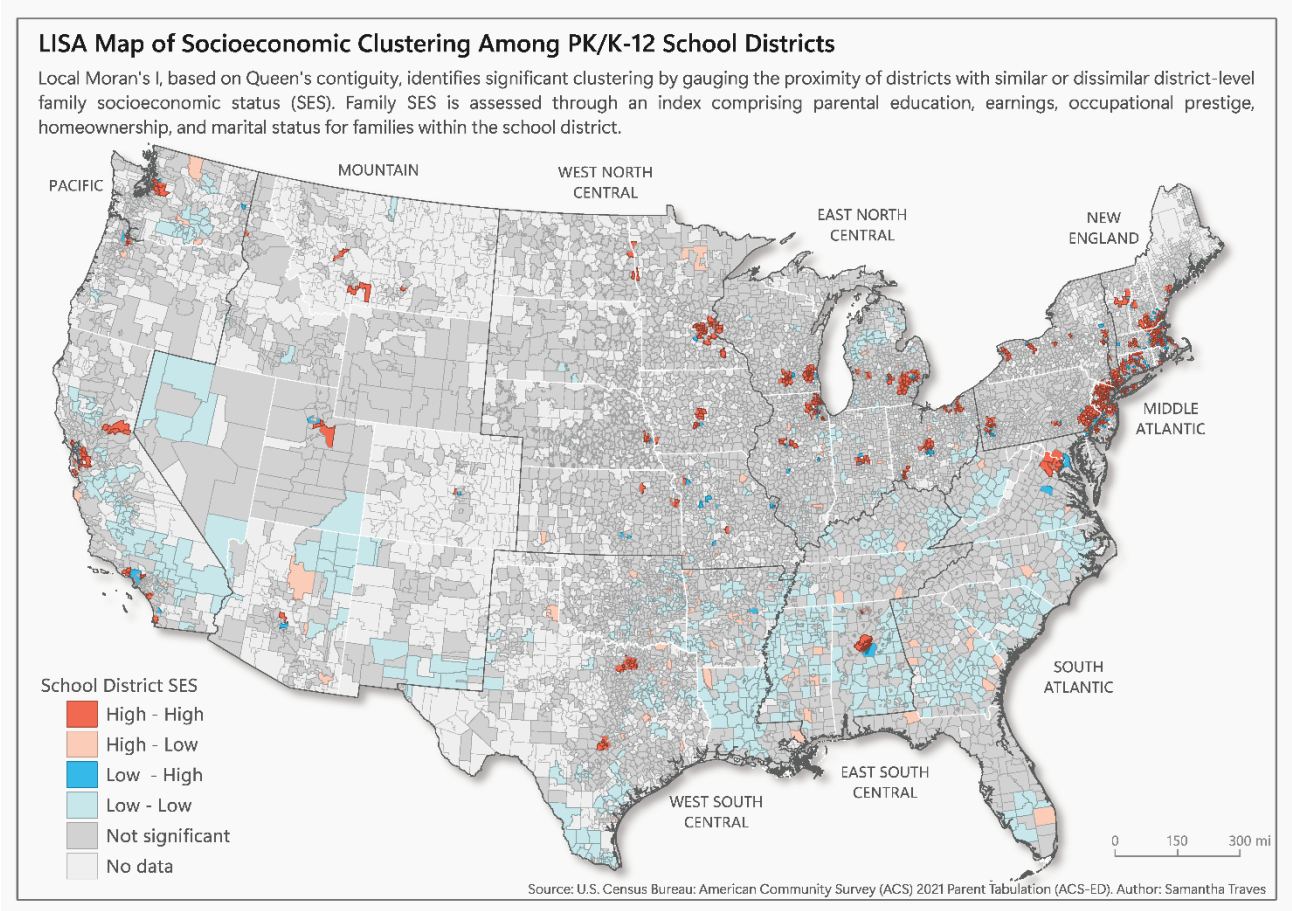
Low-Low (LL) Clusters: Areas where another non-advantaged district surrounds non-advantaged districts are shown in light blue.

High-Low (HL) Outliers: Areas where non-advantaged districts surround advantaged districts are shown in pink.

Low-High (LH) Outliers: Areas where advantaged districts surround non-advantaged districts are shown in blue.

Grey indicates that a district is not statistically significantly spatially related to its neighbors. Mapping was done in QGIS 3.28.1.

Figure 11. LISA Map of Areas of Spatial Stratification Among Public School Districts, 2021



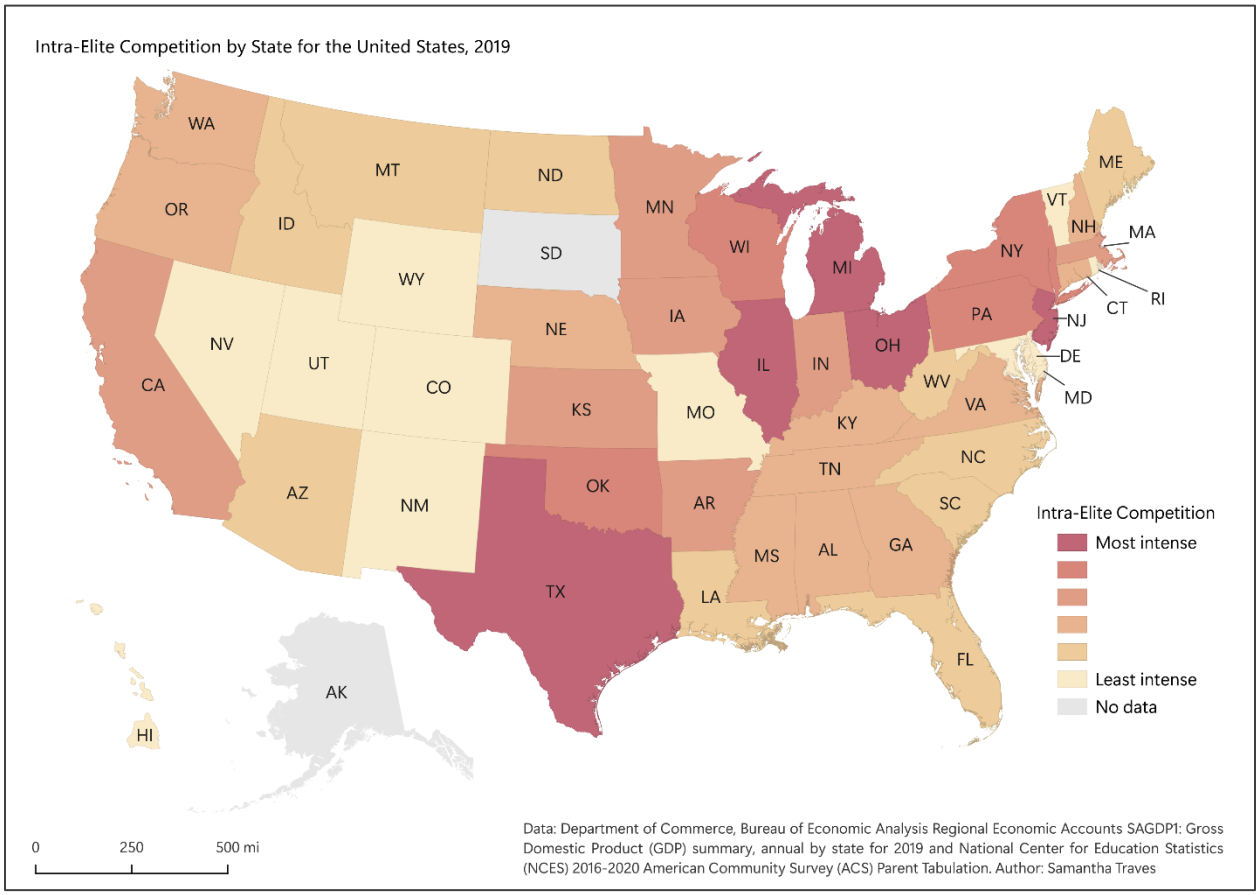

*Note*. This is a LISA map illustrating the spatial relationships between school districts and their neighbors based on family socioeconomic advantage. Red indicates advantaged districts surrounded by other advantaged districts (advantage clustering); light blue represents non-advantaged districts bordered by non-advantaged districts (non-advantage clustering); pink denotes advantaged districts encircled by non-advantaged districts (advantage isolation); blue shows non-advantaged districts surrounded by advantaged districts (non-advantage segregation); and grey indicates districts not significantly related to their neighbors. The map was created using QGIS 3.28.1

### *Estimating Intra-Elite Competition*

Intra-elite competition refers to the rivalry among members of the elite class for power, status, and resources within a society. Intra-elite competition in the economic domain is measured using the method described by Turchin and Korotayev (2020) as average elite income scaled by GDP per capita (ε-1), calculated by dividing the average income of families in the top 20% of school district socioeconomic advantage values by the GDP per capita; this scaling allows for measuring the relative elite income within a state's economic context. Higher values of ε-1 indicate more intense intra-elite competition, while lower values indicate less intense competition.

Figure 12 shows that Ohio, Michigan, Illinois, New Jersey, and Texas have the most intense competition among advantaged families with children enrolled in the public school district in which they reside.

Figure 12. Levels of Intra-Elite Competition by State in 2019



*Note*. Figure 12 is a choropleth map showing the level of intra-elite competition for states. Intra-elite competition is calculated as the average income of families in the top 20% of the school district socioeconomic advantage, scaled by the state GDP per capita. Data on state GDP in millions of 2019 dollars were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts SAGDP1: Gross Domestic Product (GDP) summary, annual by state for 2019. Data on parent demographics come from the National Center for Education Statistics (NCES) 2016-2020 American Community Survey (ACS) Parent Tabulation. The map was created using QGIS 3.28.1

### *Estimating School District Fragmentation*

School district fragmentation refers to the division of a region into multiple, smaller school districts, each operating independently. School district fragmentation is measured as the number of school districts per 10,000 students in each state, following the method used by Richards and Stroub (2014). While this fragmentation has been linked to inequality in resource allocation and demographic segregation, it can also foster better local control and responsiveness, enabling districts to tailor educational programs to meet community needs and values. This autonomy encourages innovation and experimentation, potentially leading to broader educational enhancements when successful initiatives are shared. The competitive environment among districts can drive improvements and expand educational options for parents and students. Additionally, smaller districts may promote democratic control over education and foster stronger community ties among students and their families.

### *Estimating School District Spending Inequality*

School district spending inequality refers to the significant disparities in financial resources allocated among different school districts within a state. These disparities are primarily driven by variations in local property taxes and state funding formulas, resulting in wealthier districts having more funding than poorer ones in some states. Inequality in total district expenditure by state is calculated using the mean log

deviation (MLD), in line with the method used by U.S. Census Bureau (Proctor et al., 2016):

$$MLD = \exp\left[\left(\frac{1}{n}\right) * \Sigma\left(\ln\left(\frac{y_i}{\bar{y}}\right)\right)\right] - 1 \quad (2)$$

where:

$y_i$ is the elementary-secondary expenditure for the $i$-th school district in the state,

$\bar{y}$ is the average school district expenditure for the state,

$n$ is the number of school districts in the state.

MLD measures inequality in spending among school districts within a state. Higher MLD values indicate inequality, while lower MLD values indicate equality.

***Estimating State Political Orientation***

State political orientation refers to the overall ideological leaning of a state's legislative body, determined by its members' cumulative voting behaviors and policy preferences. Estimates of state political orientation come from the 2017 values of the NOMINATE political orientation measure. This measure calculates the average ideological position of elected officials in each state by considering their policy preferences based on interest-group ratings compiled by the Americans for Democratic Action (ADA) and the AFL-CIO Committee on Political Education (COPE) (Berry et al., 2010). This standardized metric enables comparisons across states, with higher values indicating more progressive state governments and lower values representing more conservative state governments.

***Estimating Population Density***

School district population density quantifies the concentration of residents within a specific geographic area. This metric calculates the number of individuals per square mile within each district. High population density indicates urban or densely

populated suburban areas, while low population density suggests rural or sparsely populated regions.

**Analysis**

Missing data were addressed using full information maximum likelihood (FIML) estimation in R (lavaan), assuming a multivariate normal distribution and that data were missing at random (MAR) (Rosseel, 2012). Pearson's correlation coefficient (*r*) was used to assess the linear association between school district socioeconomic advantage and each predictor. This method assumes continuous variables, linear relationships, and approximately normal distributions.

I examine the relationship between factors commonly thought to be associated with segregation and then competition-related factors at the state and district level in areas of concentrated advantage:

(3)

$$LMI_{ij} = \beta_0 + \beta_1 X_{1_{ij}} + \beta_2 X_{2_{ij}} + \beta_3 X_{3_{ij}} + \beta_4 X_{4_{ij}} + \beta_{(5)X_{5_{ij}}} + \beta_6 X_{6_{ij}} + \beta_7 X_{7_{ij}} + \beta_8 X_{8_{ij}} + \beta_9 X_{9_{ij}} + \beta_{10} X_{10_{ij}} + \beta_{11} X_{11_{ij}} + u_i + e_{ij}$$

Where:

$LMI_{ij}$ are Local Moran's I for advantaged districts in state $i$ and district $j$.

$B_0$ is the intercept, representing the average LMI when all factors equal zero.

$B_1$ to $\beta_{11}$ are the regression coefficients for the respective predictor variables:

$X_{1_{ij}}$ to $X_{11_{ij}}$ are standardized values of the predictor variables: percent of school district revenue from local sources, district population density, 2019 median home value, intra-elite competition, district expenditure inequality, state government political orientation, school district fragmentation, percentage of owner-occupied housing, the percentage of white residents in the state.

$u_i$ is the random effect for the state $i$, accounting for the correlation between districts within the same state.

$e_{ij}$ is the residual term, representing the unexplained variation in LMI.

The model incorporates local district funding, population density, home value, intra-elite competition, district funding inequality, state NOMINATE political orientation score, school district fragmentation, homeownership, and the proportion of white residents as fixed effects. Random effects are incorporated through state-level random intercepts to capture variation between states. I chose not to treat race/ethnicity as an interaction with socioeconomic advantage to isolate the underlying class dynamics.

The model is estimated using the linear mixed effects regression framework, with the lmer function, and includes a random intercept for the grouping variable. I assessed the model's goodness of fit using REML criterion. All analyses were conducted using R version 4.3.1 (R Core Team, 2023).

**Findings**

The analysis builds on previous work by Altenhofen and colleagues (2016), Boterman and colleagues (2019), and Owens, Reardon, and Jencks (2016) on opportunity hoarding to show that factors associated with areas of concentrated socioeconomic advantage in U.S. public education are distinct from those commonly associated with socioeconomic segregation. More than exclusionary processes or demographic factors, competition plays a role in areas where advantaged districts are clustered. Based on data from 7,870 school districts across 47 states, predictors explain 28.4% of the variability in the spatial clustering of advantaged districts. This leaves considerable room for additional explanatory factors outside the model. Despite this, findings suggest that localized economic competition among affluent families is a key mechanism behind concentrated advantage.

### *Correlation of Fixed Effects: Foundations of Concentrated Advantage*

1. Intra-elite competition is related to local education funding and housing markets.

The correlation analysis shows a strong relationship between intra-elite competition, housing markets, and local school district revenue (Table 1). Intra-elite competition exhibits a moderate positive correlation with both median home value ($r = 0.47$, $p < .001$) and the local share of school district revenue ($r = 0.38$, $p < .001$). These relationships indicate that areas with higher property values and a greater reliance on local property taxes tend to experience more intense competition among affluent families for access to desirable districts.

The moderate correlation between local school revenue share and median home value ($r = 0.42$, $p < .001$) reinforces this connection between housing markets and school finance, underscoring the importance of property wealth in shaping both educational access and district desirability.

2. Intra-elite competition is less related to population density and state political orientation.

Intra-elite competition exhibits weak, negative correlations with both population density ($r = -0.05$, $p < .001$) and state political orientation ($r = -0.07$, $p < .001$). These small coefficients suggest that competition among advantaged families is not strongly shaped by urban density or state-level partisan alignment. This indicates that spatially concentrated advantage emerges across a wide range of political and geographic contexts, rather than being confined to conservative states or low-density suburban areas.

3. There is a modest relationship between intra-elite competition and race.

A modest positive correlation ($r = 0.15$, $p < .001$) exists between intra-elite competition and the proportion of white residents, indicating some overlap between race and spatial patterns of competition. However, this relationship is considerably weaker than those involving economic factors, such as home values and local funding.

This supports the argument that concentrated advantage is primarily driven by economic competition rather than explicit racial sorting, although race and class remain partially entangled in residential decision-making.

***Summary of Fixed Effects Correlations***

These correlations suggest that local economic factors, especially property values and property-tax-dependent school funding, are closely tied to heightened intra-elite competition. This competition appears to emerge independently of state political context or urban density, indicating that intra-elite competition is a flexible, locally driven process transcending broad regional divides. Overall, local economic factors—particularly property values and local education revenue—have the clearest ties to heightened competition among advantaged families. At the same time, the correlations are moderate enough to avoid concerns about severe multicollinearity. While education finance and housing markets could work in tandem to shape areas of concentrated advantage, intra-elite competition stands out as a distinct and influential factor in these areas.

Table 3. Correlation of Fixed Effects

| | Variables | Cor | t-value | p-value | 99% CI |
|---|---|---|---|---|---|
| 1 | local percentage of total school district revenue and median home value | .42*** | 40.52 | < 2.2e-16 | [.39, .44] |
| 2 | intra-elite competition and local school district revenue percentage | .38*** | 36.65 | < 2.2e-16 | [.36, .41] |
| 3 | intra-elite competition and state political orientation. | -.07*** | -6.32 | 2.735e-10 | [-.10, -.04] |
| 4 | intra-elite competition and district population density | -.05*** | 4.27 | 2.017e-05 | [.02, .08] |
| 5 | intra-elite competition and median home value | .47*** | 47.04 | < 2.2e-16 | [.45, .49] |
| 6 | intra-elite competition and school district funding inequality | .03 | 2.87 | .004 | [.00, .06] |

| | | | | | |
|---|---|---|---|---|---|
| 7 | intra-elite competition and school district fragmentation | .09*** | 7.66 | 2.103e-14 | [.06, .11] |
| 8 | intra-elite competition and state white population | .15*** | 13.89 | < 2.2e-16 | [.13, .19] |

*Note:* Predictors were scaled using Z-score normalization. Asterisks (***) represent p-values less than .001.

***Direct factors in Areas of Concentrated Advantage***

The fixed effects estimates provide a clearer picture of which factors directly predict the spatial clustering of advantaged districts (Table 4).

1. Intra-elite competition is the strongest predictor of concentrated advantage.

Intra-elite competition has the strongest and most statistically significant association with concentrated advantage ($\beta = 0.35$, $p < .001$). This confirms that competition among affluent families for access to high-status districts is a key driver of spatially concentrated advantage. This supports the core theoretical argument that concentrated advantage reflects positional competition within education-linked housing markets, rather than simply the spatial inverse of disadvantaged segregation.

2. Home values play a significant role in areas of concentrated advantage; however, local education funding is less robust.

Median home values also show a robust positive relationship with concentrated advantage ($\beta = 0.22$, $p < .001$). This finding is consistent with prior research that links housing markets to educational opportunities, reinforcing the role of property wealth as a marker of district desirability and a mechanism for pricing out lower-income families (Chakrabarti & Roy, 2015).

The local share of school district revenue also exhibits a small but statistically significant positive association ($\beta = 0.05$, $p < .001$). This suggests that districts more reliant on local funding tend to cluster into areas of concentrated advantage, likely because higher local revenue capacity correlates with socioeconomic advantage and reinforces localized competition for desirable districts.

3. Concentrated advantage is largely a suburban phenomenon.

Population density is negatively associated with concentrated advantage ($\beta = -0.05$, $p < .001$), indicating that clusters of advantaged districts tend to be located in suburban and exurban areas. This pattern aligns with the broader geography of suburban advantage in the United States, where affluent families compete for space in lower-density residential areas with desirable public schools.

4. Spending inequality, fragmentation, state political orientation, and homeownership rates do not play significant roles in areas of concentrated advantage.

Several factors traditionally associated with disadvantaged segregation or educational inequality show no significant correlation with concentrated advantage. These include: (1) school district expenditure inequality ($\beta = 0.00$, $p = 1.000$), (2) school district fragmentation ($\beta = 0.04$, $p = 1.000$), (3) state political orientation ($\beta = 0.02$, $p = 1.000$), (4) the percent of white residents ($\beta = -0.07$, $p = 0.050$), and (4) the percentage of owner-occupied housing ($\beta = -0.01$, $p = 1.000$).

The lack of significant relationships for these factors challenges the assumption that concentrated advantage and disadvantaged segregation share the same underlying drivers. Concentrated advantage, unlike disadvantaged segregation, emerges primarily from localized economic competition rather than school district fragmentation, inequality, or partisan educational policies.

Table 4. Summary of Fixed Effects

| Model | Estimate | Std. Error | t-value | p-value | 99% CI |
|---|---|---|---|---|---|
| (Intercept) | .28*** | .03 | 9.03 | .001 | [.20, .35] |
| Intra-elite competition (district) | .35*** | .01 | 25.76 | .001 | [.31, .39] |
| Median home values (district) | .22*** | .02 | 13.89 | .001 | [.18, .26] |
| Local funding % (district) | .05*** | .01 | 3.93 | .001 | [.02, .09] |

| Model | Estimate | Std. Error | t-value | p-value | 99% CI |
|---|---|---|---|---|---|
| Population density (district) | -.05*** | .01 | -3.95 | .001 | [-.08, -.02] |
| District expenditure inequality (district) | .00 | .01 | .03 | 1.000 | [-.02, .02] |
| White residents % (district) | -.07 | .04 | -1.87 | .050 | [-.16, .03] |
| Owner-occupied housing % (district) | -.01 | .01 | -.70 | 1.000 | [-.04, .02] |
| School district fragmentation (state) | .04 | .03 | 1.32 | 1.000 | [-.04, .12] |
| Political orientation (state) | .02 | .03 | .59 | 1.000 | [-.06, .10] |

*Note:* Predictors were scaled using Z-score normalization. Asterisks (***) represent p-values less than .001.

### *Random Effects: State-Level Variation and Historical Context*

The random effects reveal meaningful variation across states in the prevalence of concentrated advantage (variance = 0.03, SD = 0.18). This state-level variability suggests that local competition and property wealth are primary drivers, but the broader policy and development context within individual states also shapes where and how concentrated advantage emerges. Historical patterns of suburban development, zoning regulations, and state education finance systems likely play a secondary but important role in conditioning the intensity of intra-elite competition.

## Discussion

These findings suggest that spatially concentrated socioeconomic advantage in U.S. public education is primarily driven by localized economic competition among affluent families, rather than by structural or exclusionary mechanisms commonly associated with disadvantaged segregation. The most robust predictor in the model is intra-elite competition, which captures the intensity of competition among advantaged families for access to high-status public school districts. This supports the argument that concentrated advantage is not merely the inverse of segregation but reflects

distinct processes rooted in positional competition within education-linked housing markets.

Housing markets and school finance systems may be contributing mechanisms. Median home values and local school district revenue shares have a strong and statistically significant association with concentrated advantage. This suggests that areas with higher property values and a greater reliance on local funding tend to foster more intense competition and, in turn, spatial clustering of advantaged districts. These findings highlight a feedback loop in which property wealth reflects and reinforces school districts' desirability, pricing out lower-income families while intensifying demand among affluent ones.

The geography of concentrated advantage further underscores this dynamic. Population density is negatively associated with spatial clustering, indicating that advantaged districts tend to be in suburban and exurban areas. These lower-density settings offer exclusivity and residential control, allowing affluent families to compete for access to desirable public schools without relying on private education. This pattern aligns with long-standing forms of suburban stratification, where housing and schooling operate as tightly coupled forms of social positioning.

Contrary to common assumptions, several factors typically associated with educational inequality or disadvantaged segregation, such as school district fragmentation, state political orientation, and funding inequality, do not significantly predict the clustering of advantaged districts. Although there is a modest relationship between intra-elite competition and the proportion of white residents, race does not emerge as a significant factor in the multivariate model. These results suggest that concentrated advantage is primarily an economic phenomenon rather than a racial or partisan one. Affluent families compete for scarce educational resources across various political and geographic contexts, not just in conservative or racially homogeneous areas.

However, the model explains only about a third of the variation in spatial clustering, with most of the explanatory power concentrated at the local rather than the state level. The inclusion of state-level random effects reveals modest variation, suggesting that broader institutional or historical contexts, such as zoning regimes or school finance systems, may still shape how local competition plays out. However, the primary drivers of concentrated advantage appear to lie in the interplay between local housing markets and public school finance, which create the conditions for intense positional competition among the professional-managerial class.

These findings support a conceptual distinction between the mechanisms that produce concentrated advantage and those that generate disadvantaged segregation. While the latter is often linked to structural exclusion, fragmented governance, or racial sorting, concentrated advantage stems from the strategic behavior of advantaged families within local economic systems. This highlights the necessity of policy approaches that address the localized and competitive nature of educational advantage, particularly reforms that reduce the role of property wealth in determining educational access.

### *Contextualizing the Role of Intra-Elite Competition in Areas of Concentrated Advantage*

These findings contribute to and extend a growing body of research on socioeconomic inequality in U.S. public education by emphasizing a distinct set of mechanisms that drive concentrated advantage, as opposed to the more frequently studied dynamics of disadvantaged segregation. While prior scholarship has largely focused on how school district funding inequality, school district fragmentation, and racial composition reproduce disadvantage (Ayscue & Orfield, 2015; Boterman et al., 2019; Frankenberg et al., 2017; Richards & Stroub, 2014), these findings shift the focus toward how economic competition among the socioeconomically advantaged structures opportunity through clustering in select public school districts.

Historically, researchers have explored how structural inequalities sort students into separate districts—those rich in opportunity and those that reproduce disadvantage (Owens et al., 2016). Nevertheless, despite this extensive body of work and decades of reform efforts, educational inequality and spatial stratification remain entrenched. As

the "big sort" thesis illustrated, families—particularly those with resources—have increasingly clustered by lifestyle, values, and socioeconomic status, reinforcing regional divisions. As my previous work shows, concentrated advantage persists in broad, suburban regions, particularly around metropolitan cores, and policy interventions have not substantially reduced this concentration. This is particularly important, given that the 2018 PISA results show that high-income students in the U.S. are more socioeconomically segregated than their peers in other developed nations (Schleicher, 2019).

Rather than assuming that concentrated advantage is simply the spatial inverse of segregation, my findings underscore that it is not necessarily a product of exclusion or inequality in the same sense. Previous assumptions have conflated advantage clustering with disadvantaged segregation; however, my analysis shows these processes diverge in their spatial expression and underlying drivers. While disadvantaged segregation often reflects systemic exclusion through district fragmentation, underfunding, or residential segregation, concentrated advantage emerges from strategic positioning within local housing markets, driven by competition for educational prestige among relatively affluent families.

These findings add nuance to this narrative by drawing on the concept of intra-elite competition, adapted from Turchin and Korotayev (2020). This concept describes competition among elite aspirants for a limited number of high-status positions. In my application, this translates into affluent families competing for residential access to high-performing public school districts. These families are not simply reacting to school quality metrics; they are responding to broader signals of status and opportunity embedded in housing markets, school finance regimes, and peer group composition. This finding is consistent with research on local education markets, which has shown that parents, particularly those with more resources, tend to prioritize perceived demographic and socioeconomic traits over school performance data (Cucchiara & Horvat, 2014; Ellison & Aloe, 2018; Holme, 2002a, 2002b; Rich & Jennings, 2015).

Moreover, social networks play a reinforcing role in this dynamic. Research has shown that access to high socioeconomic status (SES) peers is a key predictor of upward mobility (Chetty et al., 2022). Families often rely on these networks when selecting schools (Altenhofen et al., 2016). These findings suggest that the competition for school access is also a competition for social capital, which further increases the desirability of clustered advantaged districts. By forming residential enclaves with shared resources and reinforcing social ties, advantaged families collectively shape educational opportunity structures that extend beyond individual schools or neighborhoods.

While segregated disadvantage is often concentrated in a small number of districts, my findings suggest that concentrated advantage can potentially affect a larger population of students. This has important implications for how we understand the reach and impact of stratification in the education system. Advantaged districts do not only exist in isolation, but can form interconnected communities, and students excluded from them may be cut off from the spatial opportunity structures they represent—not just better schools, but also safer neighborhoods, more valuable peer networks, and more stable family models and institutions (Galster & Sharkey, 2017).

Finally, my results challenge the relevance of several commonly cited drivers of educational inequality. In my analysis, school district spending inequality, fragmentation, homeownership rates, racial composition, and state political orientation do not significantly predict the presence of concentrated advantage. This raises questions about efforts that target these factors without considering the competitive behaviors of advantaged families. Reform strategies that overlook the demand-side dynamics—how relatively advantaged families drive and maintain inequality through competition—may fail to address the core forces shaping spatial advantage in public education.

In summary, these findings provide a critical perspective on educational stratification by shifting the focus from exclusion and deficiency to spatial opportunity hoarding through competition. This perspective aligns with other recent work that emphasizes

how affluent families engage in opportunity hoarding and use local public systems to secure class reproduction (Roda & Sattin-Bajaj, 2024). It underscores the importance of addressing not only the barriers faced by disadvantaged families but also the incentives and behaviors of advantaged families that reproduce inequality across generations.

**Implications and Conclusions**

The persistence of areas of concentrated advantage underscores the need for policy approaches that expand access to the types of spatial opportunity structures found in these advantaged clusters, rather than approaches that simply redistribute resources or restrict advantages within these areas. Consequently, policies designed to reduce spatial inequality in U.S. public education must address the economic and geographic mechanisms reinforcing concentrated advantage. For example, policies aimed at redistributing school funding often assume that equalizing resources across districts will reduce spatial inequality. However, this analysis suggests that such policies may leave the underlying positional competition driving affluent families to cluster together untouched.

While this analysis identifies intra-elite competition as a key driver of concentrated advantage, it also highlights the need for further research into the broader institutional and policy contexts that shape these competitive dynamics. The considerable state-level variation in the prevalence of concentrated advantage suggests that state education policies, housing regulations, and economic development patterns likely condition how intra-elite competition operates in different regions. Efforts to improve educational opportunity for students outside areas of concentrated advantage should focus on replicating the beneficial features of spatially concentrated opportunity in new or underserved contexts. This could include developing spatial educational opportunity zones in areas that lack concentrated advantage, combining high-quality schools with investments in housing, transportation, and community infrastructure to extend educational opportunity-enhancing spatial conditions to more communities.

### Future Research

These findings contribute to our understanding of how concentrated advantage forms and persists; however, future research is needed to identify the other mechanisms and latent variables. This work is needed to develop better strategies for replicating beneficial opportunity structures in new contexts and exploring how such efforts can succeed in different geographic, economic, and policy environments. This could include identifying the specific features of spatially concentrated advantage that most directly contribute to beneficial student outcomes, such as school quality, peer networks, family social capital, and local/regional economic geography. How variations in state funding formulas, district consolidation policies, and school choice programs influence the intensity of intra-elite competition and the spatial clustering of advantage.

Other areas that would benefit from further analysis include: (1) The role of land-use regulations and exclusionary zoning in shaping the housing supply in and around desirable districts, particularly in suburban and exurban areas where concentrated advantage is most common. (2) How shifts in housing markets, district boundaries, and economic conditions affect the formation and persistence of areas of concentrated advantage over time. (2) Comparisons of mechanisms across metropolitan regions with different governance structures (e.g., fragmented vs. regionally integrated systems) to assess how governance arrangements shape the role of intra-elite competition in socioeconomic spatial stratification in public education.

### Limitations

The findings reflect cross-sectional patterns during a specific period. They may not fully capture long-term trends or evolving dynamics in housing and education markets, especially those related to pre- and post-COVID-19 restrictions and economic downturn. Future longitudinal studies could better assess how shifts in economic conditions, housing affordability, and education policy shape the formation and persistence of concentrated advantage over time. The analysis focuses on the state and

district levels, but it does not account for variation within districts (catchment areas), where intra-district socioeconomic sorting may also play a significant role. Future work should consider multi-scalar approaches that capture both intra- and inter-district intra-elite competition and housing market processes.

The model does not directly incorporate state-level regulatory and policy environments, such as school finance systems, zoning laws, or regional governance frameworks. These likely influences how intra-elite competition operates in different contexts. Incorporating these broader structural factors would provide a more comprehensive picture of the multilevel processes that shape concentrated advantage. While this analysis identifies associations between intra-elite competition, housing markets, and concentrated advantage, it does not establish causal relationships.

**Research Ethics Statement**

I confirm that the research presented in this study has followed ethical principles in line with the Declaration of Helsinki of 1964 and its subsequent revisions, as well as Section 12 ("Informed Consent") of the American Sociological Association's Code of Ethics. The research did not involve human subjects and, therefore, does not fall under the category of human subjects research as defined by established guidelines. The data used in this study were obtained from publicly available datasets without direct involvement with human subjects, eliminating potential ethical concerns related to their welfare and privacy. Based on these facts, there is no requirement for approval from an Institutional Review Board (IRB) or a similar ethics committee.

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## Preface to Chapter 6

Chapter 6 builds on the findings from Chapter 5, which show that areas of concentrated advantage among U.S. school districts are linked to higher home prices, raising the question of whether paying a premium to live in these areas is truly worthwhile. In Chapter 4, I identified the locations of these areas of concentrated advantage, while Chapter 5 explored some of the factors that might explain their formation. Chapter 6 extends this analysis by examining whether students in these areas of concentrated socioeconomic advantage achieve better academic outcomes than those in advantaged districts outside these areas.

In Chapter 4, I used Local Indicators of Spatial Association (LISA) maps to highlight statistically significant areas of concentrated advantage across U.S. PK/K-12 school districts, revealing consistent patterns around, but not within, city boundaries, particularly in the Northeast and Midwest. Results from Chapter 5 indicate that intra-elite competition is associated with these areas of advantage, whereas factors commonly linked to segregation, such as school funding inequality, per-pupil spending, reliance on local funding, and the racial and ethnic makeup of districts, were not as significant.

I investigate whether living in an area of concentrated advantage provides a notable academic benefit compared to other spatial sorting patterns, specifically, whether these districts outperform similarly socioeconomically advantaged districts located outside these areas. I show that advantaged districts within areas of concentrated advantage outperform disadvantaged districts and similarly advantaged districts outside these areas, even after controlling for variables such as school district funding inequality, per-pupil spending, ethnic composition, state-level economic competition, and child poverty.

Finally, I discuss these findings in light of the broader surrounding environment's role in the superior academic performance of students in these areas, in addition to the immediate district environment, including family background. I also consider whether

the most competitive families with the brightest children are those most likely to afford to live in these areas of concentrated advantage due to underlying social, biological, economic, and structural factors.

# Chapter 6: Geography Matters: School District Socioeconomic Context Influences Academic Performance

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**Abstract**

This study investigates the impact of areas of concentrated socioeconomic advantage on school district academic performance in the United States. Using data from the American Community Survey Parent Tabulation (ACS-ED), I assess whether school districts within areas of concentrated advantage outperform similarly advantaged districts outside these areas, using math score data from the Stanford Education Data Archive (SEDA). Findings show that advantaged districts in areas of concentrated advantage not only outperform disadvantaged districts, but also similarly advantaged districts located outside these areas, even when controlling for funding inequality, per-pupil spending, ethnic composition, state-level economic competition, and child poverty. The positive effects of concentrated advantage are particularly pronounced in districts with higher proportions of white-collar workers and higher median household incomes. These findings highlight the critical role of spatial opportunity structures in shaping educational outcomes and suggest that policies aimed at reducing educational disparities should account for the broader spatial contexts of school districts. By demonstrating the significant influence of concentrated advantage on educational performance, this study contributes to the understanding of educational inequality. It emphasizes the need for further exploration of the benefits provided by these areas.

*keywords*: academic performance, socioeconomic advantage, spatial stratification, educational inequality, hotspot analysis, SEDA

## Geography Matters: School District Socioeconomic Context Influences Academic Performance

Over the past several decades, a considerable body of research has focused on improving curricula, pedagogy, assessment, resource provision, and teacher education in the United States (U.S.) (Anyon, 2007; Bischoff & Owens, 2019; Borman, 2014; Isenberg et al., 2021; Jackson et al., 2016; Stephens et al., 2011). Despite the numerous policy reforms and innovative educational strategies implemented based on this research, American students do poorly[35] compared to their peers in many other wealthy countries (Schleicher, 2019). This underperformance should be of great strategic interest to the nation's stability, economy, and civic health. However, American PK/K-12[36] public education is not uniformly poor; some of the best public education is available to families within locally managed public school districts (Bateman, 2012). While the localized nature of American public education allows for curricula and programs tailored to the needs of local communities, it has also been criticized for exacerbating socioeconomic segregation and blamed for disparities in student outcomes between advantaged and disadvantaged areas (Bischoff & Owens, 2019; Frankenberg et al., 2017; Lee, 2021).

Although the negative effects of segregation in disadvantaged schools and neighborhoods have been extensively documented, less is known about the impact of broader spatial socioeconomic stratification among school districts (Drake, 2020; Elliott et al., 1996; Houston & Henig, 2023). Spatial socioeconomic stratification refers to the sorting of residents into different locations based on their socioeconomic status (SES). Typically, socioeconomically advantaged households have access to

[35] In 2018, the Program for International Student Assessment (PISA) conducted by the Organization for Economic Co-operation and Development (OECD) ranked the U.S. 25th out of 72 countries on average reading, science, and math scores (Schleicher, 2019). The U.S. ranked behind the United Kingdom, Canada, China (Beijing, Shanghai, Jiangsu, Zhejiang), New Zealand, Singapore, Macao, Hong Kong, Estonia, Japan, South Korea, Taiwan, Finland, Poland, Ireland, Slovenia, the Netherlands, Sweden, Denmark, Germany, Belgium, Australia, Switzerland, Norway, and Czechia (Schleicher, 2019).

[36] PK/K-12 education refers to the combination of primary and secondary education that children in the United States receive from pre-kindergarten (PK) or kindergarten (K) through 12th grade.

more beneficial spatial opportunity structures compared to their disadvantaged counterparts, significantly influencing the opportunities available to residents (Galster & Sharkey, 2017). These structures encompass various systems—housing, labor, education, health, transportation, social services, and social networks—all shaped by the area's natural and built environment (Galster & Sharkey, 2017). In socioeconomically advantaged areas, these factors contribute to the future benefits individuals can derive from their innate and acquired traits (Galster & Sharkey, 2017).

Areas where wealth and opportunity are concentrated, *areas of concentrated advantage*, offer beneficial community-wide opportunity structures for students, even if they lack advantages in their family background or immediate school environment. Children growing up in these areas benefit from the spatial opportunity structures, while those outside these areas miss out on these advantages (Chetty et al., 2016; Chetty, Friedman et al., 2020; Sharkey, 2016). Expanding research on stratification to include the spatial concentration of advantaged school districts, rather than focusing solely on the segregation of disadvantaged districts, is essential for understanding how spatial opportunity structures shape educational and life outcomes for all students. This sorting of students across schools and districts based on socioeconomic status has been identified as a key factor contributing to the relatively poor average performance of American students in reading and math compared to their peers in other wealthy countries (Schleicher, 2019). Additionally, socioeconomically advantaged school districts often border similarly advantaged districts, forming *areas of concentrated advantage* with distinct spatial opportunity structures (Traves, TBD).

To contribute to this literature, this study examines whether the environments surrounding advantaged school districts provide an additional academic performance benefit beyond the district-level advantages. My findings indicate that not only do advantaged districts outperform disadvantaged districts, but students in socioeconomically advantaged districts in areas of concentrated advantage outperform (1) other advantaged districts outside these areas, (2) segregated disadvantaged districts, and (3) disadvantaged districts in areas of concentrated disadvantage. These

results hold even after controlling for district funding inequality, per-pupil spending, state demographic composition, state-level economic competition, and child poverty. These findings suggest that the concentration of socioeconomic advantage among school districts may significantly contribute to educational inequality among American students.

## The 'Advantage' of Concentrated Advantage

It is well established that socioeconomic sorting can limit access to resources and social networks in areas of concentrated advantage (Tai et al., 2003; Teske et al., 2016). Schools in wealthier neighborhoods, with their higher levels of social, financial, and instructional resources, often show higher student achievement compared to those serving low-income neighborhoods (Owens & Candipan, 2019). This sorting is crucial in shaping socioeconomic patterns within public school districts. Residential segregation by income intensifies these effects, as high-income families compete for access to desirable districts, which can drive up home prices and exclude lower-income families from these areas (Guerrieri et al., 2013). Socioeconomic stratification can limit access to resources and social networks in areas of concentrated advantage (Tai et al., 2003; Teske et al., 2016).

Schools in wealthier neighborhoods, which have more social, financial, and instructional resources, often show higher student achievement compared to those serving low-income neighborhoods (Owens & Candipan, 2019). However, while attending a school with high-achieving peers might seem to guarantee better educational outcomes, some research challenges this assumption. For example, Dobbie and Fryer (2014) found that attending a school with high-achieving peers does not necessarily increase the likelihood of university enrollment or graduation. This counterintuitive finding highlights the complexity of the geography of advantage.

Recent research suggests that neighborhoods may be more consequential than individual school composition in shaping long-term outcomes, such as income mobility and educational attainment. Children who grow up in safer, wealthier

neighborhoods with better healthcare, services, and schools are more likely to attend university and experience upward income mobility as adults (Chetty et al., 2016; Chetty, Friedman, et al., 2020; Chetty & Hendren, 2018a, 2018b; Sharkey, 2016). These findings underscore the importance of the broader environment, extending beyond the home, school, or immediate neighborhood, in shaping educational opportunities and life outcomes.

Understanding this link is crucial for addressing educational inequalities holistically, as it highlights the importance of considering spatial aspects of the community environment in addition to demographic and socioeconomic factors. To address this gap, I examine whether students in districts within areas of concentrated advantage achieve better academic performance than (1) other advantaged districts outside these areas, (2) segregated disadvantaged districts, and (3) disadvantaged districts in areas of concentrated disadvantage. I control for inequality in school district spending, per-pupil spending, ethnic composition, state-level child poverty rates, and state-level economic competition.

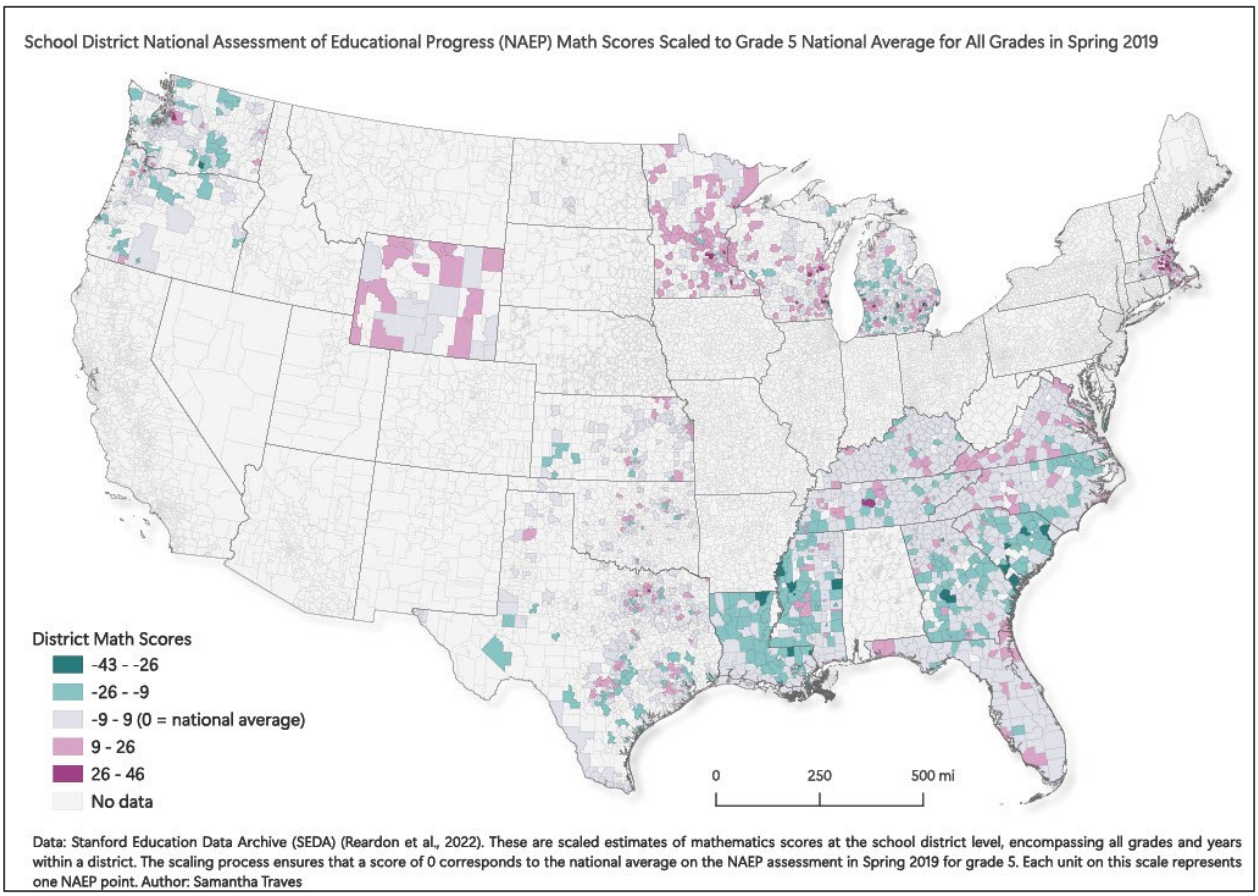
## Data and Methods

### *Estimating School District Academic Performance*

I measure school district academic performance using math scores from the Stanford Education Data Archive (SEDA) (Reardon et al., 2018). These scores are scaled estimates at the district level, encompassing all grades and years within each district. The scaling is calibrated so that a score of 0 corresponds to the national average on the National Assessment of Educational Progress (NAEP) assessment for grade 5 in Spring 2019, with each unit representing one NAEP point. This standardized scaling allows for meaningful comparisons across districts nationwide (see Figure 13). In this sample, the mean math score for a school district is -0.05, with a median of -0.46 and a standard deviation of 12.65. On average, students perform slightly below the national

baseline (a score of 0), but the large standard deviation indicates considerable variability in student performance across districts.

Figure 13. National Assessment of Educational Progress (NAEP) Math Scores by School District for All Grades, 2019




*Note.* N = 3,101 school districts. This map displays math scores from the National Assessment of Educational Progress (NAEP) by unified school districts. These scores are scaled estimates at the district level, encompassing all grades and years within a district. The scaling is based on the national average from the Spring 2019 NAEP assessment for grade 5, with a score of 0 representing this average and each unit equal to one NAEP point. These scaled estimates allow for comparisons nationwide. One of the limitations of the SEDA dataset is that it only covers select states, and states in the Southeast are overrepresented compared to states in other regions. The map shows scores below the national average in green and school districts with scores above the

national average in pink, showing clear patterns in math performance. There are more underperforming districts in the Southeast compared to the other regions. Data come from the Stanford Education Data Archive (SEDA) (Reardon et al., 2018). Map made by the author in QGIS 3.32.1.

### *Estimating School District Socioeconomic Advantage*

The data used to calculate the RFSAI come from the 2016-2020 American Community Survey (ACS) Parent Tabulation, provided by the National Center for Education Statistics (NCES). The Parent Tabulation identifies parents as householders, spouses, or identified parents in a subfamily with a child living in the household (Geverdt, 2019). Occupational prestige scores, drawn from the American Community Survey (ACS) and U.S. Bureau of Labor Statistics data for May 2020, are also included. White-collar occupations are defined as those requiring at least a bachelor's degree.

To measure the socioeconomic advantage of a school district, I use an index that comprises university attainment (0.4), median household earnings (0.3), white-collar employment (0.15), married mothers, and owner-occupied housing units (0.05) of parents with children enrolled in the district where they live. Index components were chosen based on Lind's (2020) model of the American class structure. Weights are chosen based on the results of principal component factor analysis, where the percentage of parents in a school district with a bachelor's degree or higher is represented by Principal Component 1.

All variables, except earnings, are standardized and expressed as proportions of the relevant population within a school district. Median earnings are adjusted for inflation and presented in 2020 U.S. dollars.

Mapping areas of concentrated advantage shows that New England states have the most areas of socioeconomic advantage, while states in the East South-Central region are the least advantaged (Traves, TBD). Despite these regional trends, no significant differences in the prevalence of school district socioeconomic advantage were found

among states, suggesting that regional conditions influencing socioeconomic advantage extend beyond state boundaries.

Table 8 found in the Appendix provides descriptive statistics for the total population and relevant families within school districts from 2016 to 2020.

***Estimating District Spending Inequality***

The data for analyzing between-district education funding inequality comes from the 2021 Common Core of Data (CCD) School District Finance Survey (F-33) provided by NCES, which details expenditures from local, state, and federal sources. Per-pupil state spending data come from the 2020 Public Elementary-Secondary Education Finance Data Table 8: Per Pupil Amounts for Current Spending of Public Elementary-Secondary School Systems by State: Fiscal Year 2020. Child poverty rates are measured using data on state poverty for children aged 5-17 from the 2020 Poverty and Median Household Income Estimates by the U.S. Census Bureau's Small Area Income and Poverty Estimates (SAIPE) Program, released in December 2021.

Funding for school districts in the United States originates from various sources. As of 2021, the total average funding per district is $109,912.62. On average, federal contributions amount to $9,035.39, state contributions to $53,175.03, and local sources provide $47,702.20. Property taxes make up 96.11% of local revenue. Per-pupil spending averages $11,797.82, with a median of $11,066, reflecting a relatively consistent investment in individual students across districts, although some variability exists (SD = $ 2,956.70). Despite this variability, per-pupil spending remains generally consistent across districts.

State-level inequality in per-pupil district funding between the wealthiest and poorest districts within each state is calculated using the Gini coefficient. Higher values indicate greater inequality in district funding. The Gini coefficient is given as:

$$G_j = \frac{1}{n_j \mu_j} \sum_{i=1}^{n_j} \left[ (2i - n_j - 1) y_{ij} \right]$$

where:

$n_j$ is the number of school districts in state $j$,

$y_{ij}$ represents the total expenditure for the $i$th school district in state $j$, and

$\mu_j$ is the mean expenditure across all districts in state j.

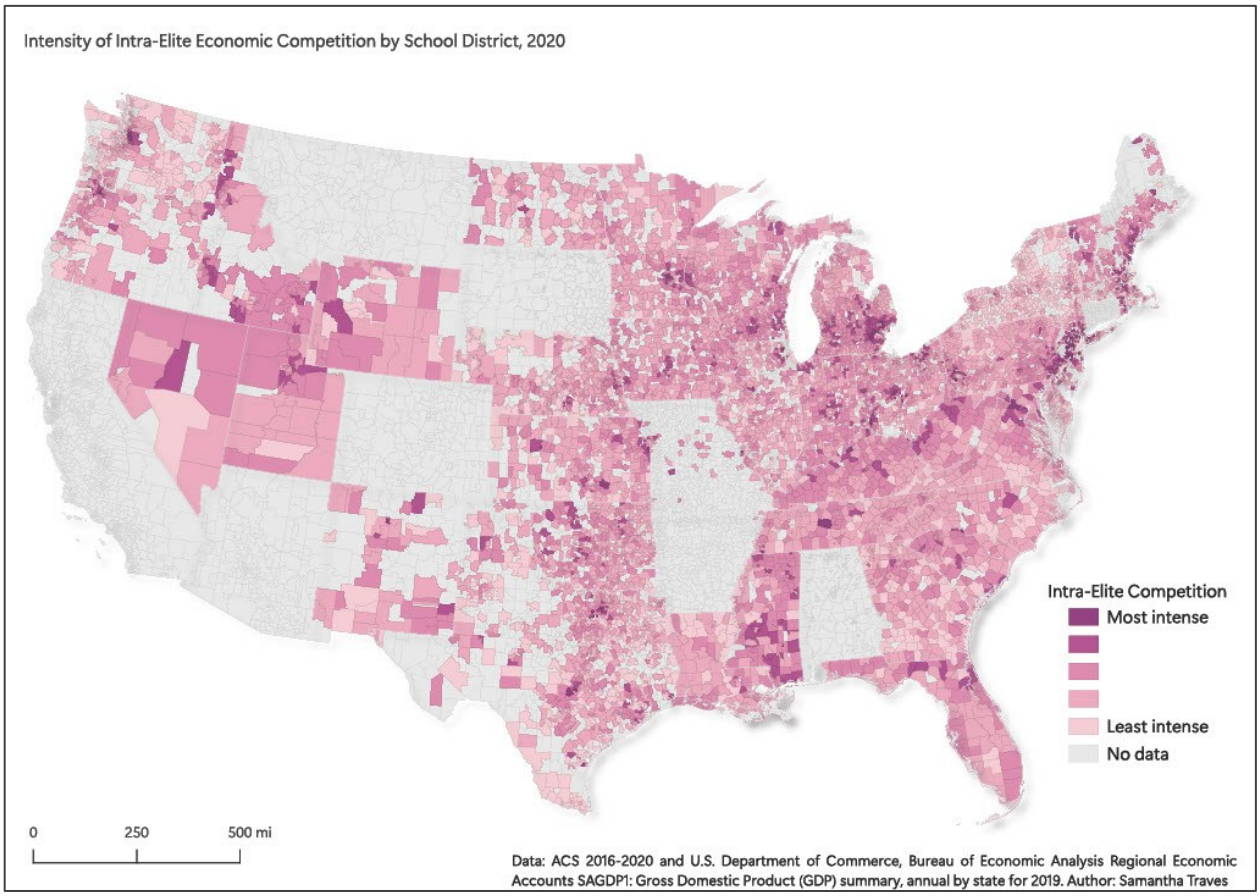
***Estimating State Economic Competition***

Data for measuring state economic competition (intra-elite competition) come from two datasets: household income data from the ACS 2016-2020, scaled to measure median household incomes for the top 20% of households in each state, and GDP data from the U.S. Department of Commerce's Bureau of Economic Analysis Regional Economic Accounts SAGDP1: Gross Domestic Product (GDP) summary, annual by state for 2019.

State economic competition is assessed using the method described by Turchin and Korotayev (2020) to measure intra-elite competition in the economic domain. This is calculated as the average income of families in the top 20% of RFSAI values divided by the GDP per capita of state $j$, denoted as $\varepsilon_j - 1$. This scaling allows for the assessment of relative elite income within the economic context of each state. Higher values of $\varepsilon_j - 1$ indicates more intense intra-elite competition, while lower values suggest less intense competition.

Figure 14 illustrates the intensity of intra-elite competition among school districts included in the sample.

Figure 14. Map of the Intensity of Intra-Elite Economic Competition by School District




*Note.* N = 9,993 PK/K-12 school districts. This map illustrates the intensity of intra-elite economic competition for school districts, with darker shades representing more intense competition. Intra-elite competition in the economic domain is measured using the method described by Turchin and Korotayev (2020), which involves calculating average elite income scaled by GDP per capita (ε-1). This is done by dividing the average income of families in the top 20% of RFSAI values by the GDP per capita, allowing for the assessment of relative elite income within a state's economic context. Higher ε-1 values indicate more intense intra-elite competition, while lower values indicate less intense competition. The ACS 2016-2020 data was used to measure median household incomes for households in the top 20%, scaled to the state GDP in millions of 2019 dollars, obtained from the U.S. Department of

Commerce, Bureau of Economic Analysis Regional Economic Accounts SAGDP1: Gross Domestic Product (GDP) summary, annual by state for 2019.

### *School District Boundaries*

The geographic boundaries of school districts were obtained from the U.S. Census TIGER State-Based Data Files for Unified School Districts, current as of January 1, 2020. Merging these boundary files with the ACS-ED 5-year estimates revealed gaps in the data due to discrepancies in public school district boundaries in several states, including California, Alabama, Arizona, Texas, Montana, and New Mexico. To address these gaps, I substituted elementary or secondary school district boundaries where unified district boundaries were missing. I then merged and corrected the geometries using QGIS 3.28.1 before integrating the shapefiles with the ACS-ED 5-year estimates. Despite these efforts, some districts in Missouri, South Dakota, Colorado, New Mexico, and Montana still had incomplete data. Consequently, the analysis was conducted on 9,993 PK-12 school districts.

### *Estimating Patterns of Spatial Socioeconomic Stratification*

To identify patterns of spatial socioeconomic stratification, I use Local Moran's I (LMI) with Queen's contiguity. For each district, Local Moran's I produces a score that indicates whether the district is part of a cluster of similar advantage index scores (a hotspot) or an outlier with differing values (a cold spot). I use the Local Moran's I tool from the Spatial Analysis Toolbox in QGIS 3.28.1. LMI is given as:

$$I_{\mathrm{i}} = \frac{(\Delta X_{\mathrm{i}} * W\Delta X_{\mathrm{i}})}{(S^0 * S^1)}$$

where:

$\Delta X_{\mathrm{i}}$ is the deviation of a binary RFSAI variable of the $i$-th school district from the mean binary RFSAI value ($\mu$). It is 0 for non-advantage (bottom 80$^{\text{th}}$ percentile) and 1 for advantaged districts (top 20$^{\text{th}}$ percentile).

$W\Delta X_i$ represent the spatially lagged values of the deviations, calculated as the sum of the deviations ($\Delta X$) of the neighboring districts, weighted by the spatial weights matrix, $W$.

$S^0$ is the sum of the spatial weights ($w_{ij}$) for the $i$-th district and its neighbors, indicating their proximity.

$S^1$ is the sum of the squared deviations ($\Delta X_i^2$) for all districts in the dataset.

The significance of each district's LMI score is assessed using the Local Moran's p-value (LMP), with a p-value greater than 0.05 indicating insignificant clustering. Additionally, the Local Moran's Quadrant (LMQ) value categorizes each district according to the type of spatial clustering:

LMQ = 1: An advantaged district surrounded by other advantaged districts. (Reference Category)

LMQ = 2: A disadvantaged district surrounded by advantaged districts.

LMQ = 3: A disadvantaged district surrounded by other disadvantaged districts.

LMQ = 4: An advantaged district surrounded by disadvantaged districts.

LMQ = null: the district has no spatial relationship with its neighbors.

***Model 1: The Influence of Socioeconomic Spatial Clustering on Student Math Scores***

Model 1 examines the relationship between school district-level socioeconomic spatial clustering and student math performance. Using multiple linear regression, the model estimates how different patterns of spatial socioeconomic sorting, as measured by Local Moran's Quotient (LMQ), relate to district-average math scores.

Local Moran's Quotient (LMQ) is a categorical extension of Local Moran's I that incorporates both individual observations and spatially aggregated units. It identifies

statistically significant spatial clusters and outliers based on the socioeconomic status (SES) of families with children enrolled in public schools.

The model is specified as:

$$Y_i = \beta_0 + \beta_1(LMQ_{1_i}) + \beta_2(LMQ_{2_I}) + \beta 4(LMQ_{4_i}) + \varepsilon_i$$

where:

$Y_i$ represents NAEP math scores in school district $i$.

$\beta_0$ is the intercept, representing the expected math score for a disadvantaged district located near other disadvantaged districts (LMQ = 3, the reference category).

$LMQ_{1_i}$ is an indicator variable equal to 1 if district $i$ is an advantaged district surrounded by other advantaged districts (LMQ = 1), and 0 otherwise;

$LMQ_{2_i}$ is an indicator variable equal to 1 if district $i$ is a disadvantaged district adjacent to advantaged districts (LMQ = 2), and 0 otherwise;

$LMQ_{4_i}$ is an indicator variable equal to 1 if district $i$ is an advantaged district isolated from other advantaged districts (LMQ = 4), and 0 otherwise;

$\varepsilon_i$ is the error term, capturing residual variance in math scores not explained by the model.

The LMQ categories are defined as follows:

LMQ = 1: Advantaged district near other advantaged districts (concentrated advantage)

LMQ = 2: Disadvantaged district near advantaged districts (segregated disadvantage)

LMQ = 3: Disadvantaged district near other disadvantaged districts (concentrated disadvantage; reference category)

LMQ = 4: Advantaged district near disadvantaged districts (isolated advantage)

A positive coefficient (e.g., $\beta_1 > 0$) indicates that the corresponding spatial pattern is associated with higher average math scores relative to the reference category (LMQ = 3). Using LMQ rather than a continuous measure like Local Moran's *I* allows for a more interpretable comparison of how distinct spatial configurations of socioeconomic status relate to academic performance.

**Model 1 Findings: The Critical Role of Spatial Concentration in Student Math Performance**

Table 5 presents results from Model 1, showing that students in districts located in areas of concentrated advantage (LMQ = 1) show math scores that are, on average, 19.65 points higher than those in disadvantaged areas (LMQ = 3). Similarly, students in isolated, advantaged districts (LMQ = 4) score an average of 14.76 points higher than those in the most disadvantaged areas. As we would expect, even when an advantaged district is not situated near other similarly advantaged districts, students perform better academically than students in disadvantaged districts.

Students in disadvantaged districts segregated from surrounding advantaged districts (LMQ = 2) perform modestly better in math (+2.61 points) than in areas of concentrated disadvantage. Although this difference is smaller, it suggests that concentrated socioeconomic disadvantage exerts a more profound influence on academic outcomes than disadvantage segregation alone.

Table 5. Coefficients from Model 1

| Spatial Sorting Pattern | Coeff | t-value | 99% CI |
|---|---|---|---|
| Concentrated advantage (LMQ = 1) | 19.65*** | 36.157 | [18.25, 21.05] |
| Disadvantage segregation (LMQ = 2) | 2.61*** | 5.728 | [1.44, 3.79] |

| | | | |
|---|---|---|---|
| Advantage isolation (LMQ = 4) | 14.76*** | 15.248 | [12.27, 17.26] |

*Note*. N = 3,634 unified PK/K-12 school districts. This table presents the results from Model 1. Coefficients reflect the average difference in math scores between the LMQ category. The reference category is disadvantaged districts in areas of concentrated disadvantage (LMQ = 3). Asterisks (***) indicate $p < 0.001$.

**Model 2: Influence of Spatial Stratification and Structural Factors on Math Scores**

Model 2 estimates the influence of spatial and socioeconomic factors on district-level math scores using multiple linear regression. It predicts math scores based on patterns of spatial socioeconomic stratification, measured by Local Moran's Quotient (LMQ), along with district- and state-level economic, demographic, and funding variables. The model is specified as:

$$Y_i = \beta_1 LMQ_{1_i} + \beta_2 LMQ_{2_i} + \beta_3 LMQ_{4_i} + \beta_4 X_{1_{idistrict}} + \beta_5 X_{2_{i_{state}}} + \beta_6 X_{3_{i_{state}}} + \beta_7 X_{4_{i_{state}}} + \beta_8 X_{5_{i_{state}}} + \varepsilon_i$$

Where:

$Y_i$ is the scaled math achievement score for school district $i$, centered at the state mean.

$\beta_0$ is the intercept term, representing the expected score when all predictors are zero.

$\beta_1, \beta_2, \beta_3$ are coefficients for dummy variables representing spatial stratification categories from the LMQ:

$LMQ_{1_i}$: Advantaged districts near other advantaged districts (1 if true, 0 otherwise)

$LMQ_{2_i}$: Disadvantaged districts near advantaged districts (1 if true, 0 otherwise)

$LMQ_{4_i}$: Isolated advantaged districts (1 if true, 0 otherwise)

The reference category (excluded) is disadvantaged districts near other disadvantaged districts ($LMQ_{3_i}$).

$\beta_4$ is the coefficient for $X_{1i}$ district, the scaled inverse elite income in district $i$, reflecting intra-elite economic competition.

$\beta_5$ is the coefficient for $X_{2i}$ state, the scaled percentage of white students in state $i$.

$\beta_6$ is the coefficient for $X_{3i}$ state, the scaled child poverty rate (ages 5–17) in state $i$.

$\beta_7$ is the coefficient for $X_{4i}$ state, the scaled per-pupil spending in 2020 in state $i$.

$\beta_8$ is the coefficient for $X_{5i}$ state, the scaled Gini coefficient of district spending inequality in state $i$.

$\varepsilon_i$ is the error term, capturing variation in math scores not explained by the predictors.

All continuous predictors are standardized to allow direct comparison of effect sizes.

**Model 2 Findings: The Influence of Socioeconomic and Spatial Factors on District-Level Math Scores**

Table 6 presents a correlation matrix from Model 2, showing the relationships between key socioeconomic factors, including district spending inequality, the percentage of white residents in a state, child poverty, and state per-pupil spending for 3,101 school districts. The analysis reveals that district spending inequality has a weak positive correlation with both the percentage of white residents and child poverty and is slightly negatively correlated with state per-pupil spending.

The percentage of white residents in a state is moderately negatively correlated with child poverty and has a small positive correlation with per-pupil spending. Notably, child poverty shows a strong negative correlation with state per-pupil spending,

indicating that higher levels of child poverty are associated with lower educational funding per student.

Table 6. Correlation Matrix of Key Predictors in Model 2

| | Spending inequality | White state residents (%) | Child poverty (%) | State per-pupil spending |
|---|---|---|---|---|
| District spending inequality | -- | 0.14 | 0.02 | -0.12 |
| White state residents (%) | 0.14 | -- | -0.33 | 0.19 |
| Child poverty (%) | 0.02 | -0.33 | -- | -0.68 |
| State per-pupil spending | -0.12 | 0.19 | -0.68 | -- |

*Note*. N = 3,101 school districts. District spending inequality is measured using the Gini coefficient. Child poverty is measured for children aged 5-17, representing school-aged children.

Table 7. Results from Model 2: Associations Between Socioeconomic Spatial Clustering and Math Scores reports the results from Model 2, which examines the impact of different spatial socioeconomic sorting patterns on district-level math scores. They suggest that the broader socioeconomic environment surrounding districts plays a significant role in educational outcomes. Districts in areas of concentrated advantage tend to have significantly higher math scores. On average, these districts (LMQ = 1) score 5.2 points higher than disadvantaged districts located in areas of concentrated disadvantage (LMQ = 3), which serves as the reference category. In contrast, districts that are segregated, disadvantaged districts (LMQ2) have math scores 0.8 points lower on average than districts in areas of concentrated disadvantage.

Students in advantaged districts isolated from other advantaged areas (LMQ = 4) perform better (+ 2.7 points) than students in disadvantaged districts located in areas of concentrated disadvantage.

Direct comparisons between districts in areas of concentrated advantage and isolated advantaged districts show that the former outperforms the latter by an average of 2.5 points. This finding highlights the importance of not only a district's socioeconomic status but also the socioeconomic context in which it is situated. Being part of an affluent community appears to offer additional benefits to students, possibly due to the favorable spatial opportunity structures within these communities.

Table 7. Results from Model 2: Associations Between Socioeconomic Spatial Clustering and Math Scores

| Variable | Estimate | 99% CI |
|---|---|---|
| intercept (LMQ = 3) | -0.7** | [-0.9, -0.5] |
| Concentrated Advantage (LMQ = 1) | 5.2** | [4.7, 5.7] |
| Disadvantage segregation (LMQ = 2) | -0.8** | [1.2, -0.4] |
| Advantage isolation (LMQ = 4) | 2.7** | [2.2, 3.2] |
| Intra-elite competition | 5.3** | [4.8, 5.8] |
| White state residents (%) | -0.2* | [-0.4, 0.0] |
| σ | 9.1 | [8.8, 9.4] |
| $\hat{y}$ | -0.1 | [-0.3, 0.1] |

*Note*. N = 3,634 unified PK/K-12 school districts. Asterisks (**) indicate significance, and (*) indicate marginal significance based on the 99% credible interval. Local Moran's Quotient (LMQ) is used to categorize school districts based on their level of socioeconomic advantage or disadvantage and their proximity to other districts with similar characteristics. The intercept represents the reference category, which is districts in areas of concentrated disadvantage (LMQ = 3). Sigma represents the standard deviation of the residuals (errors), measuring the variability in math scores not explained by the predictors.

Model 2 also examines the influence of additional factors beyond spatial sorting patterns on math scores. Two key findings emerge regarding economic competition and the state's racial composition. First, intense intra-elite economic competition is associated with higher math scores; students from districts with greater inter-elite score, on average, 5.3 points higher.

Results also show a marginally significant negative association between the percentage of white residents in a state and math scores, with scores 0.2 points for each percentage point increase in the white population. Although this effect is small and only marginally significant, it suggests that states with higher percentages of white residents might face structural challenges that impede academic achievement relative to more diverse states. This finding suggests that the racial composition of a state may reflect broader challenges that affect educational outcomes, though the impact is relatively small.

Child poverty rates, per-pupil spending, and between-district spending inequality do not show statistically significant associations with math scores, which may suggest that their influence is less direct or more complex than initially anticipated, or that the area-level benefits of advantage are not directly tied to educational resource endowments.

**Discussion: Concentrated Advantage as a Form of Spatial Inequality**

Through spatial opportunity structures, areas of concentrated advantage may provide significant area-level benefits to students through community-wide social and academic expectations and access to enriched opportunities, which could contribute to higher academic performance (Galster & Sharkey, 2017). However, given how I estimate these areas, families in advantaged districts in areas of concentrated advantage likely share several key characteristics: (1) they are highly educated, hold professional or managerial positions, and are socially connected with similar families; (2) they have the financial means to provide their children with enriching experiences; (3) their children are more likely to be raised in raised in stable, two-parent

households; and (4) they grow up in communities where these traits are consistently modeled and reinforced. These factors are all likely to contribute to better academic performance for students in these areas.

### *The Role of Funding*

Despite efforts to equalize funding, the entrenched nature of spatial socioeconomic stratification suggests that financial resources alone are insufficient to counterbalance the advantages enjoyed by wealthier communities. This may be partly due to diminishing returns on educational investment. The 2018 PISA Insights and Interpretations report indicates that the positive relationship between education spending and student performance levels off once cumulative expenditure per student reaches $50,000 between the ages of 6 and 15. Beyond this threshold, additional funding does not significantly improve outcomes (Schleicher, 2019). Moreover, increased spending does not necessarily weaken the correlation between social background and academic performance; instead, after surpassing this spending threshold, how resources are allocated becomes more crucial (Schleicher, 2019).

Despite substantial education spending, the relatively modest performance of U.S. students on an international scale further underscores the importance of factors beyond funding. In the 2018 PISA rankings, the U.S. placed 25th out of 72 countries in average reading, science, and math scores despite its high level of education expenditure (Schleicher, 2019). Findings from Model 2 reinforce this perspective by questioning the effectiveness of equalized spending alone in closing academic gaps. The analysis revealed that the poverty rate among children, per-pupil spending, and income inequality within districts did not statistically impact math scores. This suggests that merely increasing or equalizing financial resources across districts may not effectively address the root causes of academic disparities.

The lack of significant effects from these financial variables indicates that other structural-demographic factors, such as intra-elite competition, may be more decisive in determining student outcomes. In conclusion, equalizing education spending may be insufficient to bridge the academic performance gap between advantaged and

disadvantaged areas, as such, policy may need to shift from focusing on redistributing resources to addressing the deeper spatial socioeconomic stratification in housing that drives educational inequality.

### Limitations

The model assumes a linear relationship between the spatial clustering of socioeconomic status and math scores, which may oversimplify the complex dynamics involved. Additionally, Model 1 does not account for other potentially confounding variables, such as school funding, teacher quality, or district policies, which could also influence student math performance. The categorization of school districts into four LMQ categories may further overlook more nuanced patterns of spatial organization that are relevant for understanding academic outcomes. Moreover, the reliance on NAEP math scores as the sole outcome variable limits the study's generalizability to other academic subjects or broader measures of educational success. Model 2 has some unexplained variability, indicating that it does not fully capture all factors influencing these outcomes. While the relatively narrow 99% credible interval suggests a high level of confidence in the estimate, the presence of unexplained variability highlights the need for further investigation.

### Future Research

Future research should explore additional variables or alternative model specifications to better account for this variability. However, it is important to acknowledge that some residual variability is typical in predicting academic performance, which is shaped by a complex interplay of factors at the family, peer, school, district, and neighborhood levels.

### Research Ethics Statement

I confirm that this study adheres to the ethical standards outlined in the 1964 Declaration of Helsinki and its subsequent amendments, as well as the American Sociological Association's Code of Ethics, particularly Section 12 on "Informed

Consent." As the research did not involve human subjects, it does not qualify as human subjects research according to established guidelines. The data were sourced from publicly available datasets, with no direct interaction with human participants, thereby avoiding ethical issues related to their welfare and privacy. Consequently, approval from an Institutional Review Board (IRB) or equivalent ethics committee is not required.

## Appendix

Table 8. Descriptive Statistics for Total Population and Relevant Parents of School Districts, 2016-2020

| Variable | Mean | Median | SD |
|---|---|---|---|
| Total households | 20,380.48 | 8,275.00 | 50,929.39 |
| Married couple households in the total population (%) | 51.93 | 52.10 | 9.7138 |
| Population 25 years and older | 37,590.93 | 15,149.00 | 97,264.82 |
| Population 25 years+ with a bachelor's degree (%) | 17.30 | 15.70 | 8.18 |
| Population 25 years+ with graduate or professional degree (%) | 10.34 | 8.00 | 7.619522 |
| Population 25+ with a bachelor's degree or higher (%) | 27.61 | 23.50 | 15.10 |
| Total pop median household income (2020 dollars) | | | 27,254.99 |
| Total pop household income (2020 dollars) | 15,943.03 | 6,182.00 | 41,355.81 |
| Total families | 13,428.19 | 5,633.50 | 31,655.88 |
| Total pop median family income (2020) | | | 30,212.02 |
| Relevant Sample | | | |
| Housing units among relevant families | 4,736.46 | 1,957.50 | 11,253.33 |
| Owner-occupied housing units among relevant families | 2,928.30 | 1,295.00 | 5,877.45 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Owner-occupied housing units among relevant families (%) | 67.25 | 68.90 | 15.17 |
| Owner-occupied housing units among the total population | 12,974.43 | 5,916.00 | 27,280.25 |
| Owner-occupied housing units among the total population (%) | 70.32 | 72.10 | 12.36 |
| Total population | 55,370.76 | 22,188.00 | 140,446.68 |
| Total white population | 37,974.45 | 17,778.50 | 83,159.10 |
| Total white population (%) | 77.30 | 81.90 | 17.72 |
| Total non-Hispanic white population | 30,968.07 | 15,094.50 | 58,122.64 |
| Total non-Hispanic white population (%) | 68.33 | 74.75 | 23.97 |
| School Districts | | | |
| Relevant children (3+) enrolled in school | 9,313.15 | 3,720.00 | 22,744.82 |
| Population enrolled in high school | 2,499.67 | 965.00 | 6,454.98 |
| Population enrolled in high school (%) | 26.08 | 27.70 | 9.02 |
| Relevant parents | 7,517.75 | 3,062.50 | 17,779.31 |
| Relevant married fathers of public school students | 2,918.84 | 1,202.50 | 6,760.55 |
| Relevant married fathers of public school students (%) | 87.30 | 88.20 | 7.13 |
| Relevant married mothers of public school students | 2,912.06 | 1,210.00 | 6,679.38 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Relevant married mothers of public school students (%) | 71.09 | 72.60 | 12.93 |
| Population of relevant parents of public school students (25+) | 7,433.17 | 3,007.50 | 17,599.92 |
| Relevant parents of public school students with a bachelor's degree | 1,577.45 | 515.00 | 3,951.55 |
| Relevant parents of public school students with a bachelor's degree (%) | 18.98 | 16.90 | 10.15 |
| Relevant parents of public school students with a graduate or professional degree | 986.78 | 275.00 | 2,693.55 |
| Relevant parents of public school students with a graduate or professional degree (%) | 11.58 | 8.80 | 9.64 |
| Relevant parents of public school students with a bachelor's degree or higher | 2,564.22 | 800.00 | 6,570.72 |
| Relevant parents of public school students with a bachelor's degree or higher (%) | 30.46 | 25.60 | 18.33 |
| Relevant parents of public school students working (16+) | 5,945.46 | 2,435.00 | 13,887.08 |
| Relevant parents of public school students working in management/business/science/arts | 2,538.66 | 955.00 | 5,865.25 |
| Relevant parents of public school students working in management/business/science/arts (%) | 40.36 | 38.60 | 14.20 |
| Relevant parents of public school students working in service occupations | 942.64 | 350.00 | 2,622.69 |
| Relevant parents of public school students working in service occupations (%) | 15.48 | 14.70 | 6.59 |
| Relevant parents of public school students working in sales/office | 1,141.18 | 460.00 | 2,762.21 |
| Relevant parents of public school students working in sales/office (%) | 18.70 | 18.60 | 5.22 |
| Relevant parents of public school students working in natural resources/construction/maintenance | 599.55 | 255.00 | 1,484.46 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Relevant parents of public school students working in natural resources/construction/maintenance (%) | 11.60 | 10.50 | 7.24 |
| Relevant parents of public school students working in production/transport/materials | 723.53 | 320.00 | 1,829.11 |
| Relevant parents of public school students working in production/transport/materials (%) | 13.98 | 13.20 | 7.52 |
| Median age of relevant parents of public school students | 40.89 | 40.60 | 2.46 |
| Relevant parents of public school students, non-Hispanic White | 3,839.15 | 1,975.00 | 6,433.59 |
| Relevant parents of public school students, non-Hispanic White (%) | 65.36 | 72.40 | 26.96 |
| School District Finance | | | |
| Public enrollment in the fall of 2019 | 8,080.38 | 3,388.50 | 18,301.49 |
| Total district revenue | 109,912.62 | 46,487.00 | 266,674.53 |
| District revenue from federal sources | 9,035.39 | 3,292.00 | 27,457.57 |
| District revenue from Title I | 2,263.77 | 733.00 | 8,496.95 |
| District revenue from state sources | 53,175.03 | 22,801.50 | 130,764.56 |
| District revenue from local sources | 47,702.20 | 17,035.50 | 130,413.58 |
| District tax revenue | 31,295.39 | 7,544.50 | 105,732.80 |
| District property tax revenue | 29,573.69 | 7,126.00 | 101,476.22 |
| District revenue from parent contributions | 8,031.56 | 0.00 | 51,627.09 |

| Variable | Mean | Median | SD |
|---|---|---|---|
| Total district expenditure | 111,223.32 | 46,048.00 | 264,590.95 |
| Per-pupil spending | 11,797.82 | 11,066.00 | 2,956.70 |
| District revenue from federal sources (%) | 8.14 | 7.28 | 5.34 |
| District revenue from Title I (%) | 2.01 | 1.68 | 1.60 |
| District revenue from state sources (%) | 53.45 | 56.50 | 17.06 |
| District revenue from local sources (%) | 38.40 | 34.69 | 18.53 |
| District property tax revenue (%) | 96.11 | 100.00 | 10.43 |
| District revenue from parent contributions (%) | 0.00 | 0.00 | 0.00 |
| Academic Performance | | | |
| NAEP district math scores (OLS) | 0.03 | -0.40 | 12.94 |
| NAEP district math scores (Bayesian estimation) | -0.05 | -0.46 | 12.65 |

*Note*. N = 3,634 unified PK/K-12 school districts. The table presents descriptive statistics for the total population by school districts, where specified, and the relevant sample of parents with children enrolled in the district where they reside. The data on math scores come from the National Center for Education Statistics (NCES) 2016-2020 American Community Survey (ACS) Parent tabulation. A child or parent is considered relevant to a school district if they live within the district's boundaries and their assigned grade falls within the grade range for which the district is financially responsible. Statistics on school district finance are for public elementary and secondary districts in the fall of 2019. Data on school district expenditures are sourced

from the 2021 Common Core of Data (CCD) School District Finance Survey (F-33) provided by the NCES.

Table 9. Posterior Predictive Probability Distribution for Model 2

| Variable | Mean | SD | 10th | 50th | 90th |
|---|---|---|---|---|---|
| (Intercept) disadvantaged districts near other disadvantaged districts | -0.70 | 0.2 | -1.0 | -0.8 | -0.5 |
| Advantaged districts near other advantaged districts | 5.2 | 0.6 | 4.5 | 5.2 | 5.9 |
| Disadvantaged districts near advantaged districts | -0.8 | 0.4 | -1.3 | -0.8 | -0.3 |
| Isolated advantaged districts | 2.7 | 0.7 | 1.8 | 2.7 | 3.5 |
| Intra-elite competition | 5.3 | 0.2 | 5.1 | 5.3 | 5.6 |
| White state residents (%) | -0.2 | 0.2 | -0.4 | -0.2 | 0.1 |
| Child poverty (%) | -3.6 | 0.2 | -3.9 | -3.6 | -3.3 |
| State per-pupil spending in 2020 dollars | 0.6 | 0.2 | 0.3 | 0.6 | 0.8 |
| School district spending inequality | -0.2 | 0.2 | -0.4 | -0.2 | 0.0 |
| $\sigma$ | 9.1 | 0.1 | 8.9 | 9.1 | 9.2 |

*Note*. The table provides the mean and standard deviation (SD) for each variable's posterior distribution and the 10th, 50th (median), and 90th percentiles. The reference category is disadvantaged districts near other disadvantaged districts. Intra-elite competition, the percentage of white state residents, the percentage of children living in poverty aged 5-17 in families, 2020 state per-pupil spending, and state-level school district spending inequality are standardized. These estimates represent the relationship between the predictors and the outcome variable, math scores.

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# Chapter 7: Discussion and Conclusions

In this chapter, I discuss the main findings within the context of existing research and explore some of their implications for policy. I also cover limitations and directions for future research.

Past reform efforts, particularly those focused on equalizing school funding, have often struggled to address the negative impacts of socioeconomic stratification and improve educational opportunities for students in disadvantaged districts. Landmark cases, *Serrano v. Priest* (1971) and *Robinson v. Cahill* (1972), led to more redistributive state education funding formulas; however, the achievement gap between students in advantaged and disadvantaged districts persists (Downes, 2010; Downes & Killeen, 2024). As such, efforts to mitigate the negative effects of socioeconomic stratification in U.S. public education may need to include considerations of the social and spatial structures that shape the educational opportunities students have where they live and go to school. Among these considerations is a more holistic understanding of where and why advantaged school districts are concentrated. The findings from Chapters 4-6 provide the groundwork for such an understanding, showing that (1) areas of concentrated advantage are linked to academic performance benefits; (2) these areas, while geographically widespread, occur in regionally specific patterns; and (3) they are shaped by social, structural, and demographic forces that are not easily addressed through education policy.

These findings suggest that equalizing school and district resources alone may be insufficient to overcome the lack of community advantages and challenges that students and families face in economically and socially unstable and disadvantaged environments. Housing affordability is one such challenge. Rising housing costs have displaced low-income families, limiting their access to better-resourced districts and contributing to persistent inequality (Kavanagh et al., 2016). Family instability further compounds these challenges. Children raised in unstable households, especially those in areas with limited social support, face reduced academic and life prospects

(Simpson et al., 2012). These disadvantages are reinforced by inadequate spatial opportunity structures, which refer to the geographic distribution of quality schools, healthcare, transportation, and employment (Chetty et al., 2016; Chetty & Hendren, 2018). Where students live continues to shape their educational and social mobility, so reform efforts that ignore these area-level dynamics risk treating symptoms of spatial stratification rather than causes.

Instead of trying to dismantle areas of concentrated advantage or merely compensate for their existence, seeking ways to extend their benefits to students in less advantaged areas may be beneficial. This may mean some intervention into the mechanisms underlying disadvantaged districts, including housing affordability, family instability, and structural challenges, rather than relying principally on school funding redistribution and finance adjustments.

These findings also point to the broader structural changes in the U.S. economy over recent decades. The loss of stable, well-paid blue-collar jobs has weakened the economic foundations of many families, altering economic demography, along with patterns of marriage, childrearing, and housing stability (Cherlin et al., 2013; Reeves & Pulliam, 2020; Shriner et al., 2010). Many of these interventions are beyond the scope of this discussion but may include job creation in sectors accessible to less-educated workers, protections for organized labor, policies encouraging marriage and family stability, family-friendly workplace policies, and wage supports tied to the cost of living (Lind, 2020). However, because this dissertation contributes to a growing body of work on the geography of opportunity in American education, I provide some limited recommendations for extending opportunities within areas of concentrated advantage outside of the kinds of redistributive school finance reforms many others have proposed.

Through the three empirical chapters, I have (1) identified the locations of statistically significant areas of concentrated advantage in Chapter 4, (2) examined the role of demographic and economic factors in these areas in Chapter 5, and (3) evaluated whether school districts in these areas perform better than similarly resourced districts

elsewhere in Chapter 6. These findings point to new avenues for policy beyond school funding reform and school choice.

Overall, the studies in Chapters 4-6 expand our understanding of the geography of spatial socioeconomic stratification in U.S. public education and some of the factors underlying these areas. Prior work on spatial socioeconomic stratification in this context has focused largely on socioeconomic segregation and inequality within and across districts; these chapters draw attention to the broader area-level contexts in which district stratification operates. Concentrated advantage among school districts is not simply the inverse of the process that drives disadvantaged areas—it constitutes a distinct form of socioeconomic stratification that has been understudied but has major implications for overall educational equality of U.S. public education and housing policy.

The remainder of this chapter discusses these results in more detail, addresses limitations, and considers how future research might build on this work. I offer specific recommendations related to housing and zoning that may help extend the social and educational benefits of concentrated advantage to more American students.

**Key Findings**

Chapter 4 shows that school districts in areas of concentrated advantage are almost exclusively located in metropolitan areas but rarely within city boundaries, suggesting that this form of spatial stratification is not tied to urban cores. These districts also tend not to be located near socioeconomically segregated districts, reinforcing that concentrated advantage reflects a spatial pattern distinct from other forms of socioeconomic stratification, and from socioeconomic segregation, despite initial expectations. Furthermore, patterns vary regionally: in New England and the Mid-Atlantic, concentrated advantage is widespread across large population centers; in the Midwest, advantaged districts often form rings around metropolitan areas, including smaller cities; in contrast, the Southeast has few such districts, while the Mountain

and Pacific West contain isolated clusters around dense urban areas, surrounded by sparsely populated land.

Chapter 5 identifies state-level influences on areas of concentrated advantage, reinforcing Jang and Reardon's (2019) work on between-district educational inequality. This chapter finds that factors commonly associated with socioeconomic segregation, such as school district spending inequality, state political orientation, school district fragmentation, homeownership rates, and racial composition, play a significant role in areas of concentrated advantage; however, they do not seem to play a significant role in areas of concentrated disadvantage. Moreover, local school funding, typically provided by local property taxes, plays a much smaller role in areas of concentrated advantage than expected, possibly due to state-level equalization or recapture policies. Instead, concentrated advantage seems more closely associated with underlying economic competition. School districts in these areas tend to have more expensive housing and experience greater competition among socioeconomically advantaged households, intra-elite competition. These findings point to a distinct set of drivers behind concentrated advantage and call for further investigation into other latent factors and implications for intervention.

Chapter 6 asks whether students in advantaged districts located within areas of concentrated advantage outperform peers in similarly advantaged districts elsewhere. The findings show that they do, and in particular, these districts are marked by more intense intra-elite competition. This suggests that there are likely some other unincluded factors or latent variables particular to advantaged school districts in areas of concentrated advantage that may amplify educational performance beyond what is expected from the spatial opportunity structures and family backgrounds of students in advantaged districts alone. These results underscore the importance of recognizing concentrated advantage as a distinct and understudied contributor to spatial educational inequality and the role of competition in these areas.

**Revisiting Assumptions About Spatial Inequality**

While prior work by Frankenberg (2009) and Frankenberg and colleagues (2017) emphasized the isolation of socioeconomically advantaged districts, commonly referred to as fragmentation, and its role in reproducing inequality. My findings show that such isolated districts are relatively uncommon compared to the prevalence of districts in areas of concentrated advantage, which we would expect given that concentrated advantage constitutes a cluster of districts. However, these fragmented advantaged districts seem to be much more uncommon than initially expected, and so they may not play as large a role in overall spatial stratification within the public system as may be imagined.

Given the dominant focus on socioeconomic segregation in the spatial stratification literature, it was initially assumed to be the most common form of educational inequality. However, Chapter 4 shows that significantly socioeconomically segregated districts are relatively rare. Moreover, concentrated advantage is not merely the absence of socioeconomic segregation; these two patterns do not co-occur in most regions. At the same time, areas of concentrated advantage are more widespread, suggesting that many students are excluded from its benefits, even without socioeconomic segregation.

This may suggest that areas of concentrated socioeconomic advantage are not merely byproducts of urban density, development, or segregation but represent a distinct form of spatial socioeconomic stratification that may be influenced by regional, state, and local economic geography and education contexts. In line with work done by Gyourko & Krimmel (2021) and Siegel-Hawley (2024) my findings that home prices are a factor in areas of concentrated advantage located in some of the most expensive places to live suggest that socioeconomic stratification in education is partly driven by restrictive residential land use policies affecting land prices. In particular, these findings expand the implications of Siegel-Hawley's (2024) work on the potential of housing and land-use policy reform to address school segregation.

## The Geography of Concentrated Advantage

Mapping areas of concentrated advantage shows that these areas are often located independently of socioeconomically segregated districts. Socioeconomically segregated districts tend to be present in urban cores within city boundaries, while areas of concentrated advantage tend to be located in the suburban rings surrounding these cores (EdBuild, 2016). In most cities with these areas of concentrated advantage among their districts, there are no significantly socioeconomically segregated districts.

There are also regional differences in the prevalence of areas of concentrated advantage. These areas are highly prevalent in the Northeast and Mid-Atlantic, forming rings around urban centers. They form the characteristic suburban rings around the Ohio cities of Cleveland, Columbus, and Cincinnati, as well as other cities in the Midwest. In California, these areas are characteristic of high-density metro areas. Surprisingly, socioeconomically segregated districts are often absent in these same cities.

In contrast, the Southeast shows almost no significant presence of either concentrated advantage or socioeconomic segregation among its public school districts. Instead, there are widespread areas of concentrated disadvantage, with a few isolated advantaged districts—characteristic of fragmentation.

These regional disparities emphasize the uneven landscape of spatial stratification and indicate factors such as density, regional economic geography, or housing markets. Although some areas exhibit distinct patterns of concentrated advantage, others lack these, illustrating the significance of regional variation, which will be examined further in the following sections.

## The Role of Housing Markets and Residential Zoning

Some might attribute these areas of concentrated advantage patterns to urban development patterns. However, its distribution suggests a more complex relationship. Despite extensive development, many metropolitan regions in the Southeast, especially Atlanta and Houston, lack areas of concentrated advantage among school

districts. This could suggest that, along with differences in school district size, which mask intra-district sorting, housing affordability, shaped by local markets and zoning regulations, may play a more significant role in where areas of concentrated advantage develop. While zoning restrictiveness was not directly measured in Chapter 4 due to the lack of comprehensive national data, the LISA maps from Chapter 3 can be interpreted in light of existing research on zoning. Prior work shows that restrictive zoning and limited land availability raise housing prices, reduce affordability, and increase population density, particularly in metropolitan areas like New York and Boston which may partly explain why major metro areas in the Southeast and Southwest largely lack areas of concentrated advantage (Glaeser & Gyourko, 2002; Gyourko & Krimmel, 2021).

Other work also shows that decreased housing affordability in recent decades is partly due to more restrictive land use regulations (Cox, 2023; E. Glaeser & Gyourko, 2018; Herkenhoff et al., 2018; Hsieh & Moretti, 2019). The findings from Chapter 4 seem to follow this pattern: regions with some of the strictest residential zoning regulations seem to have the most widespread areas of concentrated advantage. The West, particularly California, seems to reflect this relationship. High housing demand, restrictive zoning, and elevated land costs may play a role in the prevalence of areas of concentrated advantage in expensive metropolitan areas, such as San Francisco and Los Angeles (Gyourko & Krimmel, 2021).

**Regional Comparisons**

Although this study did not directly analyze zoning restrictiveness, the mapping suggests a link between areas with high housing costs and the prevalence of areas of concentrated advantage. Expensive housing often results from higher land costs, driven by restrictive residential zoning (Gyourko & Krimmel, 2021). This, in turn, limits the availability of affordable housing, sustaining the concentration of advantage and making it difficult for lower-income families to access these areas. This cycle of high housing costs and concentrated advantage perpetuates socioeconomic disparities in educational opportunities and outcomes. High land costs, often driven by restrictive

zoning, reduce the supply of affordable housing and exclude lower-income families, which could play a role in applying the competition Chapter 5 shows in areas of concentrated advantage. These findings align with broader work showing that restrictive land use policies contribute to spatial inequality in educational geographies.

Housing and zoning policies in the United States vary regionally, influencing differences in housing affordability and potentially contributing to where areas of concentrated advantage develop as they interact with intra-elite competition. Gyourko and Krimmel (2021) note that restrictive zoning influences regional home prices by raising land costs. This effect is most pronounced in metropolitan areas such as San Francisco, Los Angeles, and Seattle, where concentrated advantage is particularly prevalent. The West, particularly California, exemplifies this dynamic. It is characterized by high demand for housing, restrictive zoning, and widespread areas of concentrated advantage, especially in metropolitan areas with high home prices. Like the West, the Northeast has high housing prices and strict zoning laws, which may be attributed to limited land availability (Cox, 2023). Furthermore, strict zoning regulations and limited land availability in this region are partly responsible for the low affordability of major metropolitan areas like New York City and Boston, two cities with widespread areas of concentrated advantage outside city boundaries (Glaeser & Gyourko, 2002; Gyourko & Krimmel, 2021)While I did not directly investigate zoning or land costs, my findings suggest there may be a link between concentrated advantage among school districts and residential zoning and restrictiveness, intra0elitece competition, and housing costs in those areas.

However, despite being among the most affordable housing markets in the country (Cox, 2023),[37] areas of concentrated advantage appear around Cleveland and Cincinnati in the suburban 'ring' pattern characteristic of the Midwest. Unsurprisingly, given the overlap between areas with restrictive residential zoning and the prevalence

[37] Cleveland and Cincinnati rank 28th and 30th in housing affordability of 177 nationwide housing markets and yet have substantial areas of concentrated advantage outside their city boundaries (Cox, 2023).

of areas of concentrated advantage in other regions, with its comparatively flexible zoning environment, the Southeast has almost no areas of concentrated advantage outside of the greater Washington D.C. area and Birmingham. Birmingham, Alabama, is one of the few cities with concentrated advantage and disadvantage segregation within its boundaries. It also has a wide range of housing prices and mixed affordability, while cities like Atlanta and Dallas remained relatively affordable until recently (Cox, 2023). Moreover, the Southeast and Southwest, known for flexible zoning and high new construction rates, show relatively few areas of concentrated advantage (Gyourko & Krimmel, 2021). Houston, Texas, for example, lacks a conventional zoning code and relies on deed restrictions and local ordinances to manage land use. Despite this flexibility, Houston ranks low in housing affordability[38] (Cox, 2023). Whether Houston is an outlier or reflects a broader regional pattern remains unclear. More work is needed to determine whether cities like Houston are outliers or if they share characteristics with other affordable cities like Atlanta, which also lack significant socioeconomic sorting across school districts.

Understanding regional differences in residential zoning restrictiveness and housing policy is needed to identify mechanisms that produce areas of concentrated advantage and where they develop. Due to the absence of a national zoning dataset, much of this work relied on local zoning maps for decades, making it challenging to systematically assess the impact of residential zoning in the U.S. However, the findings from Chapters 4 and 5 suggest that these areas of concentrated advantage may be shaped by other regional and local factors than urban development, education funding, or socioeconomic segregation. These findings extend the implications of Siegel-Hawley's (2024) work, which argues for housing policy reforms to address school segregation. Findings from these chapters suggest that housing prices, which have been shown to be partly influenced by local zoning, residential zoning restrictiveness, may explain some of the variations in the patterns and the prevalence of areas of concentrated

[38] Houston ranks 87 of 177 in housing market affordability (Cox, 2023).

advantage across the country. Regions with restrictive residential zoning and high land values seem to have more and larger areas of concentrated advantage, reinforcing socioeconomic stratification in education. It may be the case that socioeconomic stratification in public education is also shaped by local housing markets and land-use regulations, along with state and local educational resource provision. Further work may be done to determine if, in high-cost, restrictive regions, easing zoning rules could reduce spatial stratification in public education for students.

So, while housing markets and zoning may play a role, other regionally varying factors, such as land availability, population density, and local economic conditions, may also influence where concentrated advantage occurs. Further work may be needed to understand whether flexible zoning consistently reduces socioeconomic sorting or whether other factors, such as income inequality and regional economic trends, also play a role.

### *Limits of Housing Affordability*

Later sections discuss the potential of de-zoning and affordability policies. However, concentrated advantage persists even in affordable regions, such as parts of the Midwest, particularly around metropolitan areas. This suggests that improving housing affordability may not be sufficient to mediate spatial disparities. Broader structural forces, deindustrialization, and the effects of financialization continue to limit opportunities for non-college-educated workers (Marley, 2016; Reeves & Pulliam, 2020; Tomaskovic-Devey, 2011). Moreover, some benefits of concentrated advantage may stem from intangible factors such as social cohesion and shared cultural values. These findings imply that redistributing material resources may not be sufficient; educational opportunity also depends on the social context in which students live and go to school.

## Factors in Areas of Concentrated Advantage

Overall, it seems as though the mechanisms underlying where and why areas of concentrated advantage appear are distinct from what we know about the common

mechanisms underlying socioeconomic segregation. Common drivers of socioeconomic segregation, such as school funding disparities, state political ideology, and race, show little association with concentrated advantage. Instead, these areas are associated with structural demographics: high home values and intra-elite competition, a dynamic explored further below.

The role of state political orientation in the unequal distribution of educational resources and its connection to the disadvantages found in socioeconomically segregated districts has been well-documented. However, state legislative ideology, funding provision, or funding inequality do not play major roles in the districts in areas of concentrated advantage. While conservative states tend to spend less on education overall, liberal states tend to have higher funding for certain districts in states without equalization (Favero & Kagalwala, 2024; Malin, 2016). Even so, findings from Chapter 5 show no strong link between state political orientation and the prevalence of concentrated advantage. Instead, regional housing markets, economic conditions, and zoning rules appear to play a role in where they develop. Moreover, districts in areas of concentrated advantage do not appear to significantly influence broader patterns of educational funding inequality, indicating that other mechanisms are responsible for funding disparities, operating independently of whether a district is in an area of concentrated advantage. This suggests that addressing educational inequality may require a greater focus on local and district-level factors, tailored to communities' specific needs and characteristics, rather than solely on state-level factors and reforms.

### *The Role of Intra-Elite Competition*

There is a growing body of literature on the influence of intra-elite competition on political instability, state breakdown, and economic development; however, to my knowledge, no studies have examined its role in socioeconomic sorting or education (Turchin, 2013; Turchin & Korotayev, 2020). Nevertheless, while these findings suggest that this form of economic competition may shape spatial stratification and

access to educational opportunities, it is challenging to relate them to previous research directly.

Findings from Chapter 5 do reveal a strong relationship between intra-elite competition and median home values. While there is some relationship between intra-elite competition and the proportion of a district's revenue from local sources, the effect is modest. However, while a relationship exists between intra-elite competition and local school funding sourced from property taxes, it is small, contrary to what we might expect. Moreover, scaling average elite income by GDP per capita to measure intra-elite competition reflects how competitive economic dynamics within advantaged households interact with local educational environments. The findings suggest that concentrated advantage may be more influenced by state and regional economic and demographic factors than by inequalities in educational resources and contemporary and historical drivers of socioeconomic segregation. Competition among advantaged households and competition for homes may matter more for areas of concentrated advantage than education funding provision or funding inequality.

Future research should explore whether intra-elite competition interacts with zoning and housing policy to reinforce concentrated advantage.

**Extending Our Understanding of Areas of Socioeconomic Advantage**

The findings presented here contribute to the existing literature on spatial socioeconomic advantage by introducing a theoretically informed composite variable designed to enhance the measurement of area-level socioeconomic advantage of school districts. This variable advances our understanding of socioeconomic advantages, particularly concerning the intergenerational transmission of socioeconomic status among families using public education. Unlike other measures, it prioritizes the capacity of families to reproduce their social position across generations through education, rather than focusing on income and wealth, such as homeownership, within school districts. Most notably, it incorporates a measure of marital status, capturing one of the most beneficial aspects of socioeconomic

advantage for children, family stability (Jeynes, 2023; Reeves & Pulliam, 2020; Shriner et al., 2010). This approach acknowledges the significance of cultural capital and the transmission of inherited cognitive abilities, as prior research has demonstrated that inherited cognitive abilities play a critical role in student academic performance, often surpassing the influence of socioeconomic status (Marks & O'Connell, 2021; Trzaskowski et al., 2014).

A key finding of this dissertation is that concentrated socioeconomic advantage constitutes a distinct and consequential form of spatial inequality, separate from disadvantage segregation. While many studies focus on the material resources available to students, such as school funding or teacher quality, the widespread presence of two-parent households in areas of concentrated advantage may contribute to a stable social environment that reinforces educational expectations, peer norms, and long-term planning.

As discussed in Chapter 6, students in advantaged districts located within areas of concentrated advantage outperform students in disadvantaged districts and perform better than similarly advantaged students outside of those clusters. This effect is especially strong in states characterized by intense intra-elite competition. While it might be tempting to attribute these results to better funding or more selective district boundaries, my findings in Chapter 5 show that school district spending inequality, per-pupil funding, and even district fragmentation do not significantly predict the presence of concentrated advantage. Instead, higher home values and intensified competition among socioeconomically advantaged families are the most salient drivers. These conditions, in turn, are closely linked to family formation patterns, particularly the stability of marriage among the professional-managerial class.

### *Spatial Opportunity Factors*

In areas of concentrated advantage, students are embedded in a dense social ecology in which parents are more likely to be married, highly educated, and employed in cognitively demanding occupations than students in other areas, regardless of their own family background. These households offer more than just material benefits: they

provide a consistent model of normative behaviors, routines, and expectations that support academic achievement. Importantly, these students are not just learning from their parents but are surrounded by peers whose families have similar traits. This neighborhood-level consistency, a sort of socially reinforcing structure of advantage, may be a core feature of the opportunity structures available in these areas. These areas are characterized by clusters of neighboring districts where families with children enrolled in public schools generally have: (1) parents who are not only highly educated and employed in professional or managerial roles but also maintain social connections with other similarly situated families; (2) financial capability to provide their children with educational enrichment opportunities; (3) children being raised within marriages; and (4) an environment where these beneficial characteristics are consistently modeled for them.

The educational benefits of this social environment are reflected in the findings presented in Chapter 6. Students in districts within areas of concentrated advantage had statistically significant gains in math achievement, even after controlling for family socioeconomic status and other district-level characteristics. The additive effect of attending a school in one of these areas suggests that the spatial clustering of stable families provides benefits beyond what an individual student's family background can explain. These effects could be amplified through peer influence, enriched neighborhood resources, community norms around education, and greater institutional support at the school level. This supports the view that concentrated advantage is not simply an aggregation of relatively wealthy families but a spatial structure that amplifies and reproduces advantage across generations.

### *The Role of Family Structures in Spatial Opportunity*

Family structure could be part of how socioeconomic advantage is transmitted across generations and reproduced spatially. Two-parent households often have more economic resources, greater residential stability, and more capacity to support their children's education, all of which contribute to better academic outcomes (Bernardi et al., 2019). When these families live together in certain geographic areas, they may not

simply benefit from existing opportunity structures but help produce and sustain them. As the literature on peer and neighborhood effects shows, the social composition of an area can influence the collective learning environment, suggesting that spatial concentrations of stable, resource-rich families enhance educational outcomes beyond what individual advantage can explain (Owens, 2016; Reardon & Bischoff, 2011). This reflects work on Tiebout sorting and regional residential stratification, which highlights how families with greater resources and stronger preferences for high-quality education tend to sort into advantaged districts, reinforcing existing spatial hierarchies (Tiebout, 1956; Bayer et al., 2008). Moreover, when socioeconomic advantage coincides with specific regional housing markets and institutional arrangements, it may create durable opportunity structures that concentrate not only material resources but also family capacities that shape student success (Goldstein & Hastings, 2019; Boterman et al., 2019).

The prevalence of married parents in areas of concentrated advantage could be a byproduct of economic conditions rather than a driver. From this perspective, two-parent households tend to cluster in high-income areas because these families can afford to live there, rather than because their family structure reinforces the concentration of advantage. However, this interpretation overlooks several key findings. First, while housing prices and intra-elite competition are strongly associated with concentrated advantage, students in these areas outperform similarly advantaged districts even in regions with relatively low housing costs, such as the Midwest. In cities like Cincinnati and Cleveland, where housing remains affordable by national standards, districts within the suburban rings of concentrated advantage still achieve higher student outcomes than similarly resourced peers. This suggests that family and social structure may not be merely outcomes of socioeconomic advantage or land values but are integral to the spatial dynamics of educational inequality.

Second, while economic socioeconomic advantage facilitates access to concentrated advantage, it does not guarantee it. Maps in Chapter 4 revealed that many affluent areas do not form statistically significant clusters of advantage. Perhaps only when

socioeconomic advantage overlaps with a specific underlying regional economic geography do we see the formation of the types of spatial opportunity structures that constitute areas of concentrated advantage.

The superior academic performance of students in these areas could be attributed to unmeasured variables, such as the presence of specific educational programs or higher teacher quality, distinguishing them from other advantaged districts. Another plausible explanation is that families with higher levels of educational achievement, attainment, and income are more likely to be drawn to these more expensive areas (Hanscombe et al., 2012; Morris et al., 2016; Trzaskowski et al., 2014). This concentration could create a feedback loop where families with advantageous traits can afford to live in expensive areas, leading them to seek out such areas as a proxy for the intellectual caliber of their children's peers, providing greater competition and opportunities for achievement.

Alternatively, parents in these areas may, for unexplored reasons, have more time and resources to support their children's education, resulting in better academic outcomes compared to children in other advantaged districts. Despite these considerations, the results from Chapter 5 suggest that areas of concentrated advantage offer area-level benefits that contribute to higher academic performance.

Family structures may not only be shaped by access to spatial opportunity but may also actively shape and sustain concentrated advantage in educational outcomes. This process could be reinforced by economic geography, employment-based sorting, and broader structural changes in the U.S. economy over recent decades. These changes, which have affected some regions more than others, include the loss of stable, well-paid blue-collar jobs, which have weakened many of these families' economic foundations, altering marriage, child-rearing patterns, and housing stability (Cherlin et al., 2013; Kearney, 2022; Manning et al., 2019).

## Implications for Housing Affordability in Areas of Concentrated Advantage

Given the relationship between housing costs and areas of concentrated advantage, adjustments to existing regulations to improve housing affordability could promote socioeconomic integration within areas of concentrated advantage. This section outlines some possible areas of intervention to improve housing affordability in areas of concentrated advantage, while preserving the unique characteristics of these areas, specifically the medium-density, single-family residential environments that families highly value.[39] Urban planners must respond to the evolving housing market, particularly as it is increasingly shaped by the preferences of Generation Z and millennials for affordable single-family housing as they expand their families (Kotkin, 2022). Achieving this objective will require a concerted effort to increase the construction of affordable single-family homes, thereby addressing the housing needs of an increasingly suburban millennial working class (Kotkin, 2022), without replicating past housing policies that concentrated working-class families in undesirable school districts.

### *Modifications to Residential Zoning Regulations*

Modifying residential zoning regulations to enhance housing affordability within areas of concentrated advantage could facilitate the inclusion of non-advantaged families in these desirable locations. Rather than adopting high-density inclusionary zoning (IZ) units to achieve socioeconomic integration, urban planners might prioritize the development of single-family row houses and single-story terrace complexes that offer private outdoor spaces, proximity to local amenities, and other family-friendly features (Kontokosta, 2014; Steixner, 2012). Modifying residential zoning regulations to enhance housing affordability within areas of concentrated advantage could facilitate the inclusion of non-advantaged families in these desirable locations. Rather than

[39] Single-family ordinances are zoning laws that designate certain areas of a municipality for single-family homes only (Monkkonen, 2019). A single-family home is a standalone residential structure designed to house one family. These ordinances typically prevent the construction of multi-family units, such as duplexes, townhouses, or apartment buildings, in the designated areas.

adopting high-density inclusionary zoning (IZ) units to achieve socioeconomic integration, urban planners might prioritize the development of single-family row houses and single-story terrace complexes that offer private outdoor spaces, proximity to local amenities, and other family-friendly features.

However, this approach requires more land and resources than high-density IZ units and can hamper conservation and infrastructure development. To support these efforts, county and city zoning boards could consider rezoning existing residential areas to allow for smaller, more affordable homes and low-density multifamily housing. Additionally, subsidizing the construction of new housing developments with reduced minimum floor and lot size requirements could incentivize developers to build smaller, more affordable homes. These modifications would collectively increase housing affordability and expand access to high-quality educational opportunities for a broader demographic.

However, current homeowners may be concerned about the potential decrease in their property values and neighborhood character. To address these concerns, further research could be conducted to establish a threshold for socioeconomic integration that maintains property values and the desirability of school districts while increasing opportunities for non-advantaged families.

Urban planners and developers should also be cautious about increasing density, as this can compromise the compatibility of the development with surrounding neighborhoods. One approach to achieving this balance is replacing traditional use-based zoning restrictions with form-based zoning. Form-based zoning codes permit a range of uses within each area, with primary distinctions between zones based on the density of each use (Chandler & Dale, 2001). Form-Based Codes (FBCs) could facilitate the creation of low-density zones with similar allowable uses as high-density zones, offering greater flexibility to build affordable, moderate-density, mixed-use housing while preserving family-friendly amenities (Onaran, 2018). Adopting FBCs could enable planners and developers to expand affordable housing in desirable school districts with minimal disruption, potentially mitigating the concentration of poverty

and crime often associated with IZ programs (Kontokosta, 2014). This approach would involve building smaller, more affordable homes to improve affordability in single-family neighborhoods, while preserving the residential character and density typically found in suburban or low-density urban areas (Monkkonen, 2019).

Some modifications to the existing use-based codes could improve the affordability of new construction in areas of concentrated advantage. Instead of overhauling entire housing policies or constructing new infrastructure, these modifications could involve targeted adjustments to current zoning regulations. For instance, removing or reducing minimum lot[40] and floor size[41] requirements could allow developers to build smaller, more affordable homes (Hirt & Robinson, 2014).

### *Federal Subsidies for Affordable Housing in Advantaged Areas*

Federal agencies could introduce subsidies to build affordable homes in areas of concentrated advantage, complementing the removal of restrictions on minimum floor and lot size requirements. This strategy would encourage specific types of development by providing financial incentives to developers, making it more feasible to build affordable homes in high-demand school districts. These subsidies would help offset the higher land and construction costs typically associated with these areas.

### *FHA Home Loan Modifications*

Housing availability and affordability are substantial determinants of a household's ability and desire to reside in a particular neighborhood (Owens, 2019). To improve housing affordability for young families in desirable school districts and to incentivize

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[40] Minimum lot size requirements are zoning regulations that specify the smallest size of land on which a home can be built (Hirt & Robinson, 2014). For example, a minimum lot size requirement might dictate that each single-family home must be on a plot no smaller than 7,500 square feet. These requirements help control the housing density in a neighborhood, ensuring that homes are not too close together and that there is sufficient space for yards, driveways, and other outdoor areas. These requirements are often used to preserve the neighborhood's character, manage population density, and maintain property values (Hirt & Robinson, 2014).

[41] Minimum floor size requirements are zoning regulations that set the smallest allowable size for a home's interior living space (Hirt & Robinson, 2014). For instance, a minimum floor size requirement might state that each single-family home must have at least 1,200 square feet of living space.

family stability, policymakers could consider increasing the loan limits for Federal Housing Administration (FHA) loans, specifically for married first-time homebuyers. Similarly, the USDA Rural Development Guaranteed Housing Loan Program could raise loan limits for its Single Family Housing Direct Home Loans and Single Family Housing Guaranteed Loan Program for married couples. Expanding income limits for these programs would increase their accessibility by allowing a broader pool of applicants to qualify.

Removing the requirement that applicants for Single Family Housing Direct Home Loans lack "decent, safe, and sanitary" housing at the time of application could further increase access to homeownership for married first-time home buyers with children (USDA Rural Development, 2020, p. 1). Families in rental housing often face financial constraints that limit their ability to save for a down payment, especially in high-demand school districts. Eliminating this requirement could help more families transition to homeownership, promote marriage over cohabitation, and improve family stability, although there are many other structural factors that complicate this intervention.

However, increasing loan limits carries potential risks. Though such policies have complex implications, implementing rent control measures could help temper these risks.[42] Therefore, increasing loan limits for FHA and USDA housing programs for married first-time home buyers may be justified as a trade-off to enhance housing affordability, promote family stability, and improve access to desirable school districts.

Expanding the geographical coverage areas of the Single Family Housing Direct Home Loans, the Single Family Housing Guaranteed Loan Program, and first-time home buyer assistance programs administered by state housing finance agencies (HFAs) to include moderate- to high-income suburban areas could help lower-income

[42] Rent control can discourage new construction and encourage long-term tenancy, potentially delaying homeownership for some households (Autor et al., 2014). While these market distortions are significant, the actual gains experienced by renters often outweigh the potential negative effects (Autor et al., 2014).

families afford to live in desirable districts (USDA Rural Development, 2020). HFAs could broaden the eligibility criteria for first-time home buyer assistance programs to include all skilled trades and other blue-collar workers (FDIC, n.d.). Such modifications would significantly increase access to affordable homeownership opportunities, particularly for non-advantaged families. However, they might lead to increased competition and demand, potentially driving up property prices and limiting affordability for some buyers.

Nevertheless, many factors contributing to the advantageous environments in these areas remain unknown or insufficiently understood. Consequently, any proposed interventions should be approached and implemented with caution. It may be wise to consider whether the current situation, with its existing drawbacks, is preferable to the unknown consequences of attempting top-down reform within a complex set of social, structural, economic, and demographic processes and feedback loops.

## Acknowledgments and Limitations

This section outlines the limitations of the studies in Chapters 4 through 6. These limitations stem from data constraints, methodological choices, and the research's conceptual focus. I suggest areas for future research to extend or refine the findings where relevant.

### *Scope and Conceptual Limitations*

The studies focus specifically on spatial patterns of socioeconomic advantage in U.S. public school districts. This focus necessarily excludes other dimensions of inequality, such as cultural capital, institutional discrimination, or family structure, which may also shape educational outcomes. Moreover, by centering the analysis at the school district level, intra-district variation is not captured. Alternative variables or modeling strategies might reveal different patterns of stratification. I have attempted to conceptualize and measure socioeconomic advantage as holistically as possible within the scope of nationally representative data linked to geospatial school district boundaries.

The index measure developed to measure the school district socioeconomic advantage captures district-level advantage using a composite of theoretically grounded indicators drawn from literature on the professional-managerial class, emphasizing the role of university credentials (Ehrenreich & Ehrenreich, 1979; Lind, 2020). While it has not been validated in other studies, its components are well-established, as discussed in Chapter 4.

### *Data Limitations*

The American Community Survey (ACS) 5-year estimates aggregate data over time, potentially masking short-term dynamics such as the effects of the COVID-19 pandemic on housing and migration patterns. Sampling variability is particularly problematic in smaller school districts, reducing the precision of estimates.

Data from the National Center for Education Statistics (NCES) and the Education Demographic and Geographic Estimates (EDGE) lack granularity, which limits the ability to analyze within-district variation or specific subpopulations. Despite these constraints, the data provide a foundational view of national patterns of concentrated advantage. Future research using more granular data, such as catchment areas, could better capture intra-district stratification.

Missing data were addressed through imputation methods, which, while necessary, rest on assumptions that may not hold for all districts. These assumptions could introduce errors or bias that affect inferences drawn from the data.

### *Methodological Limitations*

The use of school districts as the unit of analysis introduces the modifiable areal unit problem (MAUP), a well-documented issue in spatial analysis. Patterns observed may vary if smaller or alternative geographic units were used. School districts were selected due to their administrative significance and the availability of public data; however, future work should replicate these findings at smaller spatial scales, including catchment areas.

The analysis in Chapter 4 uses Local Moran's I with Queen's contiguity to define spatial relationships. This approach assumes uniform influence across neighboring districts and is sensitive to irregular shapes and sizes of districts. Edge effects may bias the identification of spatial clusters near national boundaries. While this method offers practical advantages, these assumptions should be considered when interpreting the results.

Chapter 5 examines academic outcomes in areas of concentrated advantage but does not employ a nested design. As such, it does not account for variation at the family, school, or neighborhood level. Using math scores as a proxy for academic performance also limits the generalizability of findings. Although math scores are commonly used in educational research to estimate academic performance, future research should incorporate reading scores to provide a more holistic assessment of academic performance (Dobbie & Fryer, 2011).

### *Theoretical Framing Limitations*

Chapters 4 and 6 exclude race or ethnicity as an interaction variable in order to isolate class-based mechanisms of spatial stratification. This choice reflects the theoretical orientation of structural-demographic theory, which emphasizes elite reproduction and resource consolidation. While this approach clarifies the role of socioeconomic forces, it limits the ability to account for the intersection of race or ethnicity and class in shaping educational inequality.

This choice helps retain the focus on how the professional-managerial class reproduces its status through structural mechanisms such as housing, education, and zoning policies. Including race as an interaction term may obscure these dynamics by conflating class mechanisms with historically contingent forms of racial discrimination. However, this choice limits the study's explanatory scope, particularly in a U.S. context where racial and class stratification often co-occur.

Future studies could build on this work by incorporating race and ethnicity as additional layers of analysis to examine how intersecting forms of inequality shape the

locations of areas of concentrated advantage. Doing so would offer a more complete understanding of stratification processes in American public education.

Despite these limitations, this dissertation contributes a novel framework for understanding the spatial concentration of socioeconomic advantage in U.S. public education. The RFSAI, combined with spatial analysis of district-level data, offers a foundation for future research. More granular data and alternative modeling strategies will be essential to validate and extend these findings, particularly with respect to intra-district variation and the intersection of different forms of inequality.

## Conclusions

Overall, this dissertation is concerned with the impact of spatial socioeconomic stratification on U.S. education. Chapters 4-6 provide findings that identify areas of concentrated advantage among public school districts, their potential drivers, and implications. These areas create durable spatial inequality, affecting the educational opportunities of millions of students. To deepen our understanding and provide evidence to support more effective strategies to address the underlying causes of this issue, in this dissertation, I (1) identified areas of concentrated advantage in Chapter 4, (2) examined the relationship between factors typically associated with disadvantaged segregation and concentrated advantage in Chapter 5, (3) analyzed the role of competition in contributing to concentrated advantage in Chapter 5, and (4) evaluated whether school districts within areas of concentrated advantage experience academic performance benefits in Chapter 6.

To address the first research objective, I identify areas of concentrated advantage and various patterns of socioeconomic sorting across U.S. public school districts through a series of LISA maps presented in Chapter 4. The second and third research objectives were met through Chapter 6, in which I identified underlying factors in areas of concentrated advantage. I found that intra-elite competition is an underlying concentrated advantage among school districts in the United States, while common indicators of school district inequality are not. The fourth research objective is met

through Chapter 6, where I estimate the academic performance benefits of advantaged districts within areas of concentrated advantage, comparing them to those within other spatial patterns of socioeconomic sorting, including advantage isolation, disadvantage segregation, and concentrated disadvantage.

The findings underscore the importance of incorporating concentrated advantage and intra-elite competition into future research on the spatial dimensions of educational inequality. They also emphasize the importance of addressing the root causes of spatial stratification through policy addressing structural challenges for American families, rather than merely its symptoms, to ensure that all students, regardless of their geographic and socioeconomic backgrounds, have equal opportunities to succeed. Ultimately, reducing spatial inequality in education is necessary for American students to reach their full educational potential and meet the challenges the nation faces in the coming decades.[43]

### *Agenda for Future Research*

To build on these findings, future research should incorporate additional area-level socioeconomic advantage measures to refine the socioeconomic advantage in educationally relevant areas. Factors such as access to green spaces, public safety, social networks among parents with school-aged children, and residential zoning regulations should be considered to improve area-level measures of concentrated advantage. Incorporating distinctions between single-family and multifamily zoning and minimum floor and lot sizes could offer more nuanced insights into areas of concentrated advantage.

Zoning and catchment were not included in this national mapping project due to the difficulty in obtaining nationwide shapefiles for these boundaries (Cobb, 2020). However, the ongoing National Zoning Atlas project aims to digitize and integrate county zoning maps into a national geospatial database of zoning ordinances,

[43] These challenges include the need to develop a workforce with the technical skills required for onshoring industries of strategic national importance.

providing opportunities to integrate nationally representative zoning data into analyses of educational sorting across districts and metropolitan areas. Integrating future work into areas of concentrated advantage could provide valuable insights into the influence of local land use regulatory environments.

Future work could also be done to identify latent variables mediating the relationship between spatial opportunity structures in areas of concentrated advantage and academic performance. Moreover, predictive spatial modeling could examine patterns of concentrated advantage under various structural-demographic conditions, particularly as intra-elite competition intensifies in a contracting economic context. Examining the interaction between intra-elite competition and parental reasoning instincts could also provide valuable insights into the development of areas of concentrated socioeconomic advantage.

Expanding on these findings by incorporating additional or more holistic measures of educational achievement, while including longitudinal data on matriculation to highly selective universities and earnings, would provide a better understanding of the interaction between changes to students' spatial environments and their educational outcomes.

Another avenue of research that is needed is to explore the causal mechanisms more thoroughly and to determine whether intra-elite competition genuinely enhances academic performance. While I found a positive association between intra-elite competition and higher academic performance, particularly in math scores, this suggests a meaningful link; however, the research design I used meant I could not establish a causal relationship.

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