When Change Lands in Place:
Gentrification and Urban Schooling in the United States

By

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To my dad

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ABSTRACT

The in-migration of relatively affluent households into disinvested central city neighborhoods—commonly referred to as gentrification—is increasingly common across the United States. There is limited quantitative evidence, however, as to how gentrification relates to the structure and function of neighborhood schools. The purpose of this dissertation is to provide an introductory picture of how a shifting landscape of urban inequality brought about by patterns of gentrification relates to urban schooling in the contemporary U.S. city.

In the first section, new statistics are presented on the incidence and distribution of gentrification occurring around public schools in the United States as a whole. Of the roughly 10 percent of urban schools that were located in neighborhoods categorized as disinvested in the year 2000, roughly one in four experienced gentrification in the subsequent decade. However, there exists considerable heterogeneity in the prevalence of gentrification across U.S. metropolitan areas. For example, the share of urban schools located in disinvested neighborhoods in 2000 that subsequently gentrified was over 40 percent in Washington, DC, but effectively zero in Memphis, TN.

The second section explores factors correlated with whether gentrification occurs around public schools. Among the population of schools located in gentrifiable neighborhoods at baseline, gentrification was more likely to occur around schools with fewer non-white students, fewer students per teacher, and fewer students overall, controlling for observable differences. School neighborhoods were also more likely to gentrify if the neighborhoods themselves had fewer non-white residents and if schools were located in cities with less racial residential segregation. The third part of this dissertation estimates whether gentrification is associated with changes in disciplinary patterns at neighborhood schools. Evidence is found that gentrification is associated with increased

rates of suspension for black students at local high schools, especially in schools wherein black students comprise a minority of the student population.

CHAPTER I

INTRODUCTION

In recent decades, the in-migration of higher-SES households into relatively low-income central city neighborhoods—commonly referred to as gentrification—has become increasingly widespread across the United States (Hwang & Lin 2016). Despite that these trends are commonly associated with the improvement of neighborhood institutions (Freeman 2011), there is limited quantitative evidence as to how the *reurbanization* of the professional and middle class relates to the structure and function of neighborhood schools. Largely unknown are answers to basic questions about the intersection of gentrification and schooling: Are neighborhoods more likely to experience gentrification in certain U.S. cities? Are there particular characteristics of schools associated with whether gentrification happens around them? What happens to local schools if their surrounding neighborhood gentrifies? The field of education is in need of a coherent, introductory picture of how the shifting landscape of urban inequality relates to urban schooling across the United States.

Statement of Problem

Urban sociology of the twentieth century was devoted, in part, to understanding the causes, consequences, and trends associated with the spatial clustering of social problems in urban neighborhoods (Clark 1989; Drake & Clayton 1993; Massey & Denton 1993; Sampson 2009; Massey & Shibuya 1995; Shaw & McKay 1942). In the last several decades, another important reality of residential stratification in urban America has emerged: namely, not all disadvantaged neighborhoods stay that way. Modern trends are pointing, in part, to the reconstitution of urban space as a destination (Hwang 2016). These trends are codified in processes of gentrification that are reshaping the social, economic, and institutional organization of many urban communities nationwide, leading to considerable debate over the pros and cons of neighborhood change,

especially for low-income urban residents (Atkinson 2004; Brown-Saracino 2010; Freeman 2005; Goetz 2011; Pattillo 2008; Smith 1996).

One of the notable shortcomings of educational research on cities, neighborhoods, and schools, however, is the lack of serious attention to matters of neighborhood change. For the last several decades, the balance of educational research concerned with so-called neighborhood effects has examined the spatial distribution of educational outcomes through static research designs that explain differences in educational outcomes through differences in neighborhood-level characteristics, such as neighborhood poverty rates or broader indices of neighborhood disadvantage. However, despite significant changes in urban dynamics in recent years—in particular the re-investment in and re-population of many chronically-poor urban neighborhoods—relatively few educational researchers have treated urban communities *dynamically* and examined how gentrification relates the structure and function of schools located in these changing communities.

Purpose and Overview

This dissertation builds on emerging research into the relationship between gentrification and K-12 schooling in the United States by (1) describing the distribution, prevalence, and variation of gentrification occurring around urban schools nationwide, (2) examining factors correlated with gentrification and determining the extent to which school-level factors predict it, and (3) determining whether gentrification is related to changes in disciplinary patterns at urban schools. In doing so, this dissertation documents several stylized facts about gentrification as it occurs around public schools and provides the first empirical evidence of whether gentrification is related to changes in disciplinary patterns at local schools. Importantly, neither of these aims is causal in nature. Rather, the purpose of this dissertation is to build intuition and generate hypotheses about the broad connections between urban schools and the uneven development of underinvested, predominantly poor neighborhoods in metropolitan areas across the United States.

This dissertation is divided into six total chapters. The second chapter provides the theoretical and conceptual foundation for the analyses that follow. This chapter also provides an overview of gentrification research as it relates to urban schooling. Chapter III describes the data sources used in this study. One of the challenges associated with conducting population-level research about the connection between neighborhood change and schooling is conceptualizing and measuring *school* neighborhoods at a geographically appropriate scale. In this study, school neighborhoods are defined based on school attendance boundaries. Data on school attendance boundaries are gathered from two sources: School Attendance Boundary Information System and School Attendance Boundary Survey. In order to attribute demographic and socioeconomic characteristics to schools' catchment areas, data were gathered from the U.S. Census and American Community Survey. Data on schooling conditions were gathered from the National Center for Educational Statistics' Common Core of Data and the School and Staffing Survey. Finally, school disciplinary data were gathered from Civil Rights Data Collection. Chapter IV describes the sample construction and estimation methods. Chapter V provides the core empirical chapter of this dissertation. In the first part of Chapter V, new statistics are presented on the incidence and distribution of gentrification occurring around public schools in the United States as a whole. The second section of Chapter V explores factors correlated with whether gentrification occurs around public schools and determines the extent to which school-level factors predict it. The final section of Chapter V estimates whether gentrification is associated with changes in disciplinary patterns at neighborhood schools. To conclude, the final chapter summarizes results, discusses implications, and addresses possible limitations of the analyses.

CHAPTER II

LITERATURE REVIEW

Definitions of Gentrification

Throughout this dissertation, the term *disinvested* is used to describe a subset of neighborhoods characterized by persistent poverty and low-levels of economic investment—neighborhoods susceptible to gentrification. In its most general sense, gentrification describes a type of physical, economic, and cultural transition in low-income urban neighborhoods in which disinvested, oftentimes minority neighborhoods subsequently experience an influx of wealthier households and increases in real property values (Hwang 2016b; Patillo 2007; Smith 1988). The term gentrification was first coined by Ruth Glass, who, in the early 1960s, used the term to describe changing dynamics in London neighborhoods: "[M]any of the working class quarters of London have been invaded by the middle class…until all or most of the original working class occupiers are displaced, and the whole social character…is changed" (p. 23, Glass 1964).

As the concept of gentrification popularized and spread across the Atlantic, scholars in the United States noted similar patterns in their own cities. Features of these gentrified neighborhoods, in the U.S. and abroad, included not only a demographic shift to a more affluent residential population but also the rehabilitation of old housing units, growth in the share of owner- as opposed to renter-occupied housing, and rising property values (Clark 2005; Zuk et al. 2015). The crucial point about gentrification, as introduced by Glass but articulated by many others since, is that gentrification involves not just a social change at the neighborhood scale, moving from a less to more affluent population, but also a physical change and reinvestment in the built environment (Smith 1987).

Recent Patterns of Gentrification

Beginning in the 1970s and 1980s, concentrated urban poverty, once a fixture in the American residential landscape, began to decline, and a small number of urban neighborhoods began to experience socioeconomic ascent (Hwang & Lin 2016). Despite being limited to a handful of neighborhoods in isolated cities, this reversal sparked considerable scholarly attention to matters of gentrification. This *early wave* gentrification was defined by a slow repopulation of urban neighborhoods and was restricted, primarily, to low-income white or racially-mixed neighborhoods close to the urban cores of the largest metropolitan areas (Freeman 2009; Smith 1996). On balance, however, the average central city neighborhood in the United States remained structurally disinvested and racially isolated through the 1990s (Hwang & Lin 2016).

Since the turn of the twenty-first century, however, *current wave* research has documented a considerable increase in the share of urban neighborhoods experiencing gentrification. For instance, Hwang and Lin (2017) noted that in 1970 only 1.1 percent of all neighborhoods located in downtown areas had experienced a two-quartile increase in socioeconomic status in the previous decade—e.g., a move from the lowest quartile of socioeconomic status to the mid-quartile. By 2010, however, nearly 8 percent of all downtown neighborhoods experienced such change. Similarly, a recent report that examined the extent to which gentrification is occurring in the 50 largest U.S. cities found that nearly 20 percent of neighborhoods previously classified as disinvested have experienced gentrification since 2000, comparted to less than 10 percent during the 1990s (Macaig 2015). In other words, gentrification has come to influence an increasing number of urban neighborhoods.

It is important to note, however, that since 2000 gentrification has expanded not only in scope but also in type. First, current-wave gentrification is characterized by *shifts* in the composition of households rather than a strict growth in the number of households, as was the case before the

turn of the century. For instance, while more affluent, college-educated households have been increasingly likely to live in central city neighborhoods since 2000, less (formally) educated households and households of color have been less likely to live in downtown areas (Baum-Snow & Hartley 2016; Couture & Handbury 2016; Kolko 2016).

Second, although the share of low-skilled jobs in metropolitan areas has continued to decline and suburbanize, recent shifts in the occupational structure of downtown areas has meant a rising share of college-educated persons employed in many downtown areas (Edlund, Machado, & Sviatschi 2015). Third, scholars have noted that higher-SES households relocating to urban areas place a higher value on local amenities (e.g., coastlines, rivers, parks) than they did in previous years (Baum-Snow & Hartley 2016). Finally, recent gentrification is characterized by larger violent crime reductions in central city neighborhoods than were observed in previous years (Ellen, Horn, and Reed 2016).

Despite the general consensus in current wave research that gentrification is *on the rise*, and an increasing understanding of what makes the most recent wave of gentrification distinct from the past, less attention in the scholarly literature has been paid to understanding *the spatial distribution* of gentrification. Are there certain parts of the country in which gentrification takes place more frequently? In what cities is gentrification most common? This oversight is due in large part to the fact that the balance of empirical research on gentrification has focused on the largest metropolitan areas in the United States, such as New York and Chicago (e.g., Freeman & Braconi 2004; Patillo 2007; Timberlake Johns-Wolfe 2016). Although there are important theoretical and practical reasons for this focus—namely, the sheer size and unique relation of these two cities within the post-industrial economy—of the roughly 78,000 urban schools scattered about the United States, only around 6,000 are located in New York and Chicago.

It is also important to note that the vast majority of scholars documenting recent patterns of

gentrification operationalize neighborhood change at the level of the census tract, i.e., a statistical subdivision used for the U.S. census that generally contains between 4,000 and 6,000 residents. Despite the convention of operationalizing gentrification at the level of the census tract, little theory has been advanced regarding the scale at which gentrification is conceived as being relevant for those living in or around these changing neighborhoods. A natural question is *relevant for what?* When considering the relation between gentrification and local institutions, a good place to begin is conceptualizing gentrification at a level that encompasses the residential environments of those persons served by the institution. This has a fairly straightforward corollary in the context of public schooling relative to other public institutions. Neighborhood schools, in large part, serve children living in precise geographic areas, known as an attendance boundary. One of the aims of this dissertation is to provide the first empirical evidence on the spatial distribution of gentrification occurring at the level of school catchment areas.

In addition, the conventional approach for measuring rates of gentrification in current-wave research, which is based on dividing the share of gentrified neighborhoods by the total number of neighborhoods (see Hwang & Lin 2017), conceals an important source of variation in patterns of gentrification. In particular, cities can differ amongst themselves in rates of gentrification because cities differ in terms of rates of reinvestment in disinvested neighborhoods or because cities differ in terms of their respective number of disinvested neighborhoods in the first place. As discussed in more detail later, a methodological contribution of this dissertation is to distinguish between what are termed here *absolute* versus *relative* rates of gentrification occurring around public schools and reporting how cities, states, and regions differ along these two dimensions.

Mechanisms of Gentrification

In addition to examining geographic variation in patterns of gentrification occurring around public schools, the second and third aims of this dissertation concern how gentrification *relates* to the

structure and function of neighborhood schools. In contrast to the first aim, questions about their respective relations, i.e., how gentrification and schooling interact, are far more complex. Schools can function as both a *predictor* and an *outcome* of gentrification. That is, the structure and function of neighborhood schools can influence whether potential gentrifiers see a low-income neighborhood as a viable option for them (e.g., Liebowitz & Page 2014). At the same time, because schools are subject to the same demographic and socioeconomic forces that may reshape a neighborhood (e.g., resultant student body transformations), the structure and function of neighborhood schools can also be in part a consequence of gentrification (e.g., Cucchiara 2014).

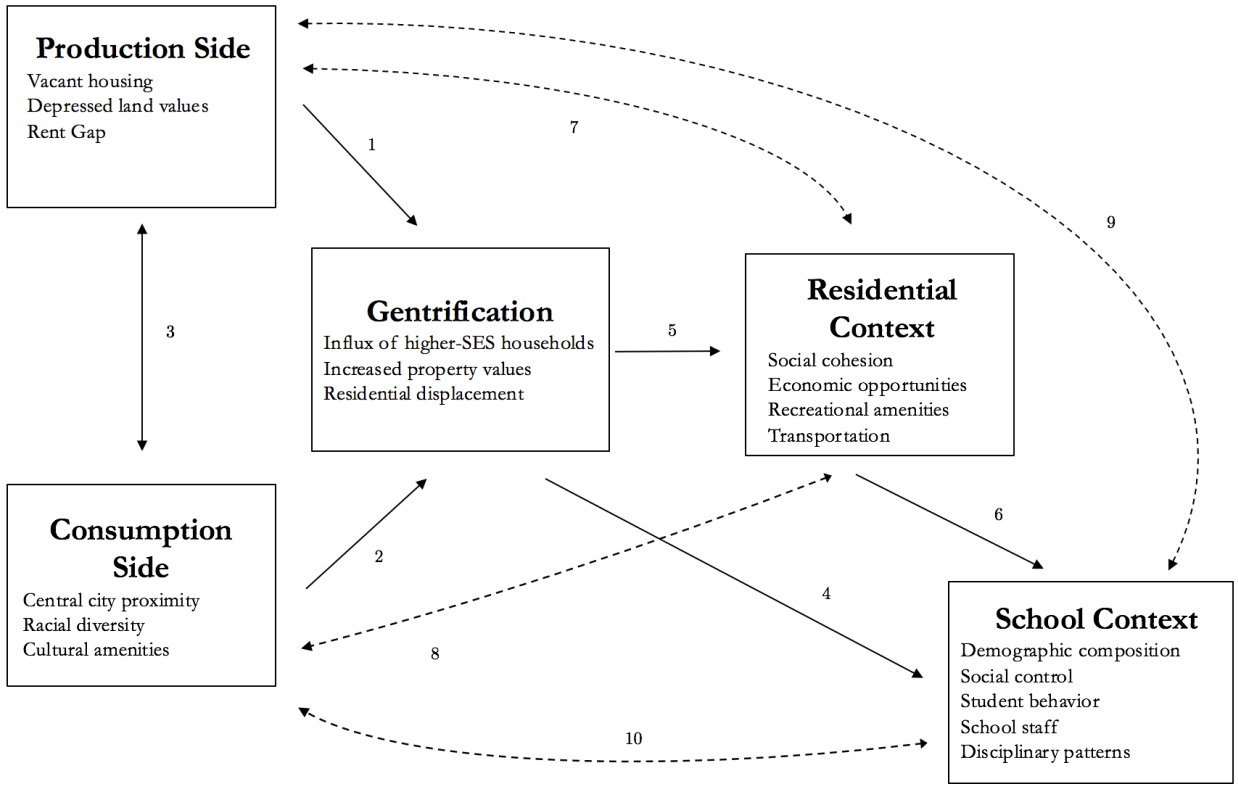


Figure 1: Theoretical Model of Relations Between Gentrification and Schooling Contexts

Figure 1 illustrates a highly stylized subset of relations depicting the association between gentrification and schooling contexts. On the left of the diagram are two theoretical categories that describe potential causes of gentrification, as indicated by arrows 1 and 2. As described in this

section, neighborhood schools can be cast in either or both of these theoretical categories. First, production-side explanations conceive of gentrification in economic terms and situate the inflow of higher-SES households and the revitalization of urban infrastructure as the product of investment opportunities that arise from systematic disinvestment and consequent under-valuation of certain neighborhoods. Gentrification, therefore, is conceived as a structural product of the housing and land markets. Neil Smith (1979) summarizes this point as follows:

> "Capital flows where the rate of return is highest, and the movement of capital to the suburbs, along with the continual depreciation of inner city capital, eventually produces the rent gap. When this gap grows sufficiently large, rehabilitation (or, for that matter, renewal) can begin to challenge the rates of return available elsewhere, and capital flows back."

This idea has come to be known as the "rent gap" theory, which is used to describe how the shortfall between actual and potential land-use values drives investment opportunities made available to homebuyers, developers, and investors and structures the flow of capital into (and out of) urban neighborhoods (Smith 1982).

Existing research into rent gap explanations of gentrification have identified significant associations between gentrification and socioeconomic indicators of neighborhood environments, including the extent of disinvestment and the age and quality of the housing stock (Betancur 2002; Galster et al. 2003; Hammel 1999; Hammel and Wyly 1996; Heidkamp and Lucas 2006; Ley 1996; Smith 1979b, 1996; Wyly and Hammel 1998). Importantly, however, there is at least suggestive evidence that this "rent-gap" may be influenced by the quality of neighborhood schools. For instance, proximity to high quality schooling, which is far less frequent in areas with high concentrations of poor, minority residents (Clotfelter, Ladd, & Vidgor 2005, 2006; Stullich 2011), has been found to be associated with increases in housing prices, net other neighborhood factors

(Bayer, Ferreira, and McMillan 2007; Clapp, Nanda, and Ross 2008; Dhar and Ross 2012). For instance, Clapp, Nanda, and Ross (2008) found that a one standard deviation increase in math scores increased property values by around 1.5 percent. In an earlier study, Black (1999) found that parents are willing to pay 2.5 percent more for housing for every 5 percent increase in test scores. Therefore, any disproportionate representation of lower-quality schools in disinvested urban neighborhoods would likely be associated with the suppression of housing demand in these neighborhoods. To the extent that lower-quality schools suppress housing demand, the potential "ceiling" of the rent gap is lowered, thus reducing the likelihood that a neighborhood undergoes gentrification (Brunner, Cho, Reback 2012).

In contrast to the rent gap theory, consumption side explanations for gentrification frame gentrification as the result of consumer demand. For instance, scholars such as Ley (1980), Hamnet (1994), and Lloyd (2010) frame the recent wave of gentrification as a natural expression of advanced capitalism and a post-industrial society that emphasizes individual creativity and risk tolerance. Based on this perspective, higher-SES households choose to gentrify neighborhoods because of an emerging alignment between their own cultural tastes and the structural features of neighborhood environments. A large body of evidence suggests that gentrifying residents are especially inclined toward the types of lifestyles made possible by proximity to urban amenities, such as cultural institutions, cafes, bodegas, and diverse residential environments (Bader 2011; Lloyd 2005).

Although Ley and others have identified a number of demand-related characteristics of gentrified neighborhoods, including proximity to a central business district, location near waterfronts, parks, and other urban amenities, growing evidence suggests that the structure and function of neighborhood schools may also serve as a consumption-side determinant of gentrification. For instance, a considerable body of research on residential mobility patterns more generally has shown that the racial and socioeconomic (SES) composition of neighborhood schools

is a key driver of home purchases among parents, expecting parents, and perspective home owners (Clapp, Nanda, & Ross 2008; Kane Staiger & Riegg 2006). These revealed preferences have resulted in low-income, high-minority schools in disinvested areas potentially serving as a barrier to higher income parents interested in taking advantage of the attractions associated with property closer to city centers (Keels, Burdick-Will, Keene 2013). In other words, cast as a neighborhood amenity, some neighborhood schools, presumably those with higher concentration of poor minority students, may simply be devalued by incoming gentry. The second set of analyses in this dissertation sheds light of this issue by determining what characteristics of neighborhood schools are associated with whether surrounding neighborhoods experiencing gentrification.

In addition to thinking about neighborhood schools as potentially upstream from gentrification, i.e., as serving as either production or consumption-side influences on patterns of gentrification (arrows 1 and 2), there is reason to believe that schools may also be downstream from gentrification. That is, gentrification may also have a role in shaping the structure and function of neighborhood schools (arrows 4 through 6).

The following section addresses a specific aspect of the relation between gentrification and schools by focusing on exclusionary discipline processes. While there are many aspects of schools that could be explored (e.g., achievement), the third analyses of this dissertation focuses on exclusionary discipline for three reasons. First, as described in detail below, there is theoretical justification that gentrification could affect school disciplinary patterns not only directly—by changing the structure and function of schools—but also indirectly by way of changes in children's residential environments. Second, there are currently available data repositories that track school discipline practices longitudinally for the universe of U.S. public schools. This allows for a population level examination of the relation between gentrification and school discipline that focuses on *changes* in disciplinary practices. Finally, despite considerable scholarly interest in the

antecedents to school discipline (e.g., Curran 2016; Krezmien, Leone, & Achilles, 2006; Wallace, Goodkind, Wallace, & Bachman, 2008), no research to date has examined whether broader changes in neighborhood environments may be associated with disciplinary outcomes. The following section outlines, in fair detail, why gentrification may be related to school disciplinary patterns before turning to the specific research questions that motivate subsequent analyses.

Gentrification and Schooling Contexts

Traditional adaptation theories of organizational change emphasize the ways in which organizations react to changes in their local environment by modifying the services they provide (Burch 2007; Dorado 2002; Edelman 1992; Edelman et al 1999). Demographic change at the neighborhood-level, reflective of gentrification, means that the same neighborhood institutions over time may serve increasing numbers of higher-SES households. Existing evidence suggests that these new, higher-SES constituents, in turn, are better equipped than long-term residents to place pressure on neighborhood institutions to improve services (Bryk, Sebring, Allensworth, Eaton, & Luppesci 2010; Noguera 2003). Consequently, the improvement of neighborhood institutions is one of the more characteristic features of gentrified neighborhoods (Hwang & Sampson 2014).

To the extent that these gentrification-induced improvements extend to neighborhood schools, it is reasonable to wonder what improvement means regarding disciplinary patterns. Would an improved neighborhood school suspend fewer students or more? On the one hand, it is reasonable to suspect that if gentrification enhances informal social control in the school (e.g., greater parental oversight) then deviant or problematic behavior in schools may become less likely and reduce the need for exclusionary discipline in the first place (Ellen and Turner 1998; Jencks and Mayer 1990; Leventhal and Brooks-Gunn 2000; Sampson, Morenoff, & Gannon-Rowley 2002). Should this be the case, one would expect overall suspension rates to decline in schools whose surrounding neighborhood undergoes gentrification.

On the other hand, there is a fair amount of evidence suggesting that after gentrification sets in that disciplinary regimes, i.e., the norms and procedures guiding disciplinary action in schools, could intensify. For instance, public safety campaigns and tough-on-crime initiatives are common in gentrifying neighborhoods, especially after the population stabilizes (Arnold 2011). These initiatives imply that gentrifying households may highly esteem perceptions of structure, order, and safety in their newly gentrified neighborhoods (Quillian & Pager 2001; Sampson 2012; Sampson & Raudenbush 2004). As a result, a push for punitive disciplinary procedures could be a natural expression of these collective impulses. For instance, a recent study of criminal juries found that those that occurred in areas in which gentrification was most common tended to have the highest conviction rates (Marcano 2016). If these predictions are accurate about the intensification of social control in schools whose surrounding neighborhood experiences gentrification, then one would expect an increase in overall suspension rates at neighborhood schools.

The impact of intensifying social control at neighborhood schools, however, may differ along racial lines. In particular, scholars have pointed to the role of implicit bias on the part of teachers and administrators as one pathway by which disciplinary disparities between minority and white students arise (Rocque 2010; Skiba et al., 2002). In the context of school discipline, implicit bias generally refers to the automatic and subconscious stereotypes about minorities that govern how school staff engages and responds to minority students. For instance, several recent studies have found that school personnel (a) view minority students as less childlike and more culpable for their actions than white students (Goff et al. 2014), (b) gaze longer at minority students than white students when expecting challenging behavior from the class in general (Gilliam et al. 2016), and (c) perceive minority students as posing a more dangerous threat to their classmates than white students (Gilliam & Reyes 2016).

The question, however, is whether and how gentrification might impact the nature of implicit bias in neighborhood schools. Gentrification could affect implicit bias through three interrelated pathways. First, teachers and administrators who work in high-poverty, majority-minority schools that potentially experience a rise in the number of non-poor white students as the result of gentrification could, in turn, come to view the behavior of minority students as more troublesome than before. This would result from staff members re-evaluating the behaviors of minority students in contrast to that of their new, affluent, white classmates. According to this logic, behavior that was once normalized in relatively segregated schools becomes less so when schools enroll a more heterogeneous group of students. This could result in harsher punishments and a greater likelihood of exclusionary discipline for minority students exhibiting a given behavioral infraction when they attend schools located in gentrifying neighborhoods with more diverse racial compositions.

Second, and in slight contrast to the first, the gentrification of schools' surrounding neighborhood could result in teachers and administrators viewing the behavior of white children more favorably, that is, whether or not they perceive behaviors of minority students as any worse than before. According to this logic, white students who attend a school located in a neighborhood undergoing gentrification could receive additional credit in terms of perceived innocence when their behavior is judged by a largely white teaching force in comparison to that of low-income students of color. Should this be the case, the same action that would otherwise amount to a suspension in a school located in a non-gentrifying neighborhood could earn a white student a less severe punishment at a school located in gentrifying neighborhood, such as a referreal. The result here, similar to the previous paragraph, would be an expansion of the racial discipline gap.

Finally, gentrification could affect the nature and expression of implicit bias in school settings by changing the racial composition of school staff. Several decades of research have shown

that a lack of representational bureaucracy on the part of a teaching staff increases the likelihood of disciplinary disparities between minority and white students (Grissom, Nicholson-Crotty, & Nicholson-Crotty 2009; Meier 1984, Meier & Stewart, 1992). That is, discipline disparities arise, in part, when a teaching staff is whiter than the student population. If new, more affluent clientele of a neighborhood school agitate for a changing-of-the-guard in which teachers and administrators of color are replaced by white teachers and administrators, one might expect an increased potential for discrimination through implicit bias, which, if operational, would likely expand racial disparities in suspensions.

In addition to the potential for altering the nature and extent of social control at neighborhood schools, gentrification could impact school disciplinary patterns by changing aggregate patterns of student behavior. First, changes to behavioral patterns could simply come about from shifts in schools' student population. As many gentrification scholars note, the influx of affluent households into previously disinvested neighborhoods is often associated with the displacement of the most economically vulnerable households (Zuk et al. 2016). To the extent that these demographic shifts translate into analogous changes to the student population at neighborhood schools, then after gentrification has run its course one would expect that neighborhood schools would enroll greater concentrations of non-poor children and lesser concentrations of the most economically-disadvantaged children. Because behavioral infractions generally follow a socioeconomic gradient (Sullivan, Klingbeil, & Van Norman 2013), i.e., less poor children generally exhibit fewer behaviors deemed discordant with normative behavioral expectations than poor children, there is reason to suspect that either or both of these student-body transformations brought about by processes of gentrification could result in the reduction of suspension rates at neighborhood schools overall.

Gentrification and Residential Contexts

In addition to influencing disciplinary patterns through changing schooling contexts directly, gentrification occurring around public schools may affect school disciplinary patterns by altering the residential contexts in which children live. These relations are depicted in Arrows 5 and 6.

Two broad theories—relative deprivation and collective socialization—provide insight as to how changes in children's residential contexts could shape school disciplinary patterns. First, relative deprivation theory assumes that children assess their own success or failure by comparing themselves to children in their immediate surroundings (Marsh & Hau 2003). In contrast to an effect occurring through changes in the nature and extent of social control deployed by school staff or effects occurring by shifting the composition of the student body, relative deprivation theory does not require changes in neighborhood schools—either in social control or student composition—for effects to materialize. In particular, an influx of affluent children into an otherwise high-poverty neighborhood school or even to its surrounding neighborhood could result in lower-income children feeling greater stress about perceived opportunities or relative status when they are cast in the shadow of peers who perceptively have more resources, social capital, or opportunities.

For instance, Odgers et al. (2014) found that low-income boys growing up alongside more affluent children were more likely to engage in antisocial behavior than their low-income peers living around less affluent children. Similarly, studies of the Moving to Opportunity Demonstration, which provided low-income families housing vouchers to move from high- to low-poverty neighborhoods, found that children, in particular boys, who moved to less poor neighborhoods were more likely to engage in anti-social behaviors (Kling, Ludwig, & Katz 2005).

Importantly, relative deprivation theory would also portend the opposite effect on the children of gentrifying households who are assumed to be at a greater advantage in their new neighborhoods, status-wise. As a result, more affluent children relocating to gentrifying

neighborhoods could feel the need for greater conformity to behavioral expectations at neighborhood schools (these students may feel themselves as having more to lose, so to speak). Whether these differential perceptions of status and opportunity among long-term versus gentrifying children culminate in the increase or decrease in overall suspension rates at neighborhood schools will likely hinge on the relative concentration of long-term versus gentrifying children attending neighborhood schools.

In addition, because gentrification is often accompanied by racial turnover, i.e., the influx of higher-SES *white* households and the displacement of poor *minority* households, one can also imagine relative deprivation theory occurring along explicit racial lines with implications for disciplinary disparities. In such a case, lower-status minority students could feel some measure of threat with the arrival of gentrifying white households that results in a greater propensity to engage in disruptive behavior. Similarly, more affluent white children who relocate to gentrifying neighborhoods could feel some cognitive benefit that results in them being less prone to engage in problematic behavior in school. Should processes of relative deprivation play out along these sorts of racial lines, then one would expect that whatever impact gentrification has on racial disparities in suspensions would hinge on whether the cumulative, adverse effect that gentrification has on the behavior of minority students outweighs (or is outweighed by) the cumulative, beneficial effect that gentrification has on white students' behavior.

It is also important to note that any potential adverse effects on school disciplinary patterns associated with relative deprivation theory or the intensification of exclusionary discipline in schools could be offset by any indirect benefits that gentrification brings about for long-term residents. For instance, as gentrification occurs, schools may well be more inclined to suspend disorderly students, and minority or poor children may experience a status threat with the arrival of more affluent, oftentimes white children, but their surrounding neighborhood may provide them enhanced

opportunities, e.g., a new recreational center, or improved economic prospects that function to enhance the overall quality of life for long-term residents. The net result could be that long-term resident children become less likely to engage in the types of disorderly behaviors that would have gotten them suspended under the previous, less punitive disciplinary regime but nonetheless find themselves suspended at similar rates as before under the new, more punitive disciplinary regime. For instance, rates of suspension for physical altercations may diminish while suspension rates for violating implicit interactional codes may increase, with the net result being no change in overall suspension rates (Vavrus & Cole 2002).

In addition to relative deprivation theory, the effect of gentrification on school disciplinary patterns may come about through aggregate increases in occupational status, educational attainment, and household income among neighborhood residents. This idea is expressed formally in the theory of collective socialization. This theory suggests that gentrification-induced changes in the social and demographic composition of the neighborhood would positively affect low-income children's behavior by exposing them to upwardly-mobile behaviors and norms that might better position them for schooling success (Nicotera, Williams, & Anthony 2013; Sampson, Morenoff, & Gannon-Rowley 2002). In fact, the idea that low-income residents will experience "trickle down" benefits from newly developed social capital obtained through differentiated social networks cultivated in revamped neighborhood environments is precisely the theory of change undergirding New Urbanist philosophies of mixed income development becoming more popular in cities across the country (Joseph, Chaskin, & Webber 2007; Chaskin & Joseph 2015).

Despite each of the previously mentioned reasons for why disciplinary patterns could be sensitive to neighborhood gentrification, it is also quite possible that gentrification could have little to no effect on disciplinary patterns. There is a fair amount of evidence suggesting that gentrifying households with children frequently opt out of the neighborhood school, choosing to enroll their

children in charter, magnet, or private schools (Keels, Burdick-Will, Keene 2013). For instance, in their study of school tracking in the quickly gentrifying area of Greenpoint-Williamsburg in Brooklyn, NY, Desena and Ansalone (2009) highlighted the role of "between-school" tracking whereby children of affluent families were sent to schools outside their immediate neighborhoods. To the extent that gentrifying households send their children elsewhere and are unconcerned with and have no influence over the neighborhood school, it is possible that the processes underpinning the level of social control and the enactment of exclusionary discipline at neighborhood schools simply do not change as a result of gentrification occurring in the surrounding neighborhood.

Finally, it is worth noting that dotted arrows 7 through 10 in Figure 1 depict a series of bidirectional relations emphasizing that the association between neighborhoods, schools, and the precursors to gentrification are in all likelihood recursive. As residential and schooling contexts change as a result of gentrification, the nature of the production- and consumption-side characteristics of a neighborhood—those factors that drive patterns of gentrification—shift as well. As a straightforward example, the rent gap and property values, nearly by definition, are inversely related. If gentrification induces property values to rise, the gap between actual and potential land values naturally diminishes, thus reducing the likelihood of further gentrification. Similarly, if a previously dysfunctional school in a disinvested neighborhood quickly improves as the result of gentrification-induced investments (e.g., more effective school leadership), then the neighborhood school may be transformed into a desirable amenity for gentrifying households, thereby promoting more gentrification. These feedback processes are critical aspects to how gentrification unfolds in communities over time but are beyond the scope of this dissertation.

There are four main takeaways from this section. First, the empirical literature on gentrification is largely unclear as to whether the intensification of post-2000 gentrification is consistent across the U.S. or if there are particular regions or cities in which gentrification is most

common. Second, prior quantitative research on gentrification has largely ignored the role of neighborhood schools as a potential predictor of gentrification. Third, current understandings of gentrification are largely limited to what is known about how gentrification affects the sociodemographic composition of census tracts, a geographic unit typically smaller than the average school catchment area. Finally, educational research has largely ignored the potential role of gentrification in shaping the structure and function of neighborhood schools, especially with regard to exclusionary discipline practices. This study will combine an expansive set of public and restricted use datasets to provide an introductory picture of the relation between gentrification and schooling in the modern U.S. metropolis.

Research Questions

In broad terms, this dissertation provides perspective on the *where*, *why* and *so what* of gentrification with respect to urban schooling at a population level. The first part of this dissertation, which addresses the *where* question, documents the distribution and prevalence of gentrification occurring around public schools nationwide. In particular, the first section addresses the following three research questions:

(1) What portion of U.S. public schools are located in gentrified neighborhoods?

(2) How do patterns of gentrification occurring around public schools differ by region, state, and city?

(3) What portion of public school students attend school in gentrified neighborhoods, and do patterns of exposure differ by race/ethnicity?

The next section of the dissertation builds from these broad descriptive findings and attempts to provide some intuition for why gentrification occurring around public schools comes about. In particular, the next section answers the following three research questions:

(4) What factors at the school, neighborhood, school district, and city level are associated with whether public schools experience gentrification in their surrounding neighborhood?

(5) What factors are the strongest predictors of whether public schools experience gentrification in their surrounding neighborhood?

(6) How does the joint predictive power of school level characteristics compare to the joint predictive power of neighborhood, district, and city characteristics, respectively?

The final analyses provide one perspective on the *so what* of gentrification with regard to the structure and function of urban schools by inquiring into the relationship between gentrification and school disciplinary patterns. In particular, the final analyses in this dissertation addresses the following two research questions:

(7) Is gentrification associated with changes in overall suspension rates at neighborhood schools?

(8) Does the association between gentrification and suspension rates differ for different racial/ethnic groups?

It is important to reiterate that these questions are purely descriptive in their aims and do not attempt to shed light on matters of cause and effect. The purpose of these questions is rather to document several stylized facts about relation between gentrification and schooling in cities across the United States. The next section describes the data sources and measures used to answer these questions.

CHAPTER III

DATA SOURCES AND MEASURES

The purpose of this chapter is to provide an overview of the data sources and key measures used in subsequent analyses. This dissertation uses seven data repositories:

1. National Center for Educational Statistics Common Core of Data
2. 1990 and 2000 U.S. Census
3. 2009-14 American Community Survey
4. 1999-00 and 2011-12 Civil Rights Data Collection
5. 1999-00 School and Staffing Survey
6. 2009-10 School Attendance Boundary Information System
7. 2013-14 School Attendance Boundary Survey

Following the overview of the datasets and measures provided in this chapter, descriptions of the statistical methods that draw on these data are provided in the Chapter IV.

Common Core of Data

Data on school and district characteristics were gathered from the National Center for Educational Statistics' (NCES) Common Core of Data (CCD). CCD is a program of the U.S. Department of Education that gathers fiscal and demographic data about all public schools and districts in the United States. CCD provides directories of public schools that contain characteristics of each school, including location information, operational status, and school type, as well as aggregated demographic variables such as the number of students by race and counts of teachers. This study makes use of four school-level variables from this dataset: the total number of students, percentage of student receiving free and reduced-priced lunch, share of non-white students, and the

student-teacher ratio. In addition, several district-level characteristics were gathered from the CCD, including total enrollment, share of non-white students, annual expenditures per student, percent of children in the district receiving free and reduced-price lunch, and the density of charter and magnet schools.

U.S. Census

Data from the 1990 and 2000 U.S. Censuses provided information on the socioeconomic and demographic characteristics at a variety of geographic levels, including that of the census tract. Census tracts are geographic entities established by the Bureau of Census that typically contain between 4,000 and 6,000 residents and for which demographic and socioeconomic information is publically available. The following variables from the 1990 and 2000 U.S. Census were used at various points in this study: poverty rates, proportion of residents who are children, percent of residents receiving government assistance, proportion of adult residents who have received a bachelor's degree, percent of residents who are non-white, proportion of working adults who are unemployed, proportion of families who are female-headed, density of persons per square mile, proportion of owner-occupied housing, proportion of vacant housing, median income levels, and the distance to the nearest affluent neighborhood (defined as a census tract whose median income is in the highest quartile of its respective city). In addition, the 2000 U.S. Census was used to compute city-level measures the degree of racial and income segregation across all city neighborhoods, total population, and a measure of income inequality. (Equations for segregation and inequality indices are included in the Appendix.)

American Community Survey

After the year 2000, the American Community Survey replaced the U.S. Census as the primary collector and producer of demographic, economic, social, and housing characteristics. The American Community Survey is a nationwide survey of U.S. households conducted by the U.S.

Census that provides annual estimates of range of characteristics at different geographic resolutions. The ACS releases demographic data down to the census tract-level every year based on a rolling five-year average. For example, the 2010-2014 ACS summarize census tract responses received in 2010, 2011, 2012, 2013, and 2014. Following convention, the 2010-14 ACS is treated as though it occurred in 2012, the midpoint year. The 2009-14 ACS is used to gather neighborhood data at follow-up (2011-12 school year) to determine whether or not a school neighborhood gentrified.

School and Staffing Survey

The School and Staffing Survey (SASS) is a nationally representative sample of school districts that offers a comprehensive account of alternative forms of school choice. This survey is used to gather a binary indicator of whether the district offered an open enrollment program. The SASS questionnaire separates intra-district choice programs in which families can opt to send their child to another school within the same district from inter-district choice programs in which families can opt to send their child to another school in a nearby district. Because of data sparseness—very few districts offer an intra-district but not an inter-district program—both intra- and inter-district choice indicators are combined under the category of open enrollment programs. Note that the 2000 School and Staffing Survey was a probability sample and not a census of school districts. Therefore, approximately one-quarter of schools in the analytic sample were unable to be linked to an open enrollment indicator. This issue was treated as a missing data problem, along with other missing values on school, neighborhood, and district covariates, and was addressed through multiple imputation. To ensure estimation models capture the effect of gentrification on neighborhood schools, i.e., the schools that children were zoned to, additional controls were included that measure the level of school choice afforded to children in each district.

Civil Rights Data Collection

Data made available through the Civil Rights Data Collection were used as the dependent variables in several inferential analyses. The CRDC is a biennial survey conducted by the U.S. Department of Education that provides discipline data on U.S. public schools. The utility of the 1999-00 and 2011-12 CRDC is that each was a census and not sample of U.S. schools; therefore, all schools in operation during the respective survey year were required by federal law to participate. Suspension rates were measured as the total number of students (overall or by race) suspended from school one or more times divided by the total number of students (overall or by race) attending that particular school. Importantly, several schools reported inconceivable suspension rates that exceeded a value of 1, i.e., schools reported more students as being suspended one or more times than there were students at the school. This issue is addressed by replacing with a missing value any value that exceeded 1 for overall suspension rates or suspension rates by race.

School Attendance Boundary Information System

The 2009-10 School Attendance Boundary Information System is a National Science Foundation-funded repository of spatial data on school attendance boundaries for grades K through 12 in over 500 of the largest school districts in the United States. The repository was maintained by the College of William and Mary and the Minnesota Population Center. (The 2011-12 version of SABINS only collected attendance boundary data in Minnesota.) Because SABINS was a voluntary survey, schools included in the survey are a non-random sample of the population of U.S. public schools. In total, SABINS provided catchment area data for over 38,000 public schools during the 2009-10 school year, which corresponds to around 40 percent of urban schools nationwide that were operational during the 2011-12 school year and 44 percent or urban schools operational at baseline.

School Attendance Boundary Survey

With the aid of the National Center for Educational Statistics, what was previously the School Attendance Boundary Information System became, in 2013, the School Attendance Boundary Survey (SABS). SABS is now conducted biennially by the National Center for Educational Statistics and is designed to collect school attendance boundaries for public schools in all 50 U.S. states, including the District of Columbia. SABS, like its predecessor, includes any school currently in operation that has at least one grade higher than prekindergarten and is defined as a regular school, so long as the school is not a charter or magnet school. Charters and magnets are automatically excluded from the survey given that charter and magnets generally operate without catchment areas. Recent iterations of SABS are a more encompassing survey than was SABINS. The 2013-14 SABS provided catchment area data for schools in over 500 districts nationwide, which comprised 63 percent of urban schools nationwide that were operational during the 2011-12 school year and 80 percent of urban schools operational at baseline.

Defining School Neighborhoods

This study adopts a conception of school neighborhoods based on the residential environments in which students live. In particular, school neighborhoods are defined based on school attendance boundaries. School attendance boundaries, also known as catchment areas, designate the housing units served by a particular public school. To maximize the representativeness of school neighborhoods, catchment area data were also gathered from both the 2009-10 School Attendance Boundary Information System as well as the 2013-14 School Attendance Boundary Survey (SABS). Despite the fact that SABS had better coverage than SABINS, the algorithm used for linking schools to their respective catchment area in the current study prioritized the 2009-10 SABINS database because it occurred within the assessment period. Any school unable to be matched to the 2009-10 SABINS database was then matched to catchment area data from the 2013-

14 SABS database. Together, the two surveys account for 73 percent of regular public schools in urban areas nationwide that were operational during the 2011-12 school year and 85 percent of schools that were operational at baseline. (As described in the methods section, all subsequent descriptive and inferential analyses are based on post-stratification weights that increase the representativeness of the sample and help generalize findings to the well-defined population of U.S. public schools.) As a reference, Appendix A provides a coverage map of attendance boundaries.

In order to attribute demographic and socioeconomic characteristics to each catchment area, catchment area shapefiles were overlaid onto shapefiles of all U.S. census tracts. Demographic data for these census tracts, which, as described above, were gathered from the 1990 and 2000 U.S. Census, as well as the 2009-14 American Community Survey, were then aggregated to the level of the catchment area. In particular, demographic characteristics for each school catchment area at each assessment period were calculated using an area-weighted average. For instance, if a school's catchment area fell completely within one census tract, only the demographic characteristics of that census tract would be used. If a school's catchment area were equally represented in four census tracts, demographic features across all four census tracts would be averaged. In contrast, if 80 percent of a school's catchment area were located in one census tract while the remaining 20 percent were located in another, demographic characteristics of the first census tract would receive a weight of 0.8 while the those of the second census tract would receive a weight of 0.2.

To mitigate concerns about catchment areas potentially changing during the observation period (possibly as a result of gentrification-related demographic trends), all subsequent analyses were replicated using a 1-mile radius around each school's physical location. The added benefit of using this alternative specification was that the universe of U.S. schools could be included in the analytic samples as opposed to a weighted subsample, as was the case for the catchment area data. This was possible because the School Universe Survey provided geographic coordinates (longitude

and latitude) for the physical location of all U.S. public schools. Similar as above, demographic data for each school neighborhood based on a 1-mile radius was computed using an area-weighted average. As shown in the results section, substantive conclusions are robust to this alternative specification.

Defining Gentrification

This dissertation adopts Neil Smith's (1998) seminal definition of gentrification as "the process by which central urban neighborhoods that have undergone disinvestments and economic decline experience a reversal, reinvestment, and the in-migration of a relatively well-off middle- and upper middle-class population" (p. 198). Importantly, this definition does not require the existence of residential displacement or racial turnover for gentrification to occur, which are two aspects still widely debated in the empirical literature on gentrification (Atkinson 2004; Freeman 2005; Pattillo 2007). For instance, although gentrifiers are commonly depicted as white, scholars have increasingly documented the role of higher-SES black households in fostering gentrification in places such as Chicago and Harlem (Taylor 2002; Freeman 2006; Pattillo 2007; McKinnish, Walsh, and White 2008) And while gentrification is commonly associated with residential displacement, scholars have begun to frame physical displacement as a *potential* outcome rather than a constituent part of gentrification, noting that gentrification without displacement is more common than previously thought (Freeman & Braconi 2004; cf. Shaw Hagemans 2015).

Following prior nationwide studies of gentrification (see Freeman 2005, 2006), this study employs a categorical measure of gentrification that accounts for both production- and consumption-side factors. A school catchment area (hereafter referred to as a school neighborhood) was classified as <u>disinvested</u> if (a) it had a median household income in 2000 that was below the 40th percentile of its respective city average, and (b) it had a housing supply built in the 20 years preceding 2000 that was below the 40th percentile of its city. (Ancillary analyses, shown in the

results section, indicate that results are robust to a less restrictive definition of disinvested based on a 50th as opposed to a 40th percentile threshold.) A school neighborhood was considered gentrified if it met disinvested criteria (a) and (b) and then underwent between 2000 and 2012 (c) an inflow of college-educated residents that exceeded the growth of college-education persons in the city overall (signifying demand-side influences), and (d) an increase in real housing prices (signifying production side influences).

Table 1 provides empirical justification for how gentrification is defined. Table 1 compares median differences of select neighborhood variables at baseline (2000) and follow-up (2012) across three different types of school neighborhoods in the analytic sample: those ineligible for gentrification at baseline, those disinvested but non-gentrified neighborhoods, and, finally, gentrified neighborhoods. (Although Table 1 provides summary statistics across all grade levels, grade-level specific summary statistics are provided in Appendix C.)

Table 1: Racial, Economic, Social, and Housing Differences by School Neighborhood Type, 2000 and 2012

	Ineligible Neighborhoods			Persistently Disinvested Neighborhoods			Gentrified Neighborhoods		
	2000	**2012**	**Δ**	**2000**	**2012**	**Δ**	**2000**	**2012**	**Δ**
% College	0.20	0.25	0.22	0.07	0.09	0.17	0.13	0.20	0.54
% White College	0.18	0.21	0.18	0.05	0.05	0.12	0.11	0.17	0.55
% Poverty	0.08	0.08	0.00	0.12	0.13	0.14	0.16	0.14	-0.12
% Unemployed	0.04	0.08	0.81	0.05	0.09	0.68	0.07	0.10	0.44
% Children	0.17	0.19	0.12	0.22	0.25	0.14	0.28	0.29	0.05
% Single Parent	0.26	0.23	-0.12	0.24	0.22	-0.10	0.25	0.21	-0.15
% Homeowners	0.06	0.08	0.46	0.06	0.09	0.60	0.08	0.11	0.40
% Vacant	0.72	0.76	0.06	0.43	0.43	-0.00	0.49	0.51	0.05
% Non-White	0.13	0.21	0.59	0.72	0.80	0.10	0.41	0.46	0.12
Total Population	4,387	4,819	0.10	3,312	3,252	-0.02	3,725	3,748	0.01
# Hsng Units	1,738	1,978	0.14	1,311	1,346	0.03	1,542	1,632	0.06
Housing Price	158,547	171,987	0.08	74,086	75,645	0.02	107,503	139,903	0.30
Median Rent	795	861	0.08	569	652	0.14	653	786	0.20

Note: All Neighborhoods are located in Metropolitan Statistical Areas.

Unsurprisingly, school neighborhoods ineligible for gentrification, i.e., those with either

median incomes or shares of recently constructed housing in the top 60% percentile of their respective city, are the most socioeconomically advantaged at baseline of all three school neighborhood types. At baseline—and throughout the observation period—ineligible school neighborhoods had the highest percentage of highly-educated residents, fewest share of non-white residents, lowest rates of poverty and unemployment, and the highest median housing price and the highest median rent. These results are partially the results of the coding scheme, which basis eligibility for gentrification on median income and housing investment, but also demonstrate that other potential indicators of disinvestment (or lack thereof) align with what would otherwise be expected, i.e., ineligible neighborhoods are more advantaged than disinvested neighborhoods across the board.

When comparing disinvested school neighborhoods at baseline that remained disinvested throughout the observation period (second set of columns) to those disinvested school neighborhoods that actually underwent gentrification (third set of columns), several important differences emerged. In particular, at baseline (2000), school neighborhoods that subsequently underwent gentrification had fewer shares of non-white residents, more residents overall, higher housing prices, higher rents, more college-educated households, and more vacant housing. (These baseline differences lend support for the regression-based estimation approach described in the next section.) In addition, by 2012, gentrified neighborhoods experienced markedly larger increases in degree attainments and housing prices, an increase as opposed to a decrease in total population, and a larger decline in the share of female-headed households than persistently disinvested neighborhoods. And while persistently disadvantaged neighborhoods experienced a slight increase in poverty rates between 2000 and 2012, poverty rates in gentrified school neighborhoods declined by 10 percent over the observation period.

It should also be noted that between 2000 and 2012 the share of non-white residents increased in all school neighborhood types, even in gentrified neighborhoods. It turns out the racial distinction of gentrified neighborhoods is more narrow than aggregate changes in racial composition. In particular, school neighborhoods that experienced gentrification saw their share of white *college-educated* households increase by 55 percent, while non-gentrified and ineligible school neighborhoods saw their shares of college-educated white households increase by much less (18 and 12 percent, respectively). In sum, this brief descriptive analysis lends support for the operational definition of gentrification used here.

As a robustness check, however, results based on an alternative measure of gentrification defined in terms of increases in rental prices as opposed to property values is reported in the results section. Because long-term residents of disinvested neighborhoods are frequently renters and not homeowners (Desmond 2016), it is conceivable that a rent-based measure may be more relevant than rising property values in shaping the residential stability of long-term residents in gentrified neighborhoods. Nevertheless, as shown in the results section, results are robust to this alternative measure.

CHAPTER IV

METHOD

Sample Construction

The purpose of this study is to document patterns and correlates of school neighborhood gentrification and to estimate whether gentrification is related to changes in disciplinary outcomes at neighborhood schools. It is important to note that two separate but overlapping samples were used to answer the above research questions. The first set of research questions—about the *where* of gentrification—are based on what is referred to as the *spatial* sample. This sample consists of the universe of schools with available data that were operational during the 2011-12 school year. The second and third set of research questions—about the *why* and *so what* of gentrification—are based on what is referred to as the *prediction* sample. This sample consists of the universe of schools with available data that were operational during the 2011-12 school year but were also operational during the 1999-00 school year, the year that school neighborhoods were classified as disinvested, i.e., *gentrifiable*, or not (see above).

The difference between the two samples is simply the stipulation that schools were present at baseline. The prediction sample, then, is, by definition, a subsample of the spatial sample. The objectives of answering the *where* questions above are to document simple exposure rates, e.g., *what fraction of schools are located in gentrified neighborhoods*? and to describe where the gentrification of school neighborhood is most prominent nationwide. The objectives of answering the second two sets of research questions are to gain an understanding of how the relation between gentrification and neighborhood schools unfolds over time. That schools are present at baseline is unimportant for the former objective but necessary for the latter.

Estimation

Subsequent analyses proceed in three general stages. The first stage begins by describing variation in rates of gentrification occurring around public schools nationwide, regionally, and across metropolitan areas. The second stage conducts a series of bivariate (based on point-biserial correlations) and multivariate analyses to describe the overall and unique associations of gentrification with a diverse set of school, neighborhood, district, and city characteristics. To estimate the unique association of each variable with gentrification, multivariate probit regressions were estimated that take the following form:

$$\Phi^{-1}\big(P(G_i = 1|\mathrm{X})\big) = \alpha + \beta \cdot \mathrm{X}_i + \lambda_s + e_i$$

where Φ^{-1} is the inverse of the standard normal conditional density function; G_i is a binary indicator of whether the neighborhood surrounding school *i* underwent gentrification between 2000 and 2012; X_i is a vector of covariates about school *i* that refer to a set of school-, neighborhood-, district-, and city-level characteristics, respectively. To facilitate interpretation, average marginal effects are computed for each coefficient in vector X_i. λ_s denotes the inclusion of state fixed effects, meaning all estimates are based on within-state comparisons. Finally e_i refers to a residual error term clustered at the city level. Importantly, because e_i may not be independent of X_i, one cannot interpret the average marginal effects in causal terms. Rather, the average marginal effect for each coefficient in vector β is interpreted as the change in the likelihood of gentrification associated with a unit change in the variable of interest.

The third stage draws on a value-added design to estimate whether gentrification is associated with *changes* in schools' disciplinary patterns. The primary analysis incorporates a full set of school-, neighborhood-, and district covariates as well as lagged outcome measures. The formal model is based on ordinary least squares (OLS) and takes the following form:

$$D_{i,2012} = \alpha + \beta_1 \cdot G_i + \beta_2 \cdot D_{i,2000} + \gamma \cdot \mathrm{X}_{i,2000} + \gamma \cdot \mathrm{X}_{i,1990} + \lambda_s + e_i$$

where $D_{i,2012}$ refers to suspension rates overall or by race in school *i* in the year 2012, G_i is a binary indicator of whether school *i*'s catchment area was gentrified between 2000 and 2012, $D_{i,2000}$ refers to the lagged value of the outcome measure assessed at baseline (2000). That this model includes the lagged outcome measure adjusts for any baseline differences in schools' disciplinary practices while simultaneously controlling for any time-invariant unobserved school- or neighborhood-level factors that might otherwise confound the observed association. $X_{i,2000}$ is a vector of baseline school-, neighborhood, district, and city-level characteristics for school *i*. $X_{i,1990}$ is a vector of covariates that capture previous neighborhood trends during the 1990s (each covariate is equal to the difference between the respective baseline neighborhood characteristic measured in 2000 and its 1990 value). λ_s is a vector state fixed effects, and e_i is an error term. Similar as above, however, because e_i may not be independent of unobserved determinants of gentrification, β_1 does not have a causal interpretation. Rather β_1 is interpreted as the change in suspension rate when a school neighborhood gentrifies. In addition, because e_i may be correlated within districts, cluster-robust standard errors are used in all analyses.

In addition, because theory suggests that the relation between gentrification and suspension rates could vary by schools' racial composition, a second set of models is estimated that includes an interaction term between gentrification (G_i) and a standardized measure of the share of non-white students in the school. In these interaction models, the main effect for gentrification is interpreted as the association between gentrification and changes in suspension rates at schools with average shares of non-white students. The coefficient for the interaction term is interpreted at the increment (or decrement) to the relation between gentrification and suspension rates associated with a standard deviation increase in the share of non-white students.

Sampling Weights

That every public school in the country did not report catchment area data may have resulted in an analytic sample that was systematically different from the broader population of urban schools nationwide. To address this concern, this study created two sets of post-stratification weights—one for the spatial sample, the other for the prediction sample—that adjusted for schools' differential probability of reporting catchment areas. This was accomplished by merging the list of schools with catchment area data (from both SABINS and SABS) with data from the National Center for Education Statistics' School Universe Survey, which included schooling characteristics for the universe of public schools (including those with catchment data). Schools in the SABINS and SABS survey were then weighted by the inverse of the probability that they reported catchment area information based on observable characteristics.

For the spatial sample, the broader population of schools for which these weights were calculated was the universe of public schools operational during the 2011-12 school year. For the prediction sample, the broader population of schools for which these weights were calculated was the universe of schools operational during both the 2011-12 and 1999-00 school years. In effect, schools that were less likely to report catchment area data were up-weighted relative to their peer institutions. These sampling weights were estimated from a logistic regression in which a binary indicator of whether a school reported its respective catchment area was regressed on observable characteristics described below. The inverse of these predicted probabilities became the post-stratification weights, which were then used in all subsequent analyses. (See Wodtke, Harding, & Elwert 2011 for a similar weighting technique.) As shown in the results section, findings were robust to the exclusion of these sampling weights, suggesting that non-random reporting of catchment areas was not a threat to external validity. As a final note, missing values on all covariates (except for

baseline disciplinary patterns) were imputed, and subsequent estimates are reported from 25 imputed datasets combined using Rubin's Rules (Rubin 1987).

CHAPTER V

RESULTS

Spatial Variation in Gentrification Occurring Around Public Schools

This section examines the *where* of school neighborhood gentrification by describing the incidence and distribution of gentrification occurring about public schools nationwide. It is important to note that rates of gentrification can be construed one of two ways. First, one can think about rates of gentrification in absolute terms; that is, with respect to the total number of schools (or students) in urban areas. Specifically, one can divide the number of schools located in gentrified neighborhoods by the total number of schools in each metropolitan area. Or one can divide the number of students attending school in a gentrified neighborhood by the number of students in a metro area. However, because a city could have low absolute rates of gentrification because a city gentrifies few of its disinvested neighborhoods or because a city has few disinvested neighborhoods in the first place, an additional statistic is provided. This additional statistic captures rates of gentrification within the population of neighborhoods that could in fact gentrify. Simply put, the denominator changes.

Rather than dividing the number of gentrified school neighborhoods by the total number of schools within a metropolitan area as was the case with absolute rates of gentrification, additional insights about patterns of gentrification can be gleaned by dividing the number of gentrified school neighborhoods by the number of *gentrifiable* school neighborhoods. This latter ratio is referred to as the rate of *relative* gentrification. Measuring relative gentrification is valuable because increases in absolute rates of gentrification may have ambiguous normative implications, as they may be driven

by fewer gentrifiable neighborhoods within city boundaries rather than more gentrification happening within city boundaries.[1]

Table 2: Absolute and Relative Rates of Gentrification Occurring Around U.S. Urban Schools by Region and Metropolitan Area Size, 2000-2012

	Urban Schools	Gentrifiable School Nhoods	Gentrified School Nhoods	Absolute Exposure	Relative Exposure
United States	78,356	11,706	3,188	4.1%	27.2%
Region					
Northeast	14,088	1,759	605	4.3%	34.4%
Midwest	18,971	2,580	600	3.2%	23.3%
South	26,443	4,648	1,123	4.2%	24.2%
West	18,854	2,719	859	4.6%	31.6%
City Population					
More than 3 million	22,108	3,480	903	4.1%	25.9%
1 to 3 million	15,939	2,733	711	4.5%	26.0%
500,000 to 1 million	8,305	1,334	309	3.7%	23.2%
250,000 to 500,000	9,447	1,256	304	3.2%	24.2%
Fewer than 250,000	22,557	2,903	961	4.3%	33.1%

Note: Neighborhood data were gathered from the 2000 Census and the 2009-14 American Community Survey. School data were gathered from the 1999-00 and 2011-12 School Universe Survey. Estimates are weighted by post-stratification weights.

For descriptive purposes, both measures of gentrification are useful in that each highlights a slightly different perspective on gentrification. Absolute rates of gentrification measure the prevalence of gentrification across all school neighborhoods, which answers questions about the degree to which all urban students in a given city are exposed to gentrified school neighborhoods.

[1] It is worth noting that a city could have a high rate of *relative* gentrification based on a large or small stock of gentrifiable neighborhoods. For instance, Santa Barbara, CA has a relative rate of gentrification around its public schools of around 20 percent. However, of the 97 public schools located in Santa Barbara, only 5 were located in gentrifiable neighborhoods, meaning only 1 of these 5 neighborhoods subsequently gentrified (1 gentrified neighborhood/5 potentially gentrifiable neighborhoods = 20 percent relative gentrification). In contrast, in Fayetteville, AR, which boasted a relative rate of gentrification roughly equal to that of Santa Barbara, nearly half of its 137 schools were located in potentially gentrifiable neighborhoods. That is, the same percentage of a larger number of potentially gentrifiable school neighborhoods in Fayetteville relative to Santa Barbara underwent gentrification. In either case, however, relative gentrification captures the degree of possible gentrification occurring within city boundaries.

Relative gentrification, on the other hand, highlights the prevalence of *reinvestment in disinvested* school neighborhoods. Relative gentrification answers questions say about the extent to which schools that could experience gentrification actually do experience gentrification.

RQ 1: What portion of U.S. public schools are located in gentrified neighborhoods?

Table 2 shows absolute and relative rates of gentrification occurring around public schools overall and disaggregated by region and metropolitan area size. As shown in Table 2, of the 78,356 public schools located in urban areas nationwide during the 2011-12 school year, 11,706 schools—or approximately 15 percent—were located in neighborhoods (catchment areas) that were structurally disinvested at baseline and had the possibility of experiencing revitalization. These were neighborhoods that had (a) incomes in the bottom 40th percentile of their respective city, and (b) a share of newly-constructed housing in the bottom 40th percentile of their respective city.

As indicated in column 3, 3,188 urban schools nationwide were located in neighborhoods that subsequently did gentrify between 2000 and 2012. These were neighborhoods with median incomes and newly-constructed housing in the bottom 40th percentile of their surrounding city at baseline that subsequently experienced (a) an influx of college-educated households that exceeded that of their city overall, and (b) an increase in inflation-adjusted housing prices. This figure translates into an *absolute rate* of gentrification equal to 4.1 percent and a *relative rate* of gentrification equal to 27.2 percent. That is, between 2000 and 2012, 4.1 percent of all urban schools across the United States were located in neighborhoods that underwent gentrification, whereas 27.2 percent of urban schools whose surrounding neighborhood could experience gentrification subsequently did experience gentrification.

RQ 2: How do patterns of gentrification differ by region, state, and city?

While these statistics provide valuable insight into national patterns of school-neighborhood gentrification, the second research question concerns regional and metro area variations. The

bottom two panels of Table 2 provide sub-national details on the prevalence of gentrification by regional category (Northeast, Midwest, South, and West) and metropolitan area size.

As indicated by the second panel, the share of urban schools located in structurally-disinvested neighborhoods at baseline was highest in the South: 17.5 percent of urban schools in the South found themselves in gentrifiable neighborhoods in the year 2000. Yet, despite the density of gentrifiable neighborhoods in the South, the South was not where gentrification was most likely to occur in a relative sense. That would be the Northeast. Of the population of schools located in neighborhoods that were gentrifiable in the year 2000, more of these neighborhoods in the Northeast gentrified than anywhere else in the county. In particular, in the Northeast, roughly one in three urban schools located in potentially gentrifiable neighborhoods at baseline underwent gentrification, compared to 23 percent in the Midwest and 24 percent in the South.

To provide a visual sense of regional variation in gentrification occurring around urban schools, Figure 2 and Figure 3 show state-level exposure rates for absolute and relative gentrification, respectively. Although the primary unit of analysis remains the metropolitan statistical area (there are over 900 of them nationwide), state-level maps, which aggregate metro area estimates to the state level, communicate regional trends in a straightforward manner. Because the rates of absolute and relative exposure are based on different denominators, the maps are not directly comparable to one another; however, the color code for each map, which is based on quintiles, conveys the relative position of states in the national distribution of absolute and relative gentrification, respectively.

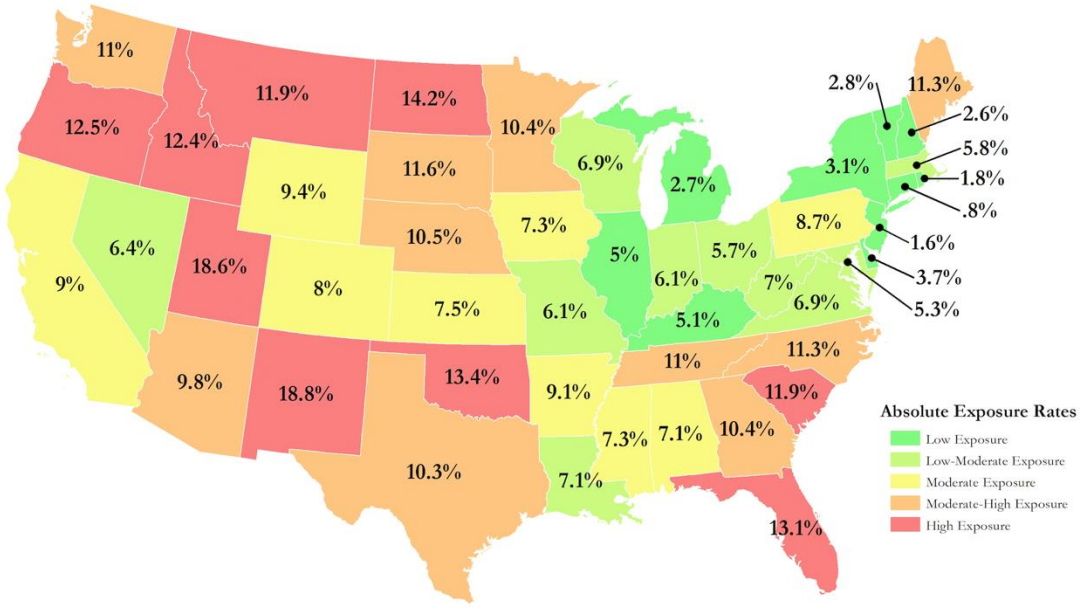
Overall, patterns of gentrification vary widely at the state-level, both in terms of absolute and relative exposure. For instance, less than 2 percent of all urban schools in New Jersey and Connecticut, respectively, were located in gentrified neighborhoods, compared to nearly 19 percent in New Mexico. And of the subpopulation of urban schools located in neighborhoods that qualified

as gentrifiable at baseline, 1.8 percent were located in neighborhoods that subsequently gentrified in Connecticut compared to nearly 60 percent in Utah.

Absolute exposure was highest in the West and South; however, several states in the Midwest—Minnesota and the Dakotas—also exhibited absolute rates of gentrification above 10 percent. On the other end of the distribution, absolute rates of gentrification in the Northeast were consistently below 6 percent, with the notable excepting being Maine, wherein roughly 1 in 9 urban schools found itself located in a gentrified neighborhood.

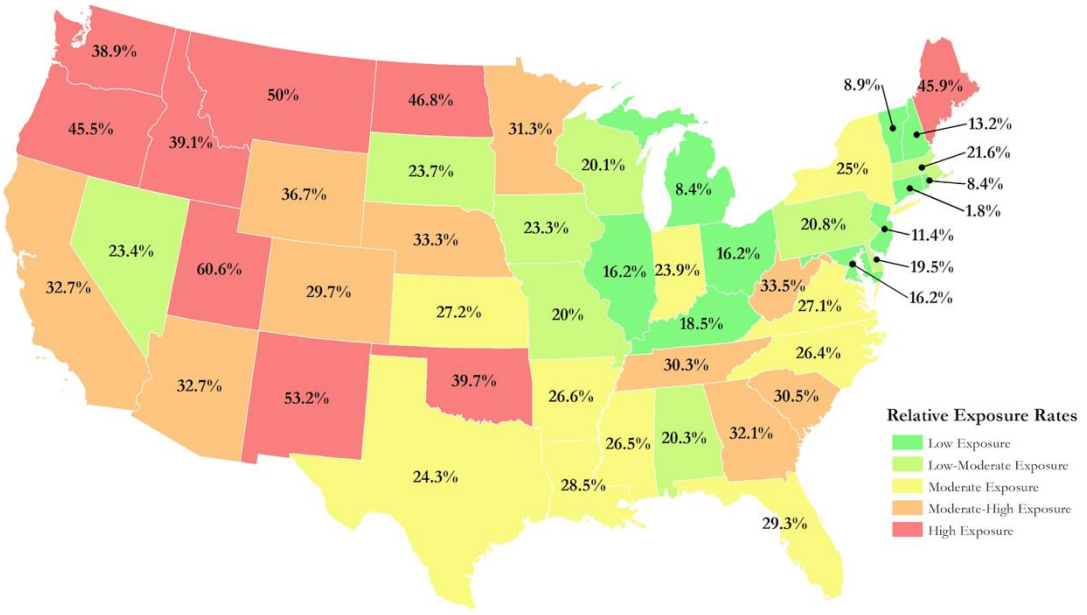
In terms of the subpopulation of schools located in gentrifiable neighborhoods, Table 2 above revealed that relative gentrification was highest in the West and in the Northeast. Figure 2 reveals that much of the relative gentrification occurring in the West happened in Washington (38.9), Oregon (45.5), Utah (60.6), and New Mexico (53.2), while the bulk of the relative gentrification that occurred in the Northeast happened in New York (25.0), Pennsylvania (20.8), and Maine (45.9).

Figure 2: Absolute Exposure of Urban Schools to Gentrified Neighborhoods, 2011-12



Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Absolute exposure to gentrification is calculated as the number of urban schools located in gentrified neighborhoods divided by the total number of urban schools in the city.

Figure 3: Relative Exposure of Urban Schools to Gentrified Neighborhoods, 2011-12



Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Relative exposure to gentrification is calculated as the number of urban schools located in gentrified neighborhoods divided by the number of urban schools located in gentrifiable neighborhoods.

In addition to regional variation, another important source of variability is related to metropolitan area size. Gentrification is usually associated with the nation's largest cities. Yet its occurrence around urban schools is more common in smaller metropolitan areas in a relative sense.

In small metropolitan areas, those with populations below 250,000, wherein 3.8 percent of all urban schools underwent gentrification between 2000 and 2012, over 30 percent schools in potentially-gentrifiable neighborhoods experienced gentrification (relative rate), compared to 24.8 in the largest MSAs. Moreover, because small MSAs contain roughly the same number of schools as the largest MSAs (due to there being far more small MSAs than large MSAs), there are similar numbers of urban schools, in absolute number, located in neighborhoods that experienced revitalization in MSAs with populations below 250,000 as there are in cities with populations above 3,000,000.

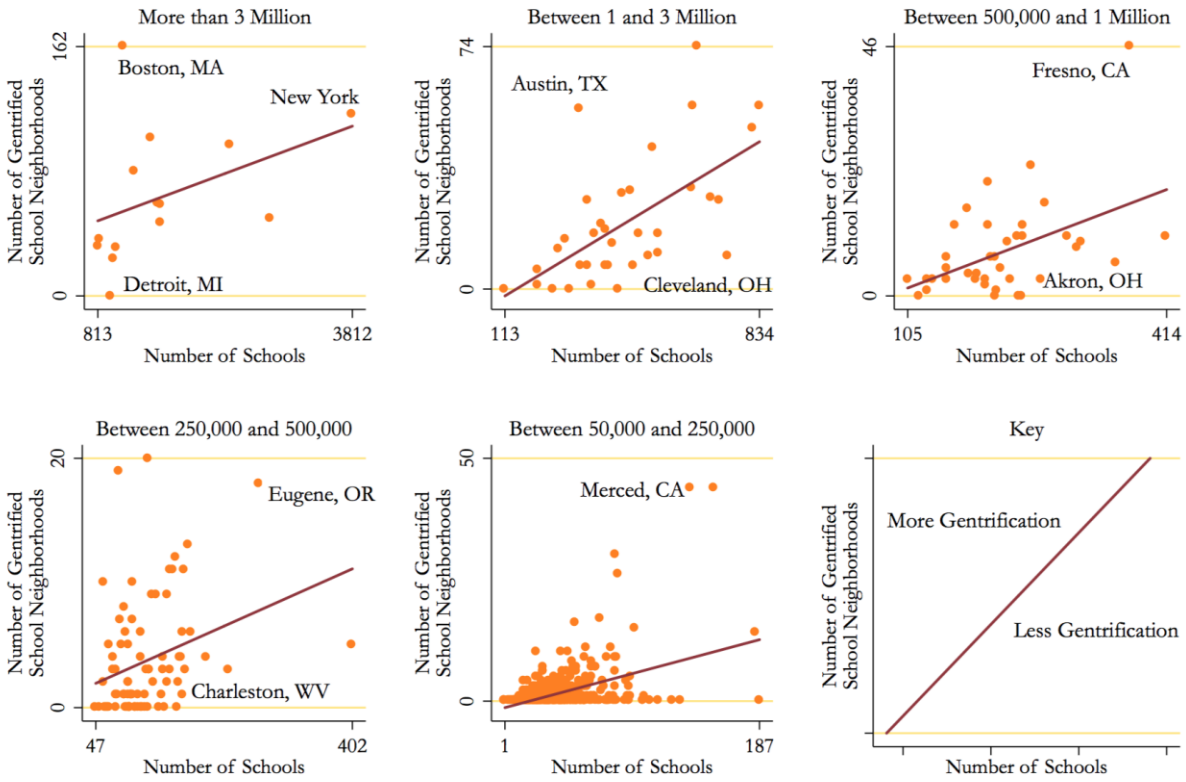


Figure 4: Absolute Exposure to School Neighborhood Gentrification by Metropolitan Size, 2011-12

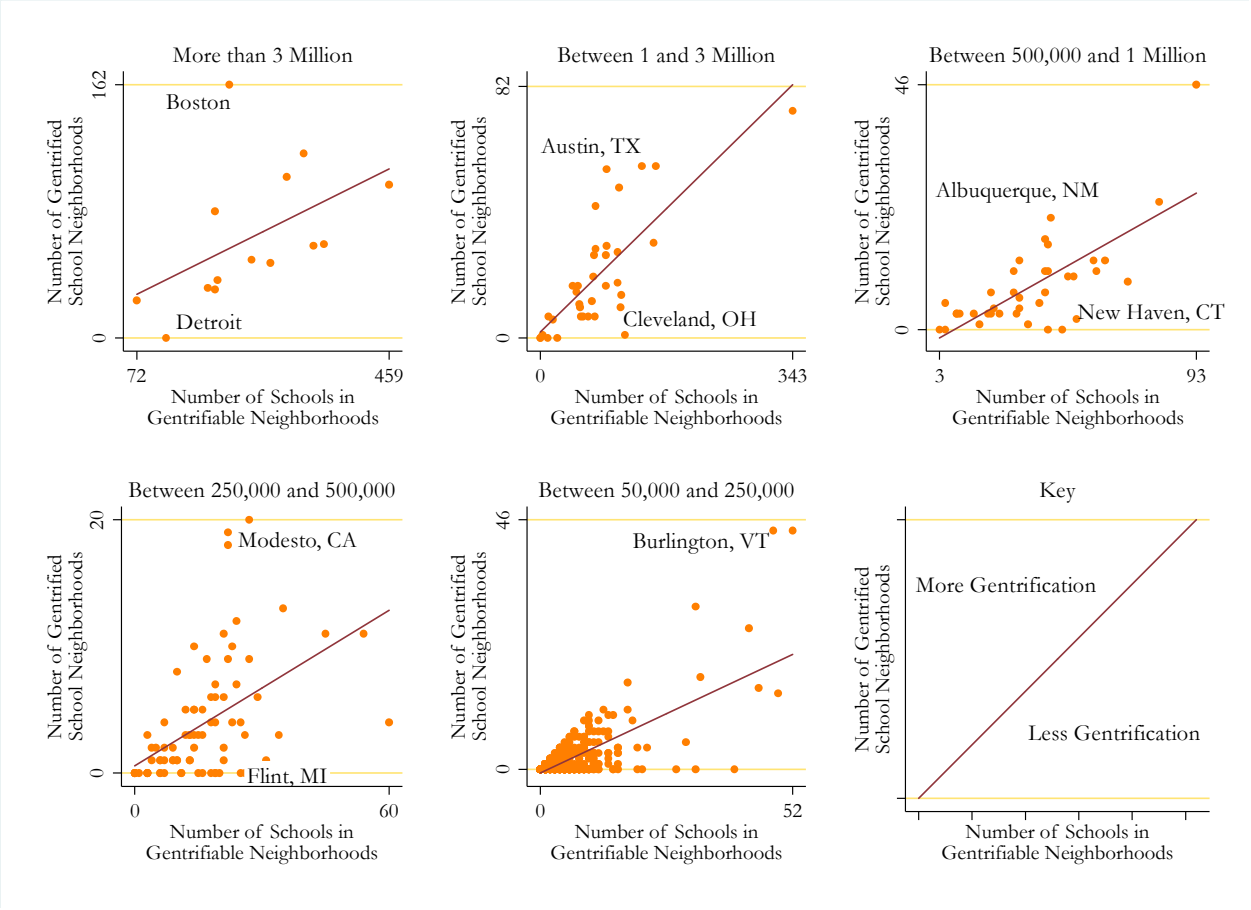


Figure 5: Relative Exposure to School Neighborhood Gentrification by Metropolitan Size, 2011-12

Another way to visualize variability in rates of gentrification across metropolitan area size is shown in Figure 4 and Figure 5, which display a series of scatterplots that capture absolute and relative rates of gentrification, respectively, by metropolitan area size. The Y-axes refer to the number of schools located in gentrified neighborhoods, while the X-axes refer either to the total number of schools (absolute gentrification) or to the total number of schools in gentrifiable neighborhoods (relative gentrification). The solid red line in each scatter plot is a trend line that plots the predicted number of gentrified school neighborhoods based on the number of schools in each city. Cities above the line have above average rates of gentrification; cities below the line have

below average rates of gentrification. Because patterns are generally consistent across both sets of scatter plots, only absolute rates (Figure 3) are described below.

As indicated across the multiple plots in Figure 3, there exists considerable variation in rates of gentrification across metro areas. With respect to the largest cities nationwide, there is Boston, MA, which has an absolute rate of gentrification of nearly 15 percent, i.e., 1.5 out of every 10 schools in Boston, MA, was located in a neighborhood that gentrified between 2000 and 2012. On the other end of the spectrum is Detroit, MI, which contains roughly the same number of schools as Boston, MA, but none of its gentrification. There were no public schools within the city of Detroit that experienced gentrification in their surrounding neighborhood between 2000 and 2012. (Detroit has nearly 1000 public schools.) Every public school in Detroit that was located in a disinvested neighborhood in 2000 remained in a disinvested neighborhood twelve years later.

Similar contrasts can be found in smaller metropolitan areas. For instance, as shown in figure 4, in the next largest category of cities, those with populations between 1 and 3 million, there is Austin, TX, which gentrified 17 percent of its urban school neighborhoods, but there is also Cleveland, OH, and Memphis, TN, which, in a similar vein as Detroit, failed to gentrify any of their disinvested school neighborhoods between 2000 and 2012. In mid-size cities with populations between 250,000 and 500,000, a handful of cities had notably high rates of absolute gentrification, including Chattanooga, TN, Modesto, CA, and Eugene, OR. In contrast, nearly two dozen cities with populations between 250,000 and 500,000 failed to gentrify any of their disinvested school neighborhoods, including Flint, MI, Spartanburg, SC, Fort Wayne, IN, and Shreveport, LA. (Full results for US cities are provided in Appendix B.)

Related to metro-level variance in rates of gentrification are concerns about the share of gentrified school neighborhoods nationwide located in each metro area. In other words, it is useful to know whether the bulk of gentrification that occurs around public schools nationally happens

primarily in a few, large U.S. cities or if the process of school-neighborhood gentrification is better conceived as a nationally-relevant phenomenon.

Table 3: The 25 U.S. Cities Containing the Largest Share of the National Distribution of Gentrification Occurring around Public Schools, 2000-2012

Metropolitan Statistical Area	Share of All U.S. Schools Located in Own Gentrified Neighborhoods	Share of Own Schools Located in Gentrified Neighborhoods
1. Boston-Cambridge-Quincy MA-NH	4.3	15.9
2. New York-Newark-Edison NY-NJ-PA	4.1	3.6
3. Chicago-Naperville-Joliet IL-IN-WI	3.8	4.4
4. Washington-Arlington-Alexandria DC-VA-MD	3.2	6.4
5. Dallas-Fort Worth-Arlington TX	2.4	3.9
6. Austin-Round Rock TX	2.2	17.3
7. Atlanta-Sandy Springs-Marietta GA	2.2	5.2
8. Seattle-Tacoma-Bellevue WA	2.1	6.7
9. Denver-Aurora CO	2.1	8.5
10. Houston-Baytown-Sugar Land TX	2.1	3.6
11. Portland-Vancouver-Beaverton OR-WA	1.9	8.4
12. Minneapolis-St. Paul-Bloomington MN-WI	1.7	5.8
13. Philadelphia-Camden-Wilmington PA-NJ-DE	1.7	3.4
14. Los Angeles-Long Beach-Santa Ana CA	1.6	1.8
15. Miami-Fort Lauderdale-Miami Beach FL	1.4	4.3
16. Phoenix-Mesa-Scottsdale AZ	1.2	4.2
17. Tampa-St. Petersburg-Clearwater FL	1.1	6.4
18. Riverside-San Bernardino-Ontario CA	1.1	3.2
19. Sacramento--Arden-Arcade--Roseville CA	1.1	6.7
20. Baltimore-Towson MD	1.0	3.9
21. Fresno CA	1.0	9.2
22. San Antonio TX	0.9	4.9
23. St. Louis MO-IL	0.9	3.7
24. San Diego-Carlsbad-San Marcos CA	0.9	3.9
25. Albuquerque NM	0.8	10.4

Table 3 provides a list of the 25 cities whose share of gentrified school neighborhoods contributed the most to the national distribution. The list, unsurprisingly, is populated by many of the largest cities in the United States. More surprising, however, is the fact that even the largest cities

in the country contribute only a fraction of the total share of gentrification that occurred around urban schools nationally. As shown in Table 3, of the 2,135 schools nationwide located in neighborhoods that underwent gentrification between 2000 and 2012, only in Boston and New York did the share of the national distribution of gentrified schools neighborhoods exceed 4 percent. Chicago, IL, and Washington, DC, were second and third on the list (3.8 and 3.2 percent, respectively). Dallas, Austin, Atlanta, Seattle, Denver, and Houston contributed just over 2 percent to the national distribution, and in only 10 more cities was the contribution above 1 percent. In other words, gentrification that occurs around public schools nationwide is a fairly diffuse process and can justifiably be conceived as a national phenomenon.

RQ 3: What portion of public school students attend school in gentrified neighborhoods, and do patterns of exposure differ by race/ethnicity?

Table 4 shows the absolute and relative exposure of urban students to gentrified school neighborhoods. As would be expected, student exposure rates across region and metro area size largely reflect findings about school exposure rates, with the South and Northeast containing the highest rates of absolute student exposure, the Northeast containing the highest rates of relative student exposure, and, finally, student exposure being more common in smaller cities than in larger cities. However, there exists important variation by racial/ethnic group that are important to highlight.

Table 5 (shown on page 51) displays rates of absolute and relative exposure for U.S. schoolchildren disaggregated by race. Black students had absolute exposure rates of 9.5 percent and relative exposure rates of 22 percent. That is, 10 percent of all black students living in urban areas and 22 percent of those black students attending school in gentrifiable urban neighborhoods attended school in a neighborhood that underwent gentrification between 200 and 2012. Similar rates held for Hispanic students across both measures.

Table 4: U.S. School Children's Absolute and Relative Exposure to Gentrified School Neighborhoods by Region and Metropolitan Area Size, 2000-2012

	Urban Schools	*Gentrifiable School Nhoods*	*Gentrified School Nhoods*	*Absolute Exposure*	*Relative Exposure*
United States	45,770,808	6,202,107	1,537,644	3.4%	24.8%
Region					
Northeast	7,327,583	924,853	286,522	3.9%	31.0%
Midwest	9,161,369	1,122,874	225,744	2.5%	20.1%
South	17,508,143	2,635,457	618,549	3.5%	23.5%
West	11,773,713	1,518,923	406,829	3.5%	26.8%
City Population					
More than 3 million	15,479,358	2,302,044	542,402	3.5%	23.6%
1 to 3 million	10,170,912	1,526,590	376,562	3.7%	24.7%
500,000 to 1 million	4,960,881	718,145	163,850	3.3%	22.8%
250,000 to 500,000	5,193,356	575,565	132,710	2.6%	23.1%
Fewer than 250,000	9,966,300	1,079,763	322,119	3.2%	29.8%

Note: Neighborhood data were gathered from the 2000 Census and the 2009-14 American Community Survey. School data were gathered from the 1999-00 and 2011-12 School Universe Survey. Estimates are weighted by post-stratification weights.

As shown in figure 6, white students, however, exhibit a noteworthy pattern. Of all racial groups, white students had the lowest *absolute* exposure rates but the highest *relative* exposure rates. That is, compared to their overall representation in urban school districts, white students were least likely to attend a school in a gentrified neighborhood, but of those students who attended schools in neighborhoods that qualified as gentrifiable in 2000, white students were *most* likely to attend schools that subsequently gentrified.

One explanation for this pattern is that, on the one hand, white students disproportionately attend schools in non-gentrifiable neighborhoods, thereby limiting white students' overall exposure to gentrified school neighborhoods. (93 percent of white students in urban areas attend school in neighborhoods that do not qualify as gentrifiable compared to 75 and 78 percent of black and Hispanic students, respectively.) On the other, patterns of gentrification appear to flow,

disproportionately, toward schools that have higher shares of white students, i.e., white students have the highest relative rate of exposure to a gentrified school neighborhood. The implication is that white students experience the dual benefit of being least likely to attend school in a disinvested neighborhood while being most likely to experience gentrification if they do.

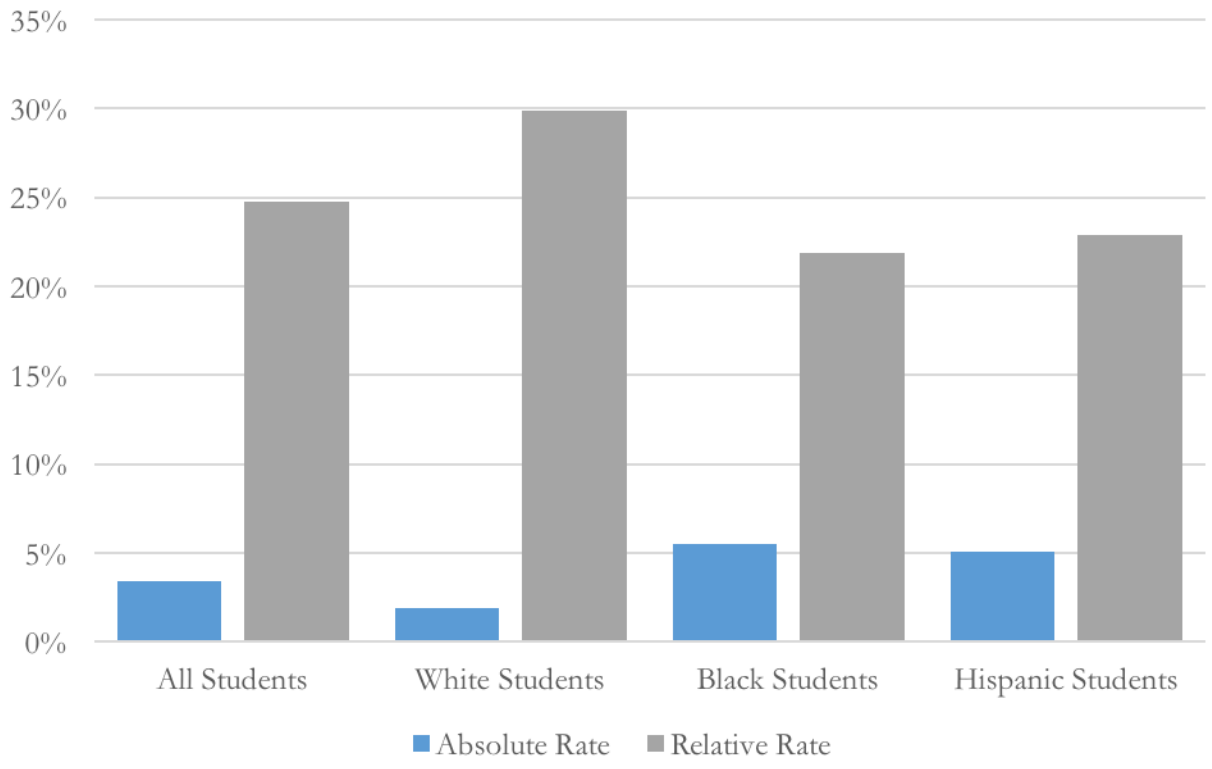


Figure 6: School Children's Absolute and Relative Rates of Exposure to a Gentrified School Neighborhood by Race

Table 5 also reports racial variation in exposure rates by region and metro area size. The largest disparity in absolute exposure rates between white students and their ethnoracial counterparts is found in the Northeast. In the Northeast, black students are 3.19 times as likely as white students to be exposed to a gentrified school neighborhood. Similarly, Hispanic students are 3.62 times as likely as white students to be exposed to gentrified school neighborhoods. Similar disparities in absolute exposure rates are observed in the largest cities (those with populations above 1,000,000), wherein ethnoracial minorities are generally 3 to 4 times as likely as white students to attend a school

in a gentrified neighborhood. This pattern is different in the smallest metropolitan areas, however. In cities with populations of fewer than 250,000, absolute rates of exposure for white students are generally consistent with those of ethnoracial minority students.

In terms of relative exposure rates, Table 5 reveals that white students are far more likely than black and Hispanic students, across nearly every region and metro size category, to attend school in a gentrified neighborhood if their school was in a *gentrifiable* neighborhood. In the Northeast and West, more than 1 in 3 white students attending school in a gentrifiable neighborhood attended school in a gentrified neighborhood. This contrasts with relative exposure rates between 1 in 4 and 1 in 5 for black and Hispanic students in these two regions. And despite the fact that in the largest cities black and Hispanic students had absolute exposure rates that were 2 to 3 times that of white students, white students in these cities who attended schools in gentrifiable neighborhoods were far more likely than black and Hispanic students in this subcategory to attend school in a gentrified neighborhood. For instance, in cities with more than 3 million residents, 34 percent of white students were exposed to a gentrified school neighborhood given that their school neighborhood was in fact gentrifiable. This compares to a relative exposure rate of 21 percent for black students and 22 percent of Hispanic students.

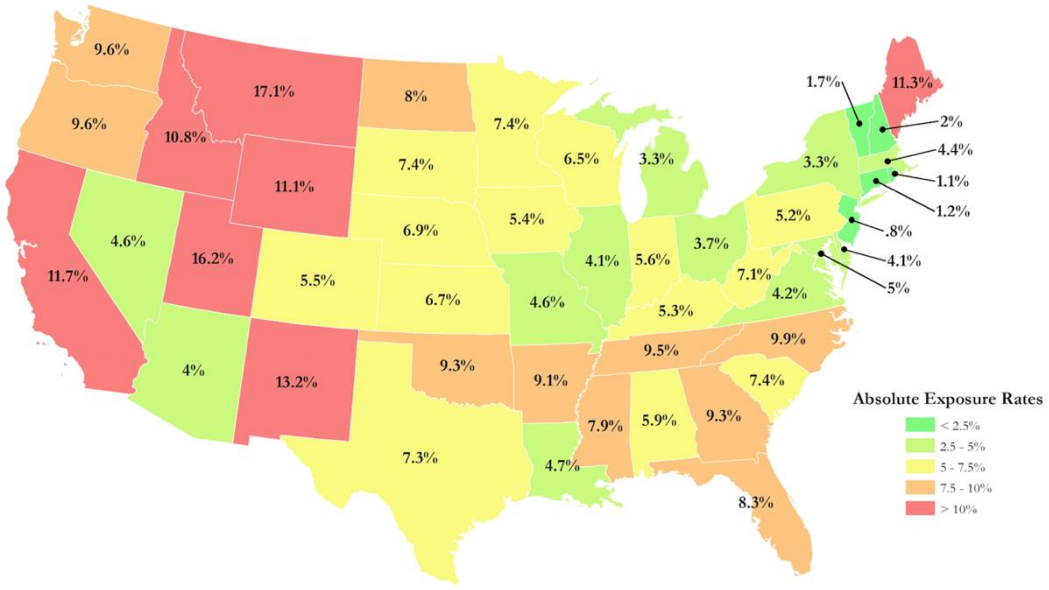
Figures 7 through 12 show state-level variation in absolute and relative exposure rates for white, black, and Hispanic students. Because the scales of absolute and relative exposure rates are different, i.e., the two metrics have different denominators, the color schemes for absolute versus relative exposure maps are naturally arrayed on different scales as well. Although maps for absolute versus relative exposure rates are metric specific, the metrics remain the same for each racial group. Therefore, maps of absolute rates can be compared visually across racial groups. The same holds for relative exposure rates.

Table 5: Student Exposure to Gentrified School Neighborhoods, by Race, Region and Metropolitan Area Size, 2012

	White Student Population			Black Student Population			Hispanic Student Population		
	# Students	Absolute Rate	Relative Rate	# Students	Absolute Rate	Relative Rate	# Students	Absolute Rate	Relative Rate
United States	23,175,166	1.9%	29.9%	7,093,313	5.5%	21.9%	11,450,934	5.1%	22.9%
Region									
Northeast	4,588,433	2.1%	36.8%	1,002,555	6.7%	24.7%	1,165,390	7.6%	29.8%
Midwest	6,321,730	1.4%	23.9%	1,189,468	4.8%	15.3%	1,019,349	5.8%	20.7%
South	7,770,944	1.9%	27.9%	4,283,526	5.3%	22.5%	4,271,850	5.2%	22.1%
West	4,494,059	2.4%	35.0%	617,764	6.0%	31.4%	4,994,345	4.2%	22.4%
City Population									
More than 3 million	5,618,449	1.3%	34.8%	2,800,051	5.5%	21.2%	5,439,374	5.0%	22.0%
1 to 3 million	5,423,968	1.5%	25.7%	1,702,168	7.1%	25.3%	2,059,102	6.6%	22.1%
500,000 to 1 million	2,453,582	1.7%	24.1%	624,459	6.3%	19.9%	1,420,196	4.8%	23.6%
250,000 to 500,000	3,067,737	1.7%	26.0%	793,424	3.8%	16.9%	980,590	4.0%	27.0%
Fewer than 250,000	6,611,430	3.7%	33.6%	1,173,211	3.8%	22.9%	1,551,673	4.1%	26.4%

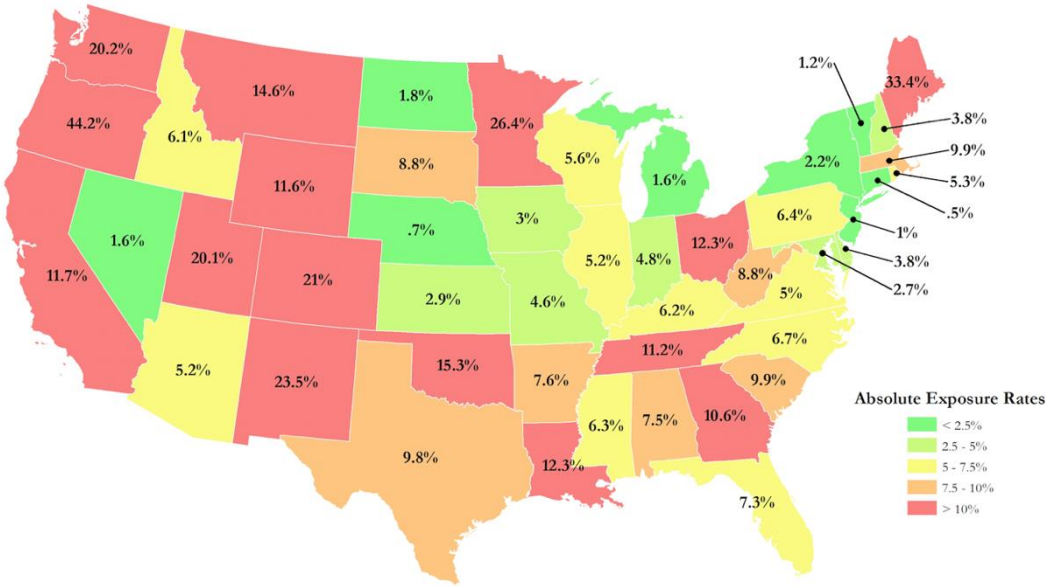
Note: Neighborhood data were gathered from the 2000 Census and the 2009-14 American Community Survey. School data were gathered from the 2011-12 School Universe Survey. Gentrification is assessed between 2000 and 2012. A neighborhood is considered gentrified if at baseline (2000) it had (a) a median household income below the 40th percentile of its respective city, and (b) a percentage of housing constructed in the 20 years preceding 2000 that was below the 40th percentile of its respective city, and between the assessment period subsequently experienced (c) an increase in real housing prices and (d) an influx of college-educated households that exceeded the city-wide increase in college-educated households overall. Higher-SES neighborhoods are those that failed to meet either criteria (a) or (b) at baseline. Non-gentrified neighborhoods are those that met criteria (a) and (b) at baseline but failed to meet either criteria (c) or (d) between 2000 and 2012.

Figure 7: Absolute Exposure of White Students in Urban Areas to Gentrified School Neighborhoods, 2011-12



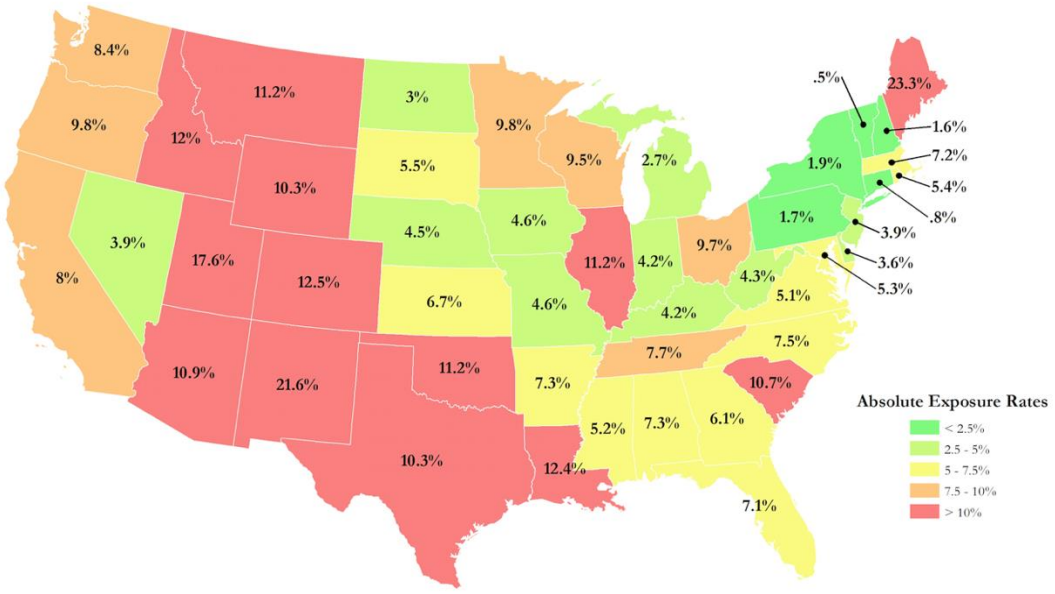
Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Absolute exposure to gentrification is calculated as the number of urban students attending school in gentrified neighborhoods divided by the total number of students in the city overall.

Figure 8: Absolute Exposure of Black Students in Urban Areas to Gentrified School Neighborhoods, 2011-12



Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Absolute exposure to gentrification is calculated as the number of urban students attending school in gentrified neighborhoods divided by the total number of students in the city overall.

Figure 9: Absolute Exposure of Hispanic Students in Urban Areas to Gentrified School Neighborhoods, 2011-12



Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Absolute exposure to gentrification is calculated as the number of urban students attending school in gentrified neighborhoods divided by the total number of students in the city overall.

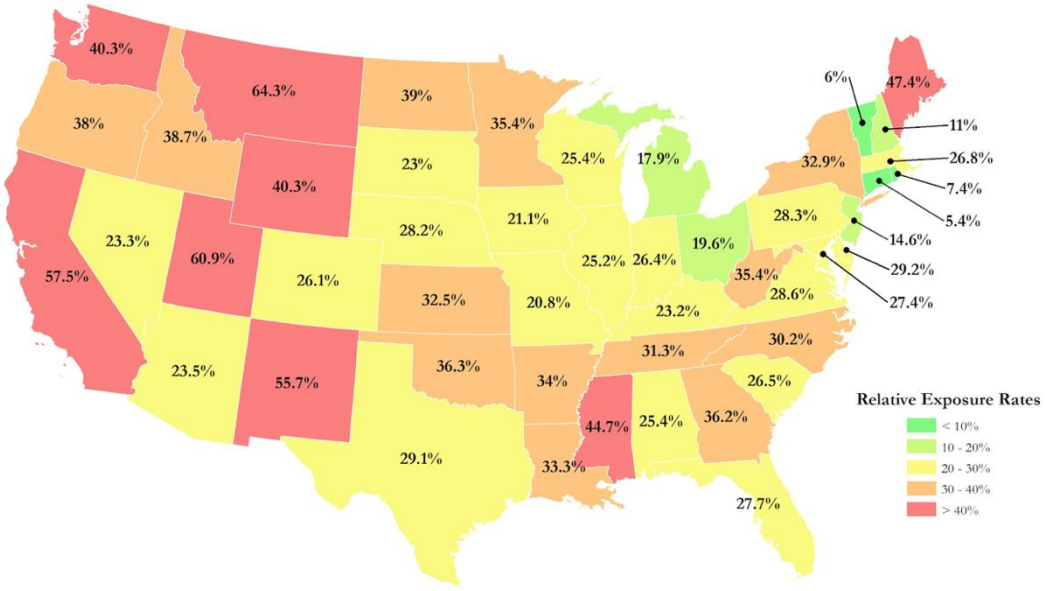
Relative to black and Hispanic students, absolute exposure rates for white students are generally lower across the board, ranging from a high of 17.5 percent in Montana to a low of 0.7 percent in New Jersey. In only seven states do absolute exposure rates for white students exceed 10 percent. In contrast, in twice as many states do absolute exposure rates for black and Hispanic students, respectively, exceed 10 percent. And while the state in which white students living in urban areas are most likely to be exposed to gentrified school had an absolute exposure rate of 17.5 percent, the absolute exposure rate for black students peaks as high as 44 percent in Oregon and is above 20 percent in Maine (31 percent), Washington (20 percent), Utah (22 percent) and New Mexico (20 percent). Although absolute exposure rates for Hispanic students do not reach the same level as for black students across the board, absolute exposure rates for Hispanic students do exceed 20 percent in Maine and remain above 10 percent in many of the Western states.

The general pattern is quite different for relative exposure rates. In particular, of the

subpopulation of students who attended schools whose surrounding neighborhood could have experienced gentrification between 2000 and 2012, the school neighborhoods of white students were, in general, most likely to experience gentrification, especially in the South and Midwest. For instance, nearly 1 in 4 white students in Michigan attended a school in a gentrified neighborhood given that their school neighborhood was in fact gentrifiable. This compares to nearly 1 in 17 black students and 1 in 10 Hispanic students in Michigan. Similarly, relative exposure rates for white students in Mississippi are nearly twice that of black and Hispanic students in the same state. Even in New York, the largest state in the Northeast, the relative exposure rate for white students was 1 in 3 compared to 1 in 13 for black students and 1 in 9 for Hispanic students. As mentioned previously, this pattern reflects the idea that white students are simultaneously least likely to attend school in a gentrifiable neighborhoods but most likely to attend school in a gentrified neighborhood if they do.

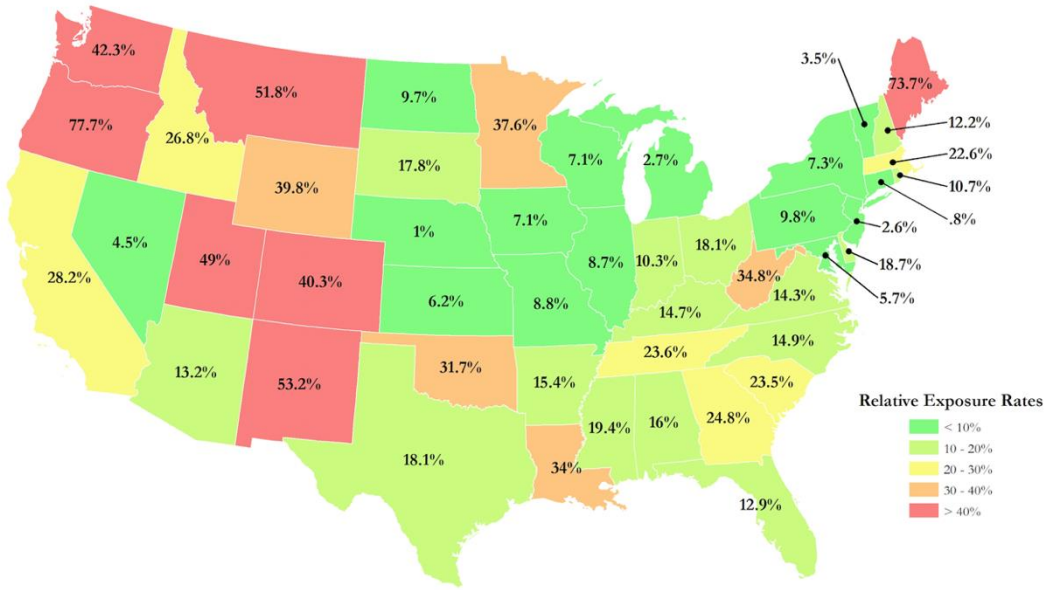
There are also several states in which black and Hispanic students had notably high relative exposure rates, however. For instance, in Oregon, nearly 8 in 10 black students attending school in a gentrifiable neighborhood attended school in a gentrified neighborhood. In Maine, this rate for black students was 7 in 10. And for Hispanic students, states with the highest relative exposure rates were Maine (65 percent), New Mexico (56 percent), and Utah (41 percent).

Figure 10: Relative Exposure of White Students in Urban Areas to Gentrified School Neighborhoods, 2011-12



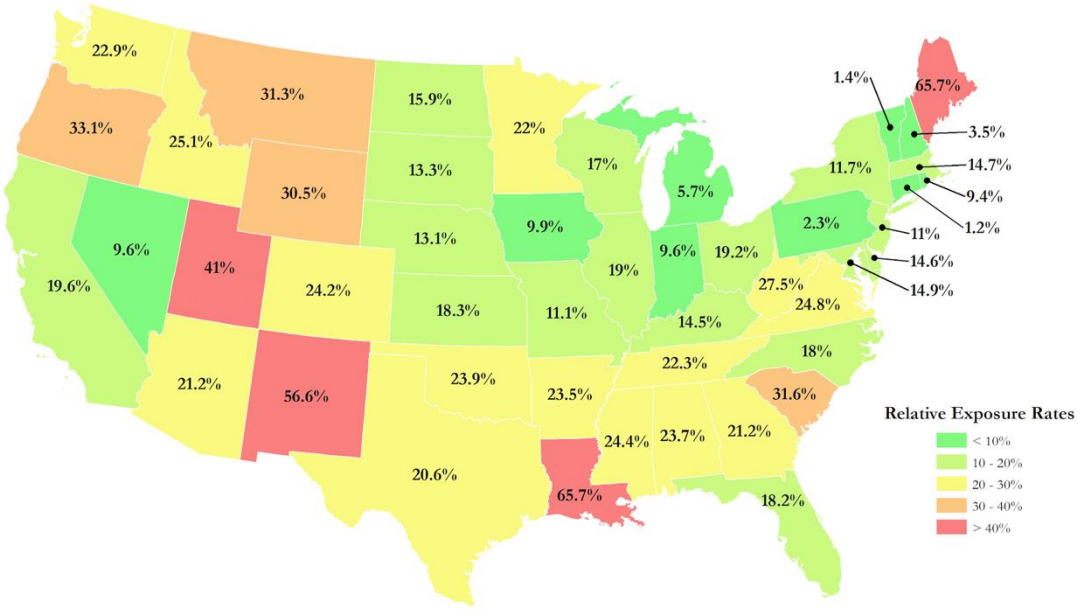
Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Relative exposure to gentrification is calculated as the number of urban students attending school in gentrified neighborhoods divided by the total number of students attending school in gentrifiable neighborhoods

Figure 11: Relative Exposure of Black Students in Urban Areas to Gentrified School Neighborhoods, 2011-12



Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Relative exposure to gentrification is calculated as the number of urban students attending school in gentrified neighborhoods divided by the total number of students attending school in gentrifiable neighborhoods

Figure 12: Relative Exposure of Hispanic Students in Urban Areas to Gentrified School Neighborhoods, 2011-12



Source: Author's tabulations, 2011-12 School Universe Survey, 2000 Dicennial Census, 2009-14 American Community Survey. Relative exposure to gentrification is calculated as the number of urban students attending school in gentrified neighborhoods divided by the total number of students attending school in gentrifiable neighborhoods

In summary, gentrification occurring around public schools is not restricted to any particular region or city, large or small, and is fairly diffuse across the country. Second, black and Hispanic students are more likely to attend school in a gentrified neighborhood if one considers the total population of urban students in general, but of those students attending school in *gentrifiable* neighborhoods, white students are actually most likely to attend school in a gentrified neighborhood. Third, there is considerable heterogeneity in patterns of gentrification occurring around U.S. public schools nationally, regionally, state-by-state, and even at the metro level. The next section explores what factors might be driving this heterogeneity.

Predicting School Neighborhood Gentrification

RQ 4: What factors at the school, neighborhood, district, and city level are associated with whether public schools experience gentrification in their surrounding neighborhood?

Why do some school neighborhoods experience gentrification while others do not? As a first step in answering this question, this section begins by estimating bivariate associations between

gentrification and various school, neighborhood, and city-level characteristics that prior research has linked to residential attainment. These correlations reveal the raw relationship between each variable and the likelihood of gentrification. Naturally, correlational results cannot be interpreted in causal terms. The goal of these analyses is merely to document several generalized understandings about neighborhood gentrification that occurs around public schools to help build intuition and generate hypotheses about the connection between neighborhood schools and the uneven development of disinvested neighborhoods in urban areas.

It is also important to note that in these and all subsequent analyses that the analytic sample is restricted to schools located in neighborhoods classified as disinvested at baseline. To establish any meaningful understanding of correlates of school-neighborhood gentrification, there must be a basis of comparison to the schools around which gentrification did not occur (Freeman 2005). Important for any statistical inference, in other words, is a counterfactual condition that might inform what might happen (or be expected) in the absence of gentrification. This is accomplished, in part, by limiting the sample to schools located in disinvested neighborhoods at baseline.

Figure 13 presents a summary of point-biserial correlational results, which displays the strength of the co-occurrence of each variable with gentrification on a standardized scale. These point estimates can therefore be interpreted as effects sizes. The dots show point estimates and the horizontal grey lines show 95% confidence intervals based on standard errors clustered at the city level. The direction of the correlation is signified by the sign in parenthesis beside each variable. A positive sign means that the variable, which is measured at baseline (2000), is more common in or around neighborhoods that subsequently gentrify. A negative sign indicates that the variable is more common in neighborhoods that did not subsequently gentrify.

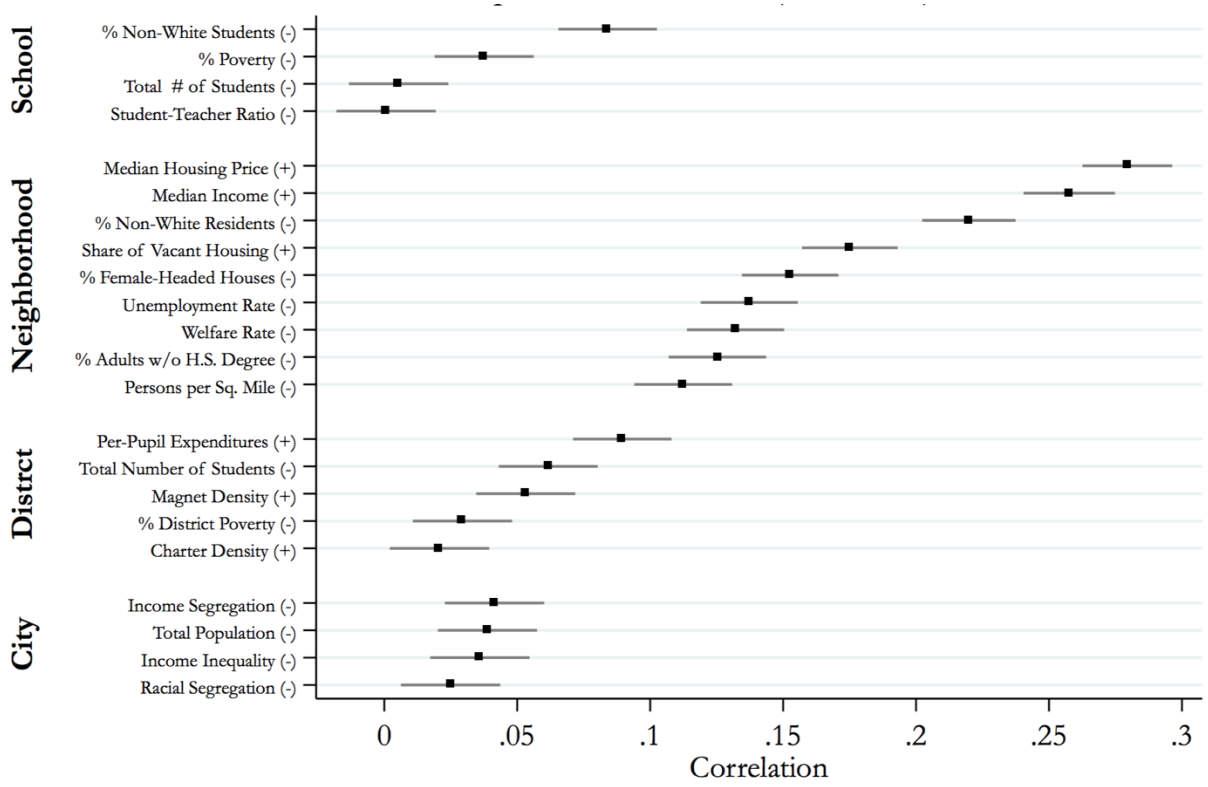


Figure 13: Point-Biserial Correlations of Baseline School, Neighborhood, District, and City Characteristics with Subsequent Gentrification (sample size = 10,987)

Figure 13 suggests five general patterns. First, gentrification occurring around public schools is most common in the *least* disadvantaged *gentrifiable* neighborhoods. This is based on the observation that virtually all of the variables that index some aspect of concentrated disadvantage have negative signs, meaning these variables are less common in neighborhood that subsequently gentrify. In particular, among school neighborhoods located in disinvested neighborhoods at baseline, gentrification is more likely to occur in school neighborhoods that have lower shares of unemployment, female-headed households, high school non-completers, and welfare recipients. Second, more people generally means less gentrification. Total enrollment at neighborhood schools, density of persons per square mile in the neighborhood, total enrollment in the surrounding district, and total city population are all negatively associated with whether gentrification occurs around

public schools. Third, a crude proxy for *investment* in public schools—per pupil spending at the district level—reveals positive associations with gentrification.

Although nearly all included variables are significantly correlated with gentrification, it is worth noting that the spatial distribution of racial groups at baseline is consistently related to whether gentrification occurs around public schools. Indeed, the unweighted point-biserial correlation between gentrification and the share of non-white *residents* is -0.17, while the unweighted point-biserial correlation between gentrification and the share of non-white *students* is -0.08. Moreover, racial residential segregation at the city level is also negatively related to gentrification, though with a smaller magnitude than those of neighborhood and school racial composition. These results are consistent with the idea that racial segregation begets segregation. The more spatially isolated racial groups are from one another in general, and the more concentrated non-white residents are in disinvested neighborhoods, the less likely it is that higher-SES households relocate to disinvested neighborhoods around public schools.

RQ 5: What factors are the strongest independent predictors of whether public schools experience gentrification in their surrounding neighborhood?

The next objective is to determine which variables are the strongest predictors of gentrification occurring around public schools. This is accomplished by fitting a series of multivariate probit regression models that provide estimates of the partial associations of each covariate with gentrification after controlling for other school, neighborhood, district, and city-level characteristics. As in the previous analyses, the average marginal effects described in this section do not have a causal interpretation. Rather, average marginal effects simply signify the expected change in the likelihood of gentrification associated with a unit change in each covariate. To facilitate interpretation, all continuous variables are normalized to have a mean of zero and standard deviation of one.

One concern in fitting these models was the inherent multicollinearity between shares of non-white students and shares of non-white residents in surrounding neighborhoods. Nearly by definition the racial composition of a school should mirror that of its catchment area. Indeed, the correlation between the two variables was 0.94. Rather than simply removing one of the two variables, as is customary, the approach adopted here was to replace the continuous measure of racial composition at the school-level with a binary indicator of whether the school's share of non-white residents exceeded that of its surrounding neighborhood. This transformation mitigated concerns about multicollinearity (the point-biserial correlation fell below .30), permitted the association of racial composition with gentrification to vary at the neighborhood versus school level, and allows for a relatively straightforward interpretation as the expected change in the likelihood of gentrification if a school is "darker" than the neighborhood.

Results from select characteristics are summarized in Table 6 (complete results are located in Appendix E). Standard errors are in parentheses. Average marginal effects are in brackets and can be interpreted as the average change in the probability of gentrification associated with a standard deviation change in the predictor variable. Column (1) provides estimates for all schools, controlling for school level. Columns (2), (3), and (4) provide school-level estimates. Because estimates are generally consistent across school level, this section focuses on results for all schools (Model 1), but notes school-level heterogeneity when necessary.

There are several patterns that stand out from Table 6. First, among the school-level characteristics, gentrification is less likely to occur around schools that have more students per teacher and more students overall. Gentrification is also less likely to occur if a school has higher shares of non-white students than there are non-white residents in the surrounding community. As shown in Table 6, Column 1, a one standard deviation increase total enrollment is associated with a two percentage point decline in the likelihood of gentrification. Similarly, if a school is more non-

white than its neighborhood, this school is three percentage points *less likely* to experience gentrification in its surrounding neighborhood. Notably, this analysis finds no evidence that the share of students qualifying for free and reduced price lunch is associated with whether gentrification occurs in schools' surrounding neighborhoods after controlling for other factors.

Table 6: Regression of Gentrification on Select School, Neighborhood, District, and City Characteristics

	All Schools	School Level		
		Elementary	Middle	High
	(1)	(2)	(3)	(4)
<u>School Characteristics</u>				
% Non-White > Neighborhood	-0.14	-0.12	-0.29	-0.02
	(0.07)	(0.07)	(0.15)	(0.13)
	[-0.03]	[-0.03]	[-0.06]	[-0.00]
% FRPL	-0.04	-0.06	-0.03	0.22
	(0.05)	(0.05)	(0.10)	(0.11)
	[-0.01]	[-0.01]	[-0.01]	[0.04]
Student-Teacher Ratio	-0.08	-0.09	-0.11	-0.03
	(0.03)	(0.04)	(0.07)	(0.07)
	[-0.02]	[-0.02]	[-0.02]	[-0.01]
Total Students	-0.09	-0.20	-0.20	-0.09
	(0.02)	(0.04)	(0.08)	(0.05)
	[-0.02]	[-0.05]	[-0.04]	[-0.02]
Overall Suspension Rates	-0.05	-0.05	-0.01	-0.12
	(0.03)	(0.04)	(0.04)	(0.05)
	[-0.01]	[-0.01]	[-0.00]	[-0.02]
<u>Neighborhood Characteristics</u>				
% Non-White	-0.26	-0.23	-0.45	-0.29
	(0.05)	(0.05)	(0.12)	(0.14)
	[-0.06]	[-0.06]	[-0.10]	[-0.06]
% Female-Headed Households	0.18	0.12	0.33	0.34
	(0.06)	(0.05)	(0.13)	(0.15)
	[0.04]	[0.03]	[0.07]	[0.06]
Median Housing Price	0.30	0.33	0.19	0.13
	(0.07)	(0.06)	(0.13)	(0.17)
	[0.07]	[0.08]	[0.04]	[0.02]

Table 6: (Con't)

	All Schools (1)	School Level: Elementary (2)	Middle (3)	High (4)
% Vacant Housing	0.08	0.12	0.02	0.02
	(0.03)	(0.03)	(0.06)	(0.05)
	[0.02]	[0.03]	[0.00]	[0.00]
Persons per Sq. Mile	0.07	0.06	0.17	0.38
	(0.03)	(0.03)	(0.10)	(0.14)
	[0.02]	[0.01]	[0.04]	[0.07]
<u>School District Characteristics</u>				
%FRPL	0.08	0.09	0.12	-0.06
	(0.04)	(0.05)	(0.10)	(0.09)
	[0.02]	[0.02]	[0.03]	[-0.01]
Per-Pupil Expenditures	0.08	0.09	0.09	0.02
	(0.04)	(0.04)	(0.07)	(0.04)
	[0.02]	[0.02]	[0.02]	[0.00]
Total Enrollment	0.12	0.12	0.27	0.12
	(0.05)	(0.05)	(0.12)	(0.13)
	[0.03]	[0.03]	[0.06]	[0.02]
<u>City Characteristics</u>				
Racial Segregation	-0.14	-0.13	-0.14	-0.22
	(0.07)	(0.06)	(0.11)	(0.10)
	[-0.03]	[-0.03]	[-0.03]	[-0.04]
Income Segregation	-0.13	-0.04	-0.09	-0.41
	(0.13)	(0.15)	(0.23)	(0.19)
	[-0.03]	[-0.01]	[-0.02]	[-0.08]
Income Inequality	0.08	0.01	0.08	0.35
	(0.13)	(0.13)	(0.22)	(0.17)
	[0.02]	[0.00]	[0.02]	[0.07]
Total Population	-0.10	-0.08	-0.19	-0.14
	(0.06)	(0.06)	(0.13)	(0.13)
	[-0.02]	[-0.02]	[-0.04]	[-0.03]
R^2 =	0.18	0.17	0.20	0.26
n =	10,136	6,615	1,414	1,789

Note: Standard errors are in parenthesis and are clustered at the city level. Marginal effects are in brackets. School neighborhoods are defined based on their catchment area. All school neighborhoods in the analytic sample were those whose median household income in 2000 was below the 40th percentile of its respective city average and whose housing supply built in the 20 years preceding 2000 was below the 40th percentile of its city. Neighborhoods that subsequently underwent gentrification experienced (a) an inflow of college-educated residents between 2000 and 2012 that exceeded the growth of college-education persons in the city overall, and (b) an increase in real housing prices between 2000 and 2012. Additional controls not included in table but included in analytic model were binary indicators of grade level and pre-baseline trends in neighborhood characteristics between 1990 and 2000.

Second, among neighborhood-level variables, the share of non-white residents, percentage of vacant housing, and density of persons per square mile remain associated with gentrification in fully-adjusted models. For every one standard deviation increase in the share of non-white residents, the likelihood of gentrification declines by five percentage points, on average. This estimate equals two percentage points when considering either the percentage of vacant housing or the density of the surrounding neighborhood. Additionally, consistent with the notion that gentrification is most common in the *least* disadvantaged *gentrifiable* neighborhoods, property values remain positively associated with gentrification after controlling for other neighborhood, school, district, and city characteristics. That is, amongst schools located disinvested neighborhoods, for every one standard deviation increase in property values, the likelihood of gentrification increases by seven percentage points.

Somewhat counter-intuitively, the share of female-headed households emerged as positively related to gentrification in the fully adjusted model—this despite its strong negative bivariate correlation with gentrification noted above. As was made clear in the introduction of this section, this association need not imply that increases in the share of female-headed households facilitates gentrification. Rather this association simply indicates that after controlling for a broad set of variables at the school, neighborhood, district, and city level, school neighborhoods that have higher fractions of female-headed households are generally more likely to undergo gentrification, perhaps for reasons unaccounted for by the model, e.g., single mothers may be more likely than nuclear families to sell their home to incoming gentry.

Third, among district-level characteristics, the concentration of poor students (measured as the share of students qualifying for free and reduced price lunch) remains positively associated with gentrification in the full adjusted model; so too do the total enrollment and per-pupil expenditures in the district. For every one standard deviation decrease in the share of poor students in schools'

designated school district, or for every one standard deviation increase in the amount of dollars allocated per student in the school district, the likelihood of their experiencing gentrification increases by two percentage points, on average. And for every one standard deviation increase in the total number of students enrolled in the surrounding school district, the likelihood that a given school neighborhood experiences gentrification declines by three percentage points, on average.

Finally, at the city level, results from Table 6 indicate that the amount of racial residential segregation in the district is negatively correlated with gentrification. None of the other city level predictors—total population, income segregation, and income inequality—remain significant in the fully adjusted model. The insignificant coefficients for these variables do not mean, for instance, that the total population of a city does not cause or is not correlated with gentrification. Indeed, the previous analyses noted robust correlations between the size of a city and the frequency with which city schools experience gentrification in their surrounding neighborhoods. Rather, Table 6 suggests that the significant covariate-adjusted correlation between gentrification and other variables, say between gentrification and per-pupil expenditures at the district-level, may arise, in part, because bigger cities contain districts that spend more dollars per student.

In sum, the fifth research question was about determining which factors at the school, neighborhood, school district, and city level were the strongest predictors of whether public schools experience gentrification in their surrounding neighborhood. In the fully adjusted model that partitions out the unique relation of each variable with gentrification, the five strongest and most consistent predictors of gentrification occurring around public schools are 1) shares of non-white residents, 2) whether a school is more non-white than its surrounding neighborhood, 3) the median housing price in the surrounding neighborhood, 4) total enrollment at the district-level, and 5) the amount of racial segregation in the city.

RQ 6: How does the joint predictive power of school level characteristics compare to that of the neighborhood, district, and city?

Lastly, to determine the relative predictive power of the different sets of covariates (school, neighborhood, district, and city characteristics, respectively), Table 7 reports Akaike Information Criterion (AIC) statistics overall and by grade level for a series of models that include one of the four sets of covariates. An AIC statistic provides for a straightforward model comparison based on model fit that adjusts for the number of included covariates. A lower value of AIC indicates better predictive power. Results from these estimates provide insight as to the relative predictive power of school, neighborhood, district, and city characteristics in determining which neighborhoods gentrify. Each row refers to a model that only includes variables in the group specified by the row title. The final row reports results from models that includes all four sets of covariates.

Table 7: RELATIVE PREDICTIVE POWER OF DIFFERENT COVARIATES SETS

	Akaike information criterion (AIC)			
	All Schools	Elementary Schools	Middle Schools	High Schools
School Characteristics	10,517	7,034	1,460	1,818
Neighborhood Characteristics	9,452	6,456	1,300	1,558
District Characteristics	10,482	7,039	1,455	1,815
City Characteristics	10,555	7,088	1,461	1,829
Full Model	9,266	6,312	1,295	1,528

Note: Akaike information criterion (AIC) is estimated from probit regression models as -2*ln(likelihood) + 2*k and is averaged across 25 multiply imputed datasets.

Overall, that the AIC is lowest for the neighborhood-only model indicates that the sociodemographic characteristics of the residential environments that comprise school catchment areas are the best predictor of whether these catchment areas gentrify. School-level characteristics, on the other hand, are roughly as predictive of gentrification as characteristics of schools' broader city and district. Interestingly, school level characteristics of middle and high schools are far more predictive of gentrification than those of elementary schools, suggesting that schools play a bigger

role in shaping patterns of gentrification at the middle and high school level than at the elementary level.

It should be noted that these AIC estimates are based only on those variables included in the estimation models. It is possible, therefore, that the predictive power of each category of covariates could well change based on a different or more encompassing set of characteristics. However, it is doubtful that the predictive capability of any single category would ever exceed that of the neighborhood. For instance, a prediction model that only includes neighborhood racial composition still has a lower AIC than any other category of covariates.

Table 8: Regression of Disciplinary Outcomes on Gentrification, Suspension Rates Overall by Race

	Overall Suspensions	White Suspensions	Black Suspensions	Hispanic Suspension
Elementary School				
Gentrification	-0.002	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.004)	(0.002)
R^2	0.320	0.115	0.109	0.094
n=	6,589	6,130	5,527	5,517
Middle School				
Gentrification	-0.005	-0.003	-0.004	-0.009
	(0.007)	(0.010)	(0.018)	(0.009)
R^2	0.525	0.313	0.239	0.261
n=	1,437	1,392	1,139	1,206
High School				
Gentrification	-0.007	0.006	0.033†	-0.006
	(0.005)	(0.008)	(0.020)	(0.011)
R^2	0.472	0.288	0.160	0.158
n=	1,830	1,791	1,154	1,362

Note: All models are fully-adjusted and include state-fixed effects. Standard errors are in parenthesis. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001 for two-tailed tests of significance.

Gentrification and School Discipline

The previous two sections established a clear sense of where school-neighborhood gentrification is happening nationwide and provided some intuition for why it might be happening. The current section returns the focus to school disciplinary patterns as an exploration of the relation between gentrification on school functioning. As in the previous analysis, all schools in the analytic sample were located in *gentrifiable* neighborhoods at baseline that had median incomes and shares of recently-constructed housing in 2000 that were below the 40th percentile of their respective city. The counterfactual group, in other words, was comprised of similarly situated schools located in neighborhoods that qualified for gentrification but subsequently did not experience it. Finally, as described in the methods section above, estimates in this section are based on a value-added design that controls for lagged outcome measures assessed at baseline, among other factors. As a result, coefficients of interest are interpreted as the association between gentrification and *changes* in suspension rates between 2000 and 2012.

RQ 7: Is gentrification associated with changes in overall suspension rates at neighborhood schools? Does the observed association between gentrification and suspension rates differ for different racial/ethnic groups?

Table 8 presents results from OLS estimates of the observed relation between gentrification and changes in suspensions rates overall and by race. Each column refers to one of four outcomes of interest—overall suspension rates, and suspension rates for white, black, and Hispanic students, respectively. The first panel of each table refers to results from the sample of elementary schools, the second panel, middle schools, and the final panel refers to high schools. All models are full-adjusted and are based on within-state comparisons. Standard errors are in parenthesis.

One notable, albeit marginally-significant finding stands out from Table 8. Adjusted estimates reveal that gentrification is positively associated with a change in black suspension rates at local high schools ($p < .10$). On average, a high school located in a gentrified neighborhood was more likely to suspend black students relative to its baseline suspension rate for black students if the

school was located in a gentrified rather than a non-gentrified neighborhood. In particular, the net change in high school suspension rates between 2000 and 2012 for black students was 3.3 percentage points higher in schools located in gentrified neighborhoods than in observably equivalent schools located in similar neighborhoods at baseline that did not gentrify. Importantly, this association is not driven by baseline differences in suspension rates or observable differences in neighborhood (including pre-baseline trends), district, or city-level characteristics.

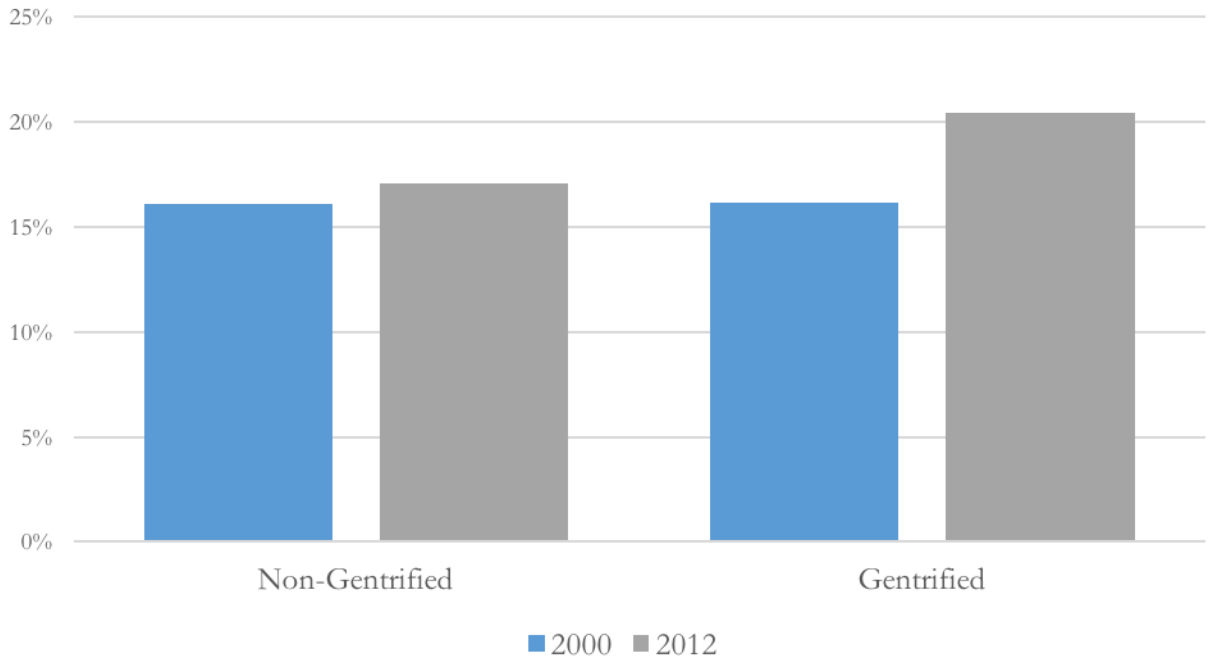


Figure 14: Adjusted Predictions of Suspension Rates for Black Students at Baseline (2000) and Follow-up (2012), High School Sample

To help illustrate the meaning of this estimate, Figure 14 presents adjusted predictions of suspension rates for black students at local high schools before and after gentrification.[2] At baseline (pre-gentrification, blue column), schools located in neighborhoods that subsequently gentrified had virtually identical suspension rates for black students as those of schools whose surrounding

[2] Adjusted baseline estimates include the entire vector of covariates noted above, including overall suspension rates at baseline. These predictions exclude the lagged measure of black suspension rates, which, obviously, is the dependent variable in this case.

neighborhood did not subsequently gentrify. Approximately 16 percent of black students attending school in either type of neighborhood had been suspended at least once during the 1999-00 school year. However, 12 years later, schools in gentrified neighborhoods suspended 20 percent of their black students, while schools in non-gentrified neighborhoods suspended 17 percent of their black students. In other words, although all high schools located in gentrifiable neighborhoods in 2000 wound up suspending, on average, higher shares of black students 12 years later, those schools located in neighborhoods that subsequently gentrified ratcheted up their suspensions of black students at a faster clip than than schools located in persistently poor neighborhoods.

As a point of reference, Figure 15 shows the adjusted predictions overall and for each racial group during the 2011-12 school year. While Table 9 above noted that gentrification was positively associated with changes in suspension rates for black students during high school, Figure 15 makes clear not only that gentrification has a disproportionate adverse association with suspension rates for black students relative to other racial groups, but also that black students attending high school in gentrifiable neighborhoods—that is, in either gentrified and non-gentrified neighborhoods—were already far more likely to be suspended from school than any other racial group in the analytic sample. Rates of suspension for white students attending school in gentrifiable neighborhoods hovered around 7 percent, whereas analogous rates for Hispanic students was around 10 percent—far less than that of black students.

Table 9 presents results from a series of models that allow the association between gentrification and suspension rates to vary by the racial composition of the school. Similar as above, each column refers to a different suspension rate, and panels refer to the elementary, middle, and high school samples, respectively. Added to this table, however, is the estimated coefficient for the interaction between gentrification and shares of non-white students. Also included as a reference is

the the main effect for shares of non-white students. As above, all models are fully-adjusted and include state fixed effects.

Several patterns stand out from Table 9. First, and similar as above, the main "effect" for gentrification remains significant in the model predicting suspension rates for black students in high school. Because of the higher-order interaction term, and the fact that shares of non-white students was standardized to have a mean of 0 (and standard deviation of 1), the main effect for gentrification is interpreted to mean that the change in suspension rates for black students between 2000 and 2012 in schools *with average shares of non-white students* was 5.1 percentage points higher for high schools located in gentrified relative to non-gentrified neighborhoods after conditioning for observable factors ($p < .05$).

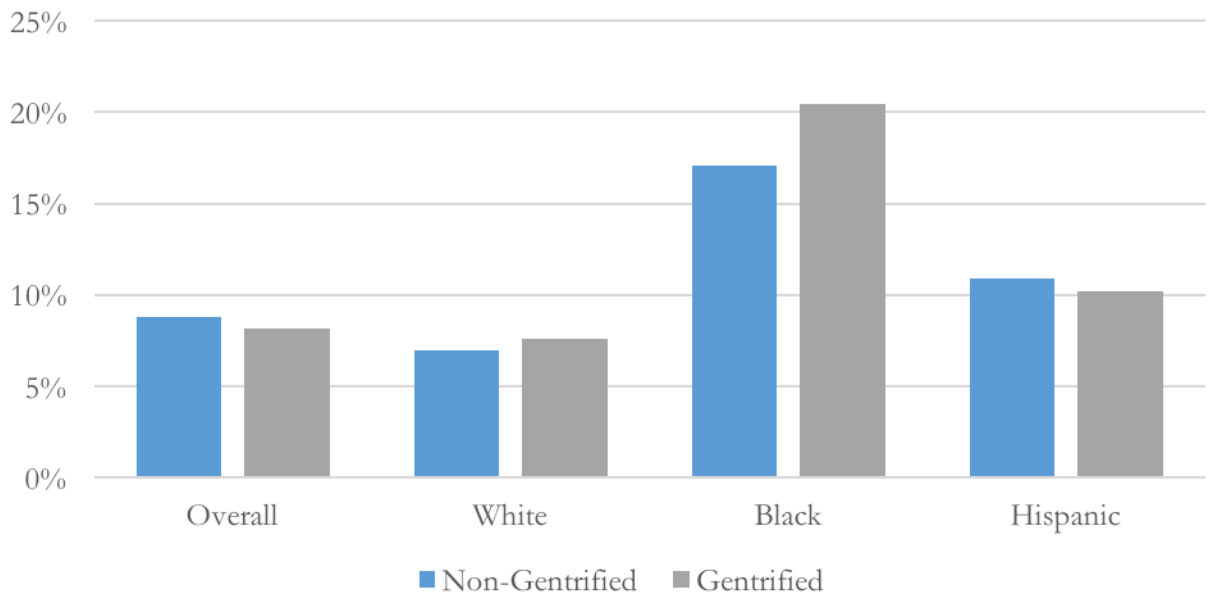


Figure 15: Adjusted Predictions of High School Suspension Rates Overall and By Race Across Gentrified versus Non-Gentrified Neighborhoods, 2011-12

Second, the main effect for shares of non-white students emerged as significant in several models. Because of the higher-order interaction, this variable too has a restricted interpretation. In particular, a one standard deviation increase in the share of non-white students *in schools located in*

neighborhoods that did not gentrify was associated with around a 1 percentage point increase in the change in overall, white, and black suspension rates in elementary schools, a 4.2 percentage point increase in overall suspension rates in high school, and a 2.3 percentage point increase in the change in white suspension rates in high school.

Table 9: Regression of Suspension Rates on Gentrification Overall and by Race, Interaction Included

	Overall Suspensions	White Suspensions	Black Suspensions	Hispanic Suspension
Elementary School				
Gentrification	-0.002	-0.001	-0.000	-0.001
	(0.002)	(0.003)	(0.005)	(0.002)
% Non-White	0.012***	0.010*	0.011†	-0.004
	(0.003)	(0.004)	(0.006)	(0.003)
Interaction	-0.002	-0.000	-0.006	0.000
	(0.002)	(0.003)	(0.005)	(0.002)
R^2	0.320	0.115	0.110	0.095
n=	6,589	6,130	5,527	5,517
Middle School				
Gentrification	-0.006	-0.003	-0.009	-0.010
	(0.006)	(0.010)	(0.018)	(0.009)
% Non-White	0.022	0.037	-0.002	-0.014
	(0.019)	(0.028)	(0.028)	(0.022)
Interaction	0.003	0.008	0.019	0.009
	(0.007)	(0.012)	(0.018)	(0.009)
R^2	0.525	0.316	0.285	0.262
n=	1,437	1,392	1,139	1,206
High School				
Gentrification	-0.005	0.006	0.051*	-0.006
	(0.005)	(0.007)	(0.024)	(0.012)
% Non-White	0.042***	0.023†	0.035	0.005
	(0.011)	(0.013)	(0.022)	(0.027)
Interaction	-0.007	0.010	-0.041**	-0.003
	(0.005)	(0.011)	(0.016)	(0.010)
R^2	0.469	0.290	0.165	0.158
n=	1,830	1,791	1,154	1,362

Note: All models are full-adjusted include state-fixed effects. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001 for two-tailed tests of significance.

Third, and most interesting, the positive association between gentrification and rates of suspension for black students in high school positively interacts with shares of non-white students ($p < .01$). In particular, for every one standard deviation increase in shares of non-white students, the observed relation between gentrification and the change in suspension rates for black students declines by 4.1 percentage points. In other words, gentrification becomes less pernicious in terms of the suspension rates of black students as the share of non-white students in the school increases.

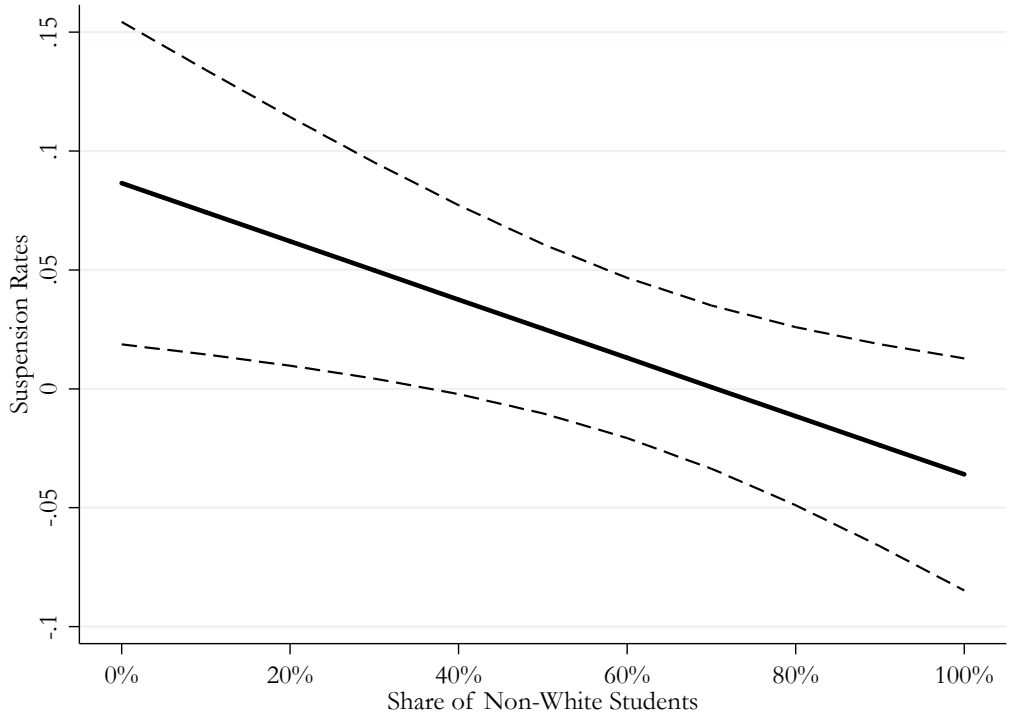


Figure 16: Marginal Association of Gentrification and Changes in Suspension Rates for Black Students

To illustrate this interaction graphically, Figure 16 displays the marginal association of gentrification with changes in suspension rates for black students at local high schools across shares of non-white students. The solid line in the figure refers to the marginal association between gentrification and black suspension rates. Mathematically, the marginal association at each point on the x-axis is equal to the difference in the adjusted predictions between schools located in gentrified versus non-gentrified neighborhoods. The dotted lines indicate the 95 percent confidence interval.

Any point of the x-axis where the 95 percent confidence interval excludes zero is considered a significant association.

Figure 16 reveals that the association between gentrification and changes in suspension rates for black students is highest in predominantly white schools and declines as the share of non-white students increases. This is depicted by the solid black line reaching its peak on the left of the figure and declining moving from left to right. The point estimate for gentrification remains significant so long as the share of non-white students at the school does not exceed around 40 percent, beyond which the observed association between gentrification and changes in suspension rates for black students at local high schools is indistinguishable from zero. That is, gentrification has no statistically-meaningful association with black suspension rates when non-white students make up 40 percent or more of the student population.

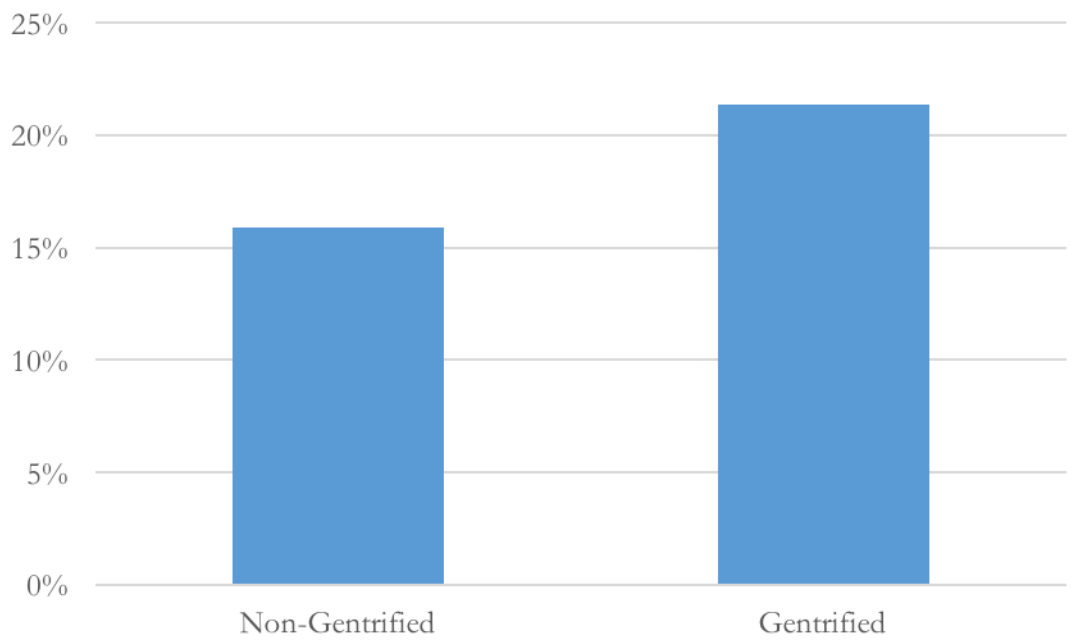


Figure 17: Adjusted Prediction of Suspension Rates for Black Students in Predominantly White High Schools Across Gentrified versus Non-Gentrified Neighborhoods

To clarify the strength of the association between gentrification and black suspension rates in predominantly white schools, consider Figure 17. This figure displays the adjusted predictions of

black suspension rates in predominantly white schools (set at 75 percent white) located in gentrified versus non-gentrified neighborhoods during the 2011-12 school year. Schools wherein 75 percent of students were white that were located in gentrifiable neighborhoods that remained disinvested during the observation period had suspension rates of around 15 percent for black students during the 2011-12 school year. In contrast, similarly-situated predominantly white neighborhoods located in neighborhoods that *did* gentrify between 2000 and 2012 had suspension rates for black students of approximately 21 percent during the 2011-12 school year. This difference, which is fully-adjusted and accounts baseline differences in suspension rates, among other factors, is significant at the α = 0.05 level.

Table 10: Robustness Checks for Regressions of Black Suspension Rates on Gentrification, High Schools

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	0.034†	0.051*	-0.041**
	(0.020)	(0.024)	(0.016)
2) Excluding Sampling Wgts	0.033†	0.052*	-0.040*
	(0.020)	(0.024)	(0.016)
3) Excluding State FEs	0.036†	0.053*	-0.040*
	(0.020)	(0.024)	(0.016)
4) Rent-Based	0.030†	0.045*	-0.034*
	(0.017)	(0.021)	(0.014)
6) 50th-Percentile	0.020	0.030*	-0.035**
	(0.013)	(0.014)	(0.011)
Size of School Neighborhood			
7) 1-Mile Radius	0.009	0.037	-0.073†
	(0.012)	(0.023)	(0.037)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

Table 10 evaluates the robustness of the estimated association between gentrification and black suspension rates in high school. For comparative purposes, the first row of Table 8 displays

the effect estimates described in the main text. The remaining rows display estimated relations from alternative specifications. Overall, substantive conclusions about the relation between gentrification and suspension rates for black students in high school is robust to the exclusion of sampling weights, robust to an alternative definition of gentrification based on median rent prices, robust to a less restrictive definition of *gentrifiable* that counts as gentrifiable school neighborhoods whose median housing prices and share of recently constructed housing at baseline was below the 50th as opposed to the 40th percentile of the surrounding city, and is generally robust to an alternative specifications of schools' surrounding neighborhood based on a 1-mile radius. (Robustness checks for alternative outcomes and other grade levels are provided in Appendix C. Results for alternative outcomes and grade levels are generally consistent with those reported in the main text.)

In sum, gentrification is positively associated with changes in suspension rates for black students in high school. On average, a high school located in a gentrified neighborhood is more likely to suspend black students than a similarly-situated school located in a neighborhood that does not gentrify. This association is strongest in predominantly white neighborhoods and falls insignificant when around 40 percent of students are non-white. However, no evidence is found that gentrification is associated with changes in suspension rates for black students at local elementary or middle schools. Nor is evidence found in favor of an association between gentrification and changes in suspension rates for white students, Hispanic students, or students overall at any grade level.

CHAPTER VI

DISCUSSION AND CONCLUSION

Discussion

This dissertation has used population and administrative data to present a new portrait of gentrification as it relates to urban schooling in the United States. Three primary points emerge from the previous descriptive analyses. First, there is considerable heterogeneity in patterns of gentrification occurring around urban schools depending on the location of the phenomenon. In some cities, such as Austin, TX, the gentrification of school neighborhoods is fairly common. In other cities, such as Detroit and Cleveland, gentrification is virtually non-existent with respect to urban schools. Second, prior literature has documented a broad array of correlates and potential causes of gentrification at the neighborhood level, including what are collectively considered neighborhood *amenities*. No quantitative study to date, however, has considered the role of the neighborhood school, an important amenity. This dissertation finds evidence that after conditioning for a robust set of variables at the neighborhood, district, and city level, several school-level characteristics measured at baseline predict subsequent gentrification. In particular, student-teacher ratios, the size of the school, and whether schools are "darker" than their surrounding neighborhood all significantly predict whether schools experience gentrification in their surrounding neighborhood, controlling for observable factors. Nevertheless, this study finds that neighborhood conditions are by far the strongest and most consistent predictor of whether the neighborhoods surrounding urban schools experience gentrification.

Third, despite the fact that scholars have devoted considerable attention to understanding the causes and consequences of exclusionary discipline in schools, few studies to date have

conceptualized schooling contexts to include schools' broader neighborhood environment or considered the role of neighborhood change in shaping the ways schools mete out punishment. This study finds that gentrification is associated with changes in disciplinary patterns for black students at local high schools. In particular, high schools are more likely to suspend black students if these schools are located in gentrified rather than non-gentrified neighborhoods, holding constant observable differences at the school, neighborhood, district, and city level.

An obvious question is why a similar association between gentrification and suspension rates was not observed at either the elementary or middle school level. There are two general explanations for why this pattern may have come about. First, it is possible that gentrification of school catchment areas is more intensive at the high school level. This rationale derives from the fact that high school catchment areas are generally larger than those of either elementary or middle schools. The size of the catchment area of the average elementary or middle school experiencing gentrification may mean that only several square miles of a disinvested part of a city experiences revitalization. In contrast, the catchment area of the average high school experiencing gentrification would mean that a considerably larger disinvested section of a city experiences revitalization. As a result, high schools that undergo gentrification may experience a greater shock than either elementary or middle schools in terms of the level of demographic or structural change occurring in surrounding neighborhoods.

In addition to the treatment itself being more intensive with respect to local high schools, it is possible that the underlying mechanism linking gentrification and disciplinary patterns could be different at the high school level. For instance, older children may be especially sensitive to the sociodemographic and institutional change associated with gentrification. Prior research has documented that residential contexts are highly salient during later adolescence because of children's increasing reliance on peer and intuitional relations as they grow older (e.g., Wodtke et al. 2012). For

instance, parents may be less able to shield older children from the stress associated with gentrification-induced changes, such as increased residential instability (Ananat et al. 2011) Moreover, if gentrification decreases the representational bureaucracy of school staff by increasing the share of white teachers and administrators in schools with predominately non-white student populations, prior research suggests that these staff-level changes may be most consequential for the disciplinary patterns of older black children (Goff, Jackson, Leone, & Culotta 2014). Future research will need to clarify these speculative explanations for why elevated suspension rates for black students in gentrified neighborhoods is restricted to local high schools.

Although the findings presented in this paper provide novel descriptive evidence of a potentially important policy-related link between the gentrification and schooling in urban areas that deserves further examination, there are several limitations. First, this study's emphasis on population-level estimates obscured any heterogeneity that might exist in the observed relation between gentrification and school discipline (or between schooling characteristics and patterns of gentrification) across different cities, states, or regions. The first section of this dissertation documented considerable variation in the frequency and distribution of gentrification across region and metropolitan areas. It is reasonable to suspect that the observed relations described in the main text may be sensitive to variation in schools' broader residential environments with respect to patterns of segregation, zoning laws, business development, school choice options, tax abatements, et cetera. For instance, the relation between gentrification and school disciplinary patterns could be different in cities with rent control policies or other legislation explicitly designed to lessen the potential adverse effects of gentrification on the residential stability of vulnerable families.

A second limitation was that this dissertation concerned but a single school-level outcome: school disciplinary patterns. Other educational outcomes at neighborhood schools that may be sensitive to sociodemographic change occurring in surrounding neighborhoods include student

achievement, instructional quality, on-time promotion, students' sense of belonging, as well as high school completion and college-going rates. Future research should extend the findings reported here by examining any number of these additional outcomes, some of which may be even more predictive of later life success than exposure to exclusionary discipline. In other words, despite the useful insights provided in the previous pages, a more complete picture is needed about the potential consequences of gentrification for school structure and function in urban areas.

A final limitation concerns the limits of interpreting ecological correlations. Although measuring the relation between gentrification and the average suspension rate at neighborhood schools, i.e., an ecological correlation, is appropriate for the institutional level analyses conducted in this dissertation, it is important to note that such correlations cannot be interpreted at the individual level. For instance, the fact that high schools were more likely to suspend black students in gentrified neighborhoods does not mean, ipso facto, that all black students living and attending school in a gentrified neighborhood are more likely to be suspended from school than black students living and attending school in a non-gentrified neighborhood. Making inferences at the individual level on the basis of aggregate statistics such as these can lead to committing the *ecological fallacy* (Preacher 2011). Future research with individual-level data will be needed before such individual level attributions can be made.

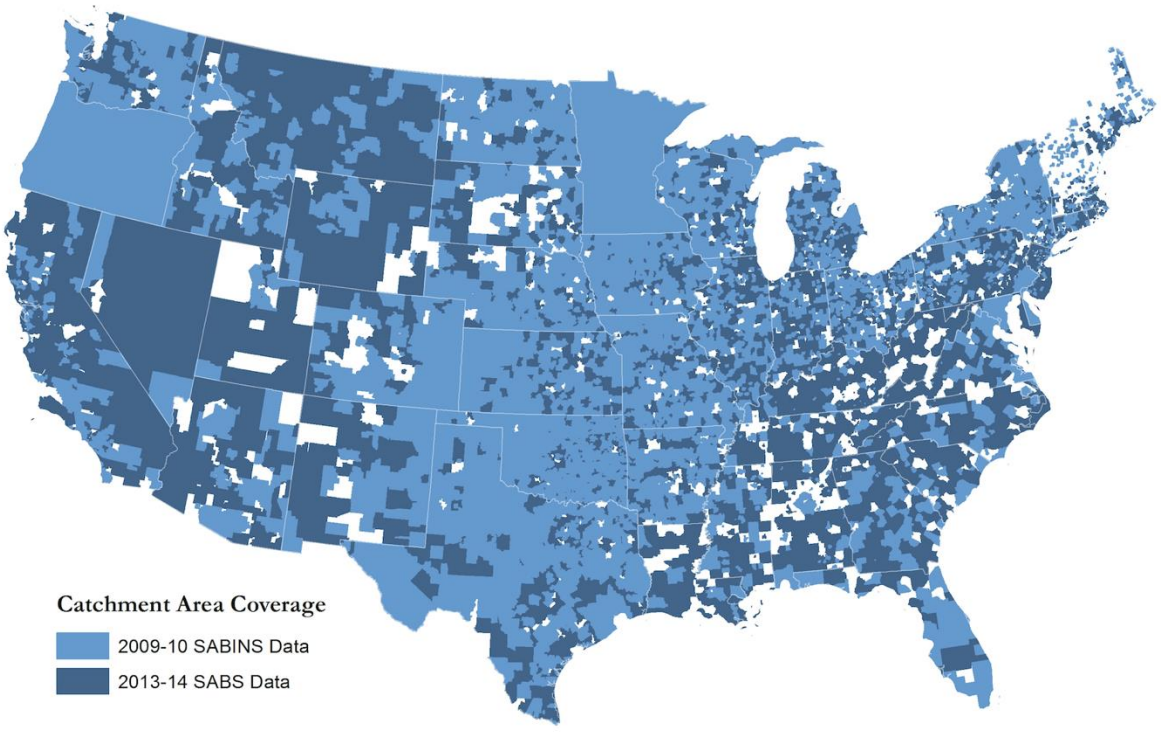
Conclusion

Gentrification remains the subject of intense debate in mainstream and scholarly outlets alike. As gentrification becomes more common in urban areas across the country, it is becoming increasingly important to understand its varied implications for those living and growing up in these changing neighborhoods. This dissertation set out to provide answers to several basic, descriptive questions about the intersection of gentrification and schooling in urban America. Are neighborhoods surrounding urban schools more likely to experience gentrification in certain areas of

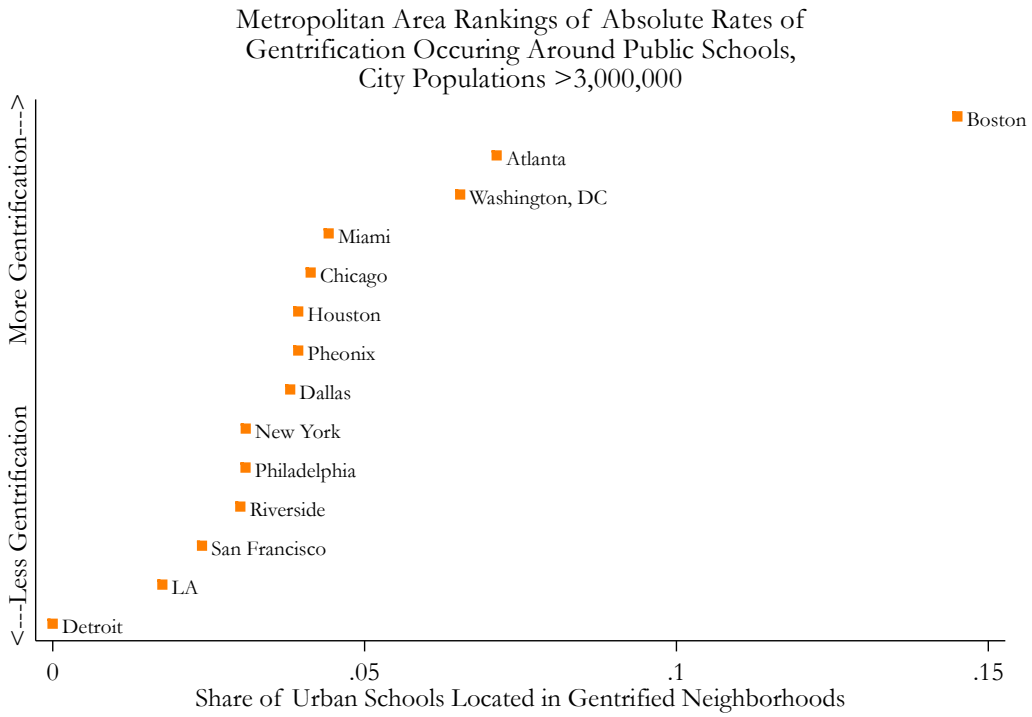
the country? Are there particular characteristics of schools associated with whether gentrification happens around them? What happens to local schools if their surrounding neighborhood gentrifies? Despite the correlational nature of these questions, their answers were quite revealing. School neighborhood gentrification can be quite common, but it depends on the city. Schooling characteristics, independent of the neighborhoods in which schools are located, predict patterns of gentrification. Finally, suspension rates for black students in urban areas may be attributable, in part, to gentrification. Taken together, this dissertation finds considerable evidence that the sociodemographic, economic, and structural changes associated with gentrification provide novel insight into the convoluted relation between neighborhoods and schools in the modern U.S. city.

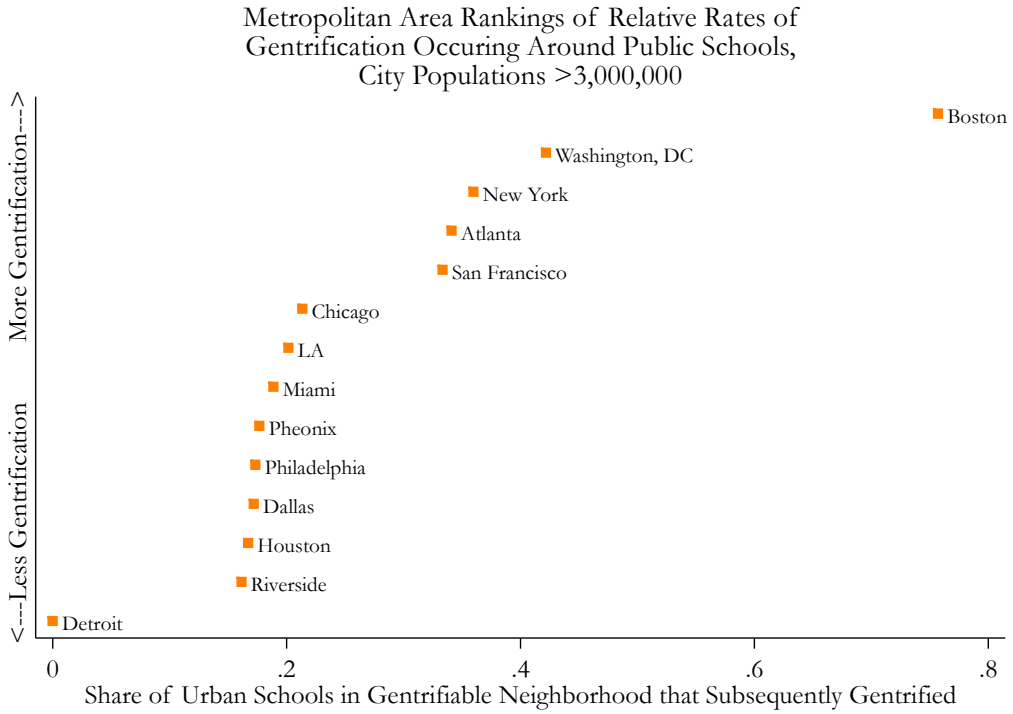
APPENDIX A

Coverage Map of 2009-10 School Attendance Boundary Information System and 2013-14 School Attendance Boundary Survey

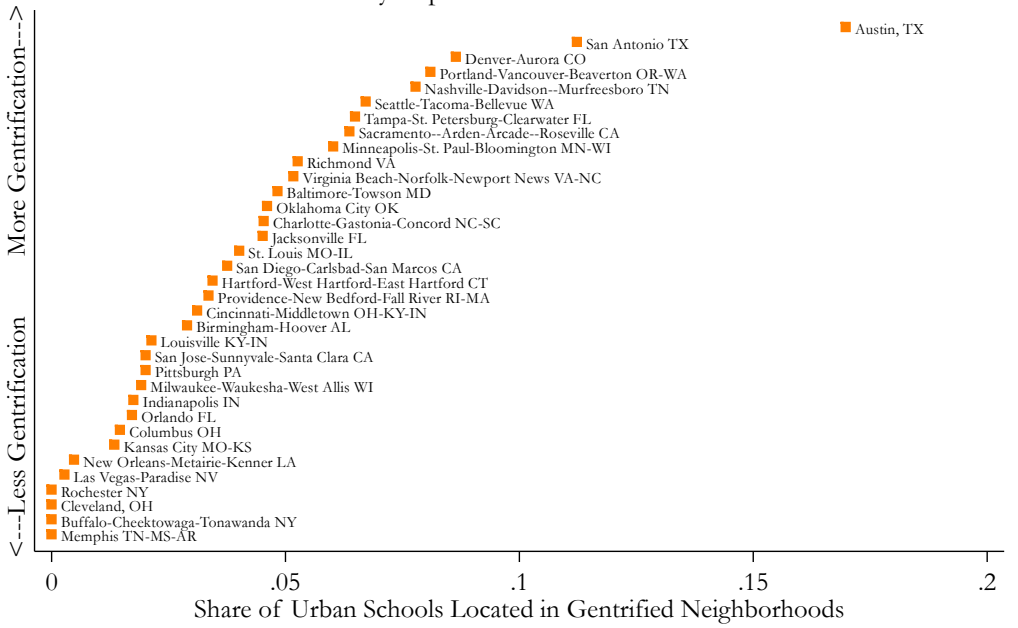


APPENDIX B

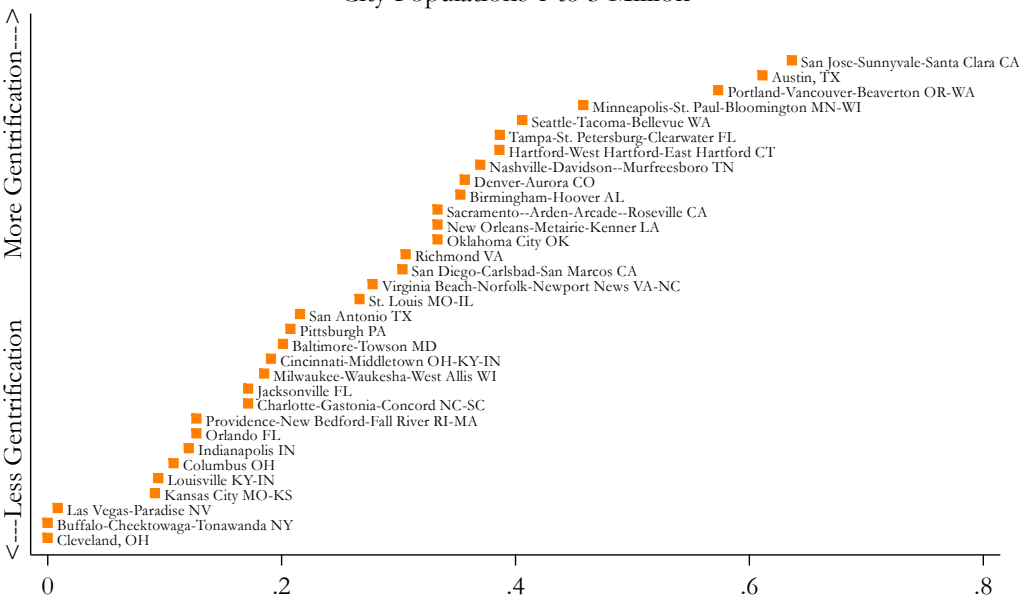

Metropolitan Area Rankings of Absolute Rates of
Gentrification Occuring Around Public Schools,
City Populations >3,000,000
<---Less Gentrification More Gentrification--->
Boston
Atlanta
Washington, DC
Miami
Chicago
Houston
Pheonix
Dallas
New York
Philadelphia
Riverside
San Francisco
LA
Detroit
0
.05
.1
.15
Share of Urban Schools Located in Gentrified Neighborhoods


Metropolitan Area Rankings of Relative Rates of
Gentrification Occuring Around Public Schools,
City Populations >3,000,000
<---Less Gentrification More Gentrification--->
Boston
Washington, DC
New York
Atlanta
San Francisco
Chicago
LA
Miami
Pheonix
Philadelphia
Dallas
Houston
Riverside
Detroit
0
.2
.4
.6
.8
Share of Urban Schools in Gentrifiable Neighborhood that Subsequently Gentrified

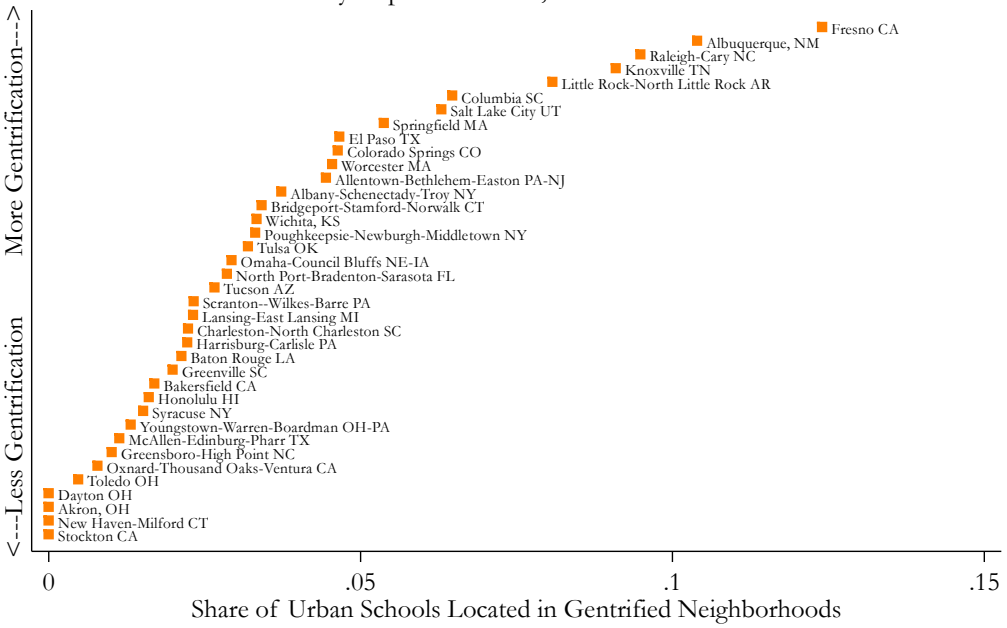
Metropolitan Area Rankings of Absolute Rates of Gentrification Occuring Around Public Schools, City Populations 1 to 3 Million



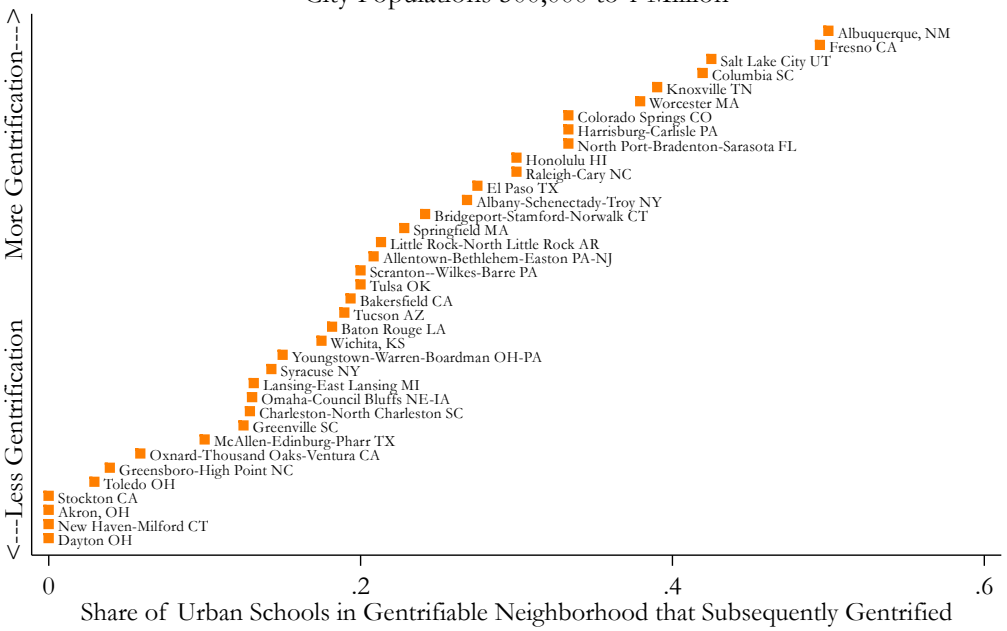
Metropolitan Area Rankings of Relative Rates of Gentrification Occuring Around Public Schools, City Populations 1 to 3 Million



Metropolitan Area Rankings of Absolute Rates of Gentrification Occuring Around Public Schools, City Populations 500,000 to 1 Million



Metropolitan Area Rankings of Relative Rates of Gentrification Occuring Around Public Schools, City Populations 500,000 to 1 Million



APPENDIX C

RACIAL, ECONOMIC, SOCIAL, AND HOUSING DIFFERENCES BY SCHOOL NEIGHBORHOOD TYPE BETWEEN 2000 AND 2012, ELEMENTARY SCHOOLS

	Ineligible Neighborhoods			Persistently Poor Neighborhoods			Gentrified Neighborhoods		
	2000	2012	% Chg	2000	2012	% Chg	2000	2012	% Chg
% College	0.21	0.26	0.20	0.08	0.10	0.16	0.14	0.22	0.59
% White College	0.19	0.21	0.15	0.05	0.06	0.10	0.11	0.17	0.59
% Poverty	0.08	0.08	0.01	0.14	0.18	0.22	0.17	0.15	-0.11
% Unemployment	0.04	0.08	0.83	0.07	0.11	0.66	0.07	0.10	0.44
% Children	0.17	0.19	0.12	0.27	0.31	0.13	0.30	0.31	0.05
% Single Parent	0.26	0.23	-0.11	0.26	0.23	-0.09	0.25	0.21	-0.15
% Homeowners	0.05	0.08	0.48	0.06	0.10	0.65	0.08	0.11	0.41
% Vacant Homes	0.72	0.75	0.05	0.46	0.45	-0.01	0.49	0.51	0.04
% Non-White Residents	0.14	0.23	0.58	0.68	0.78	0.14	0.42	0.48	0.13
Total Population	4,395	4,841	0.10	3,682	3,663	-0.01	3,804	3,847	0.01
# Housing Units	1,731	1,970	0.14	1,422	1,470	0.03	1,569	1,681	0.07
Median Housing Price	164,332	177,887	0.08	84,590	83,227	-0.02	114,487	150,681	0.32
Median Rent	823	885	0.08	623	710	0.14	684	825	0.21

Note: All Neighborhoods are located in Metropolitan Statistical Areas.

RACIAL, ECONOMIC, SOCIAL, AND HOUSING DIFFERENCES BY SCHOOL NEIGHBORHOOD TYPE BETWEEN 2000 AND 2012, MIDDLE SCHOOLS

	Ineligible Neighborhoods			Persistently Poor Neighborhoods			Gentrified Neighborhoods		
	2000	2012	% Chg	2000	2012	% Chg	2000	2012	% Chg
% College	0.21	0.25	0.23	0.07	0.08	0.20	0.13	0.20	0.47
% White College	0.18	0.22	0.18	0.04	0.05	0.20	0.11	0.16	0.46
% Poverty	0.08	0.08	0.02	0.09	0.10	0.08	0.16	0.15	-0.03
% Unemployment	0.04	0.08	0.82	0.04	0.07	0.77	0.07	0.10	0.42
% Children	0.16	0.19	0.12	0.15	0.18	0.16	0.28	0.29	0.03
% Single Parent	0.26	0.23	-0.12	0.23	0.19	-0.14	0.24	0.21	-0.14
% Homeowners	0.06	0.08	0.44	0.05	0.08	0.55	0.08	0.11	0.45
% Vacant Homes	0.73	0.77	0.05	0.42	0.42	-0.01	0.47	0.50	0.06
% Non-White Residents	0.13	0.21	0.59	0.76	0.83	0.09	0.45	0.51	0.12
Total Population	4,411	4,885	0.11	3,052	3,041	-0.00	3,692	3,772	0.02
# Housing Units	1,745	1,998	0.15	1,241	1,283	0.03	1,498	1,632	0.09
Median Housing Price	159,986	173,090	0.08	67,564	70,557	0.04	103,703	129,552	0.25
Median Rent	788	863	0.09	510	592	0.16	630	742	0.18

Note: All Neighborhoods are located in Metropolitan Statistical Areas.

RACIAL, ECONOMIC, SOCIAL, AND HOUSING DIFFERENCES BY SCHOOL NEIGHBORHOOD TYPE BETWEEN 2000 AND 2012, HIGH SCHOOLS

	Ineligible Neighborhoods			Persistently Poor Neighborhoods			Gentrified Neighborhoods		
	2000	2012	% Chg	2000	2012	% Chg	2000	2012	% Chg
% College	0.18	0.23	0.26	0.04	0.05	0.29	0.12	0.18	0.47
% White College	0.17	0.20	0.22	0.03	0.04	0.23	0.10	0.15	0.46
% Poverty	0.08	0.08	-0.02	0.03	0.02	-0.26	0.13	0.11	-0.14
% Unemployment	0.04	0.08	0.78	0.01	0.02	0.38	0.05	0.08	0.54
% Children	0.16	0.18	0.12	0.04	0.04	0.10	0.18	0.20	0.13
% Single Parent	0.26	0.23	-0.12	0.09	0.08	-0.11	0.24	0.20	-0.15
% Homeowners	0.07	0.09	0.42	0.03	0.04	0.44	0.08	0.11	0.31
% Vacant Homes	0.73	0.78	0.07	0.22	0.24	0.13	0.52	0.56	0.09
% Non-White Residents	0.10	0.17	0.61	0.81	0.84	0.05	0.35	0.38	0.10
Total Population	4,346	4,721	0.09	1,184	1,166	-0.02	3,374	3,300	-0.02
# Housing Units	1,744	1,976	0.13	528	538	0.02	1,407	1,505	0.07
Median Housing Price	146,647	159,391	0.09	30,444	37,940	0.25	87,807	111,439	0.27
Median Rent	728	809	0.11	177	207	0.17	555	658	0.18

Note: All Neighborhoods are located in Metropolitan Statistical Areas.

APPENDIX D

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON OVERALL SUSPENSION RATES, HIGH SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.007	-0.006	-0.006
	(0.005)	(0.005)	(0.005)
2) Excluding Sampling Weights	-0.006	-0.006	-0.006
	(0.005)	(0.005)	(0.005)
3) Excluding State Fixed Effects	-0.008	-0.008	-0.003
	(0.005)	(0.005)	(0.005)
4) Rent-Based Gentrification	-0.002	-0.001	-0.004
	(0.005)	(0.005)	(0.005)
6) 50th-Percentile Threshold	-0.004	-0.004	-0.010*
	(0.004)	(0.004)	(0.004)
Size of School Neighborhood			
7) 1-Mile Radius	-0.009*	-0.002	-0.019
	(0.004)	(0.006)	(0.015)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001.

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON WHITE SUSPENSION RATES, HIGH SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	0.006	0.005	0.010
	(0.008)	(0.007)	(0.011)
2) Excluding Sampling Weights	0.006	0.005	0.011
	(0.008)	(0.007)	(0.011)
3) Excluding State Fixed Effects	0.003	0.002	0.012
	(0.007)	(0.007)	(0.011)
4) Rent-Based Gentrification	0.008	0.007	0.008
	(0.007)	(0.006)	(0.011)
5) 50th-Percentile Threshold	0.005	0.005	0.003
	(0.005)	(0.005)	(0.007)
Size of School Neighborhood			
6) 1-Mile Radius	0.001	-0.008	0.028
	(0.006)	(0.007)	(0.031)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001.

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON BLACK SUSPENSION RATES, HIGH SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	0.034†	0.051*	-0.041**
	(0.020)	(0.024)	(0.016)
2) Excluding Sampling Weights	0.033†	0.052*	-0.040*
	(0.020)	(0.024)	(0.016)
3) Excluding State Fixed Effects	0.036†	0.053*	-0.040*
	(0.020)	(0.024)	(0.016)
4) Rent-Based Gentrification	0.030†	0.045*	-0.034*
	(0.017)	(0.021)	(0.014)
5) 50th-Percentile Threshold	0.020	0.030*	-0.035**
	(0.013)	(0.014)	(0.011)
Size of School Neighborhood			
6) 1-Mile Radius	0.009	0.037	-0.073†
	(0.012)	(0.023)	(0.037)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin

Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON HISPANIC SUSPENSION RATES, HIGH SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.007	-0.007	-0.003
	(0.011)	(0.012)	(0.011)
2) Excluding Sampling Weights	-0.008	-0.007	-0.003
	(0.011)	(0.012)	(0.010)
3) Excluding State Fixed Effects	-0.008	-0.009	0.005
	(0.011)	(0.012)	(0.010)
4) Rent-Based Gentrification	-0.002	-0.002	0.003
	(0.011)	(0.011)	(0.010)
5) 50th-Percentile Threshold	0.005	0.008	-0.016†
	(0.009)	(0.009)	(0.009)
Size of School Neighborhood			
6) 1-Mile Radius	-0.004	-0.002	-0.006
	(0.009)	(0.016)	(0.030)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON OVERALL SUSPENSION RATES, MIDDLE SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.005	-0.006	0.003
	(0.007)	(0.006)	(0.007)
2) Excluding Sampling Weights	-0.005	-0.005	0.003
	(0.007)	(0.006)	(0.007)
3) Excluding State Fixed Effects	-0.004	-0.005	0.004
	(0.007)	(0.007)	(0.007)
4) Rent-Based Gentrification	0.001	-0.001	0.008
	(0.007)	(0.007)	(0.007)
5) 50th-Percentile Threshold	-0.002	-0.002	-0.001
	(0.005)	(0.005)	(0.005)
Size of School Neighborhood			
6) 1-Mile Radius	0.007	-0.000	0.017
	(0.006)	(0.008)	(0.017)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001.

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON WHITE SUSPENSION RATES, MIDDLE SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.003	-0.003	0.008
	(0.010)	(0.010)	(0.012)
2) Excluding Sampling Weights	-0.002	-0.003	0.008
	(0.010)	(0.010)	(0.012)
3) Excluding State Fixed Effects	-0.002	-0.002	0.010
	(0.010)	(0.009)	(0.012)
4) Rent-Based Gentrification	0.001	0.000	0.014
	(0.011)	(0.010)	(0.013)
5) 50th-Percentile Threshold	-0.002	-0.002	0.002
	(0.007)	(0.007)	(0.009)
Size of School Neighborhood			
6) 1-Mile Radius	0.004	0.001	0.008
	(0.009)	(0.010)	(0.033)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON BLACK SUSPENSION RATES, MIDDLE SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.004	-0.009	0.018
	(0.018)	(0.018)	(0.018)
2) Excluding Sampling Weights	-0.004	-0.010	0.019
	(0.017)	(0.018)	(0.018)
3) Excluding State Fixed Effects	-0.002	-0.008	0.022
	(0.017)	(0.018)	(0.018)
4) Rent-Based Gentrification	0.006	0.001	0.015
	(0.016)	(0.018)	(0.017)
5) 50th-Percentile Threshold	0.001	0.000	0.012
	(0.012)	(0.012)	(0.013)
Size of School Neighborhood			
6) 1-Mile Radius	0.014	-0.010	0.053
	(0.012)	(0.022)	(0.038)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON HISPANIC SUSPENSION RATES, MIDDLE SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.009	-0.010	0.009
	(0.009)	(0.009)	(0.009)
2) Excluding Sampling Weights	-0.008	-0.010	0.010
	(0.009)	(0.009)	(0.009)
3) Excluding State Fixed Effects	-0.006	-0.007	0.012
	(0.009)	(0.009)	(0.009)
4) Rent-Based Gentrification	-0.000	-0.004	0.019†
	(0.010)	(0.010)	(0.010)
5) 50th-Percentile Threshold	-0.006	-0.006	0.009
	(0.007)	(0.007)	(0.007)
Size of School Neighborhood			
6) 1-Mile Radius	0.014†	0.031*	-0.038
	(0.008)	(0.015)	(0.025)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON OVERALL SUSPENSION RATES, ELEMENTARY SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)
2) Excluding Sampling Weights	-0.002	-0.002	-0.001
	(0.002)	(0.002)	(0.002)
3) Excluding State Fixed Effects	-0.004*	-0.004*	-0.001
	(0.002)	(0.002)	(0.002)
4) Rent-Based Gentrification	-0.002	-0.002	-0.001
	(0.001)	(0.001)	(0.002)
5) 50th-Percentile Threshold	-0.002*	-0.002*	-0.001
	(0.001)	(0.001)	(0.001)
Size of School Neighborhood			
6) 1-Mile Radius	-0.001	-0.001	-0.000
	(0.002)	(0.002)	(0.004)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON WHITE SUSPENSION RATES, ELEMENTARY SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.002	-0.002	-0.000
	(0.002)	(0.003)	(0.003)
2) Excluding Sampling Weights	-0.001	-0.001	0.000
	(0.003)	(0.003)	(0.003)
3) Excluding State Fixed Effects	-0.003	-0.003	-0.000
	(0.003)	(0.003)	(0.003)
4) Rent-Based Gentrification	-0.000	-0.000	0.001
	(0.002)	(0.002)	(0.003)
5) 50th-Percentile Threshold	-0.002	-0.002	0.001
	(0.002)	(0.002)	(0.002)
Size of School Neighborhood			
6) 1-Mile Radius	0.000	0.000	0.000
	(0.002)	(0.003)	(0.008)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON BLACK SUSPENSION RATES, ELEMENTARY SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.001	-0.000	-0.006
	(0.004)	(0.005)	(0.005)
2) Excluding Sampling Weights	-0.001	-0.000	-0.006
	(0.004)	(0.005)	(0.005)
3) Excluding State Fixed Effects	-0.003	-0.003	-0.004
	(0.004)	(0.005)	(0.005)
4) Rent-Based Gentrification	0.001	0.002	-0.006
	(0.004)	(0.004)	(0.004)
5) 50th-Percentile Threshold	-0.003	-0.004	0.001
	(0.003)	(0.003)	(0.004)
Size of School Neighborhood			
6) 1-Mile Radius	-0.001	0.002	-0.005
	(0.004)	(0.008)	(0.012)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

ROBUSTNESS CHECKS FOR REGRESSIONS OF GENTRIFICATION ON HISPANIC SUSPENSION RATES, ELEMENTARY SCHOOLS

	Main Effect Only	*Interaction Model*	
	Gentrification	*Gentrification*	*Interaction*
1) Reported Estimates	-0.001	-0.001	0.000
	(0.002)	(0.002)	(0.002)
2) Excluding Sampling Weights	-0.001	-0.001	0.000
	(0.002)	(0.002)	(0.002)
3) Excluding State Fixed Effects	-0.001	-0.001	0.001
	(0.002)	(0.002)	(0.002)
4) Rent-Based Gentrification	-0.000	0.000	-0.001
	(0.002)	(0.002)	(0.002)
5) 50th-Percentile Threshold	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)
Size of School Neighborhood			
6) 1-Mile Radius	-0.001	-0.001	0.002
	(0.002)	(0.004)	(0.007)

Note: All models are full-adjusted and include state-fixed effects. Standard errors are clustered at the district level and are reported in parentheses below each estimate. Estimates are based on 25 multiply imputed datasets, combined based on Rubin Rule's for MI inference (1987). †p<.10, *p<.05, **p<.01, ***p<.001

APPENDIX E

REGRESSION OF GENTRIFICATION ON SCHOOL, NEIGHBORHOOD, DISTRICT, AND CITY CHARACTERISTICS, FULL RESULTS

	All Schools	School Level		
		Elementary	Middle	High
	(1)	(2)	(3)	(4)
School Characteristics				
% Non-White > Nhood	-0.14	-0.12	-0.29	-0.02
	(0.07)	(0.07)	(0.15)	(0.13)
	[-0.03]	[-0.03]	[-0.06]	[-0.00]
% FRPL	-0.04	-0.06	-0.03	0.22
	(0.05)	(0.05)	(0.10)	(0.11)
	[-0.01]	[-0.01]	[-0.01]	[0.04]
Student-Teacher Ratio	-0.08	-0.09	-0.11	-0.03
	(0.03)	(0.04)	(0.07)	(0.07)
	[-0.02]	[-0.02]	[-0.02]	[-0.01]
Total Students	-0.09	-0.20	-0.20	-0.09
	(0.02)	(0.04)	(0.08)	(0.05)
	[-0.02]	[-0.05]	[-0.04]	[-0.02]
Overall Suspension Rates	-0.05	-0.05	-0.01	-0.12
	(0.03)	(0.04)	(0.04)	(0.05)
	[-0.01]	[-0.01]	[-0.00]	[-0.02]
Neighborhood Characteristics				
% Non-White	-0.26	-0.23	-0.45	-0.29
	(0.05)	(0.05)	(0.12)	(0.14)
	[-0.06]	[-0.06]	[-0.10]	[-0.06]
Median Income	0.11	0.11	-0.02	0.27
	(0.08)	(0.07)	(0.16)	(0.20)
	[0.03]	[0.03]	[-0.00]	[0.05]
% Female-Headed Households	0.18	0.12	0.33	0.34
	(0.06)	(0.05)	(0.13)	(0.15)
	[0.04]	[0.03]	[0.07]	[0.06]
% Unemployment	0.08	0.06	0.29	-0.00
	(0.05)	(0.05)	(0.12)	(0.16)
	[0.02]	[0.01]	[0.06]	[-0.00]
% Welfare Receipt	-0.03	0.01	-0.21	-0.22
	(0.07)	(0.06)	(0.13)	(0.18)
	[-0.01]	[0.00]	[-0.04]	[-0.04]
% Adults w/o H.S. Degree	0.08	0.10	-0.00	0.25
	(0.06)	(0.05)	(0.12)	(0.11)
	[0.02]	[0.02]	[-0.00]	[0.05]

REGRESSION OF GENTRIFICATION ON SCHOOL, NEIGHBORHOOD, DISTRICT, AND CITY CHARACTERISTICS, FULL RESULTS (CONTINUED)

	All Schools	School Level		
		Elementary	Middle	High
	(1)	(2)	(3)	(4)
Median Housing Price	0.30	0.33	0.19	0.13
	(0.07)	(0.06)	(0.13)	(0.17)
	[0.07]	[0.08]	[0.04]	[0.02]
% Vacant Housing	0.08	0.12	0.02	0.02
	(0.03)	(0.03)	(0.06)	(0.05)
	[0.02]	[0.03]	[0.00]	[0.00]
Persons per Sq. Mile	0.07	0.06	0.17	0.38
	(0.03)	(0.03)	(0.10)	(0.14)
	[0.02]	[0.01]	[0.04]	[0.07]
School District Characteristics				
%FRPL	0.08	0.09	0.12	-0.06
	(0.04)	(0.05)	(0.10)	(0.09)
	[0.02]	[0.02]	[0.03]	[-0.01]
Per-Pupil Expenditures	0.08	0.09	0.09	0.02
	(0.04)	(0.04)	(0.07)	(0.04)
	[0.02]	[0.02]	[0.02]	[0.00]
Total Enrollment	0.12	0.12	0.27	0.12
	(0.05)	(0.05)	(0.12)	(0.13)
	[0.03]	[0.03]	[0.06]	[0.02]
Charter Density	0.02	0.02	0.05	0.02
	(0.03)	(0.03)	(0.10)	(0.05)
	[0.00]	[0.00]	[0.01]	[0.00]
Magnet Density	0.04	0.02	0.06	0.07
	(0.02)	(0.03)	(0.08)	(0.07)
	[0.01]	[0.01]	[0.01]	[0.01]
City Characteristics				
Racial Segregation	-0.14	-0.13	-0.14	-0.22
	(0.07)	(0.06)	(0.11)	(0.10)
	[-0.03]	[-0.03]	[-0.03]	[-0.04]
Income Segregation	-0.13	-0.04	-0.09	-0.41
	(0.13)	(0.15)	(0.23)	(0.19)
	[-0.03]	[-0.01]	[-0.02]	[-0.08]
Income Inequality	0.08	0.01	0.08	0.35
	(0.13)	(0.13)	(0.22)	(0.17)
	[0.02]	[0.00]	[0.02]	[0.07]

REGRESSION OF GENTRIFICATION ON SCHOOL, NEIGHBORHOOD, DISTRICT, AND CITY CHARACTERISTICS, FULL RESULTS (CONTINUED)

	All Schools	School Level		
		Elementary	Middle	High
	(1)	(2)	(3)	(4)
Total Population	-0.10	-0.08	-0.19	-0.14
	(0.06)	(0.06)	(0.13)	(0.13)
	[-0.02]	[-0.02]	[-0.04]	[-0.03]
R^2 =	0.18	0.17	0.20	0.26
n =	10,136	6,615	1,414	1,789

Note: Standard errors are in parenthesis and are clustered at the city level. Marginal effects are in brackets. School neighborhoods are defined based on their catchment area. All school neighborhoods in the analytic sample were those whose median household income in 2000 was below the 40th percentile of its respective city average and whose housing supply built in the 20 years preceding 2000 was below the 40th percentile of its city. Neighborhoods that subsequently underwent gentrification experienced (a) an inflow of college-educated residents between 2000 and 2012 that exceeded the growth of college-education persons in the city overall, and (b) an increase in real housing prices between 2000 and 2012. Additional controls not included in table but included in analytic model were binary indicators of grade level and pre-baseline trends in neighborhood characteristics between 1990 and 2000.

APPENDIX F

Absolute and Relative Rates of Gentrification Occurring Around U.S. Urban Schools by Region and Metropolitan Area Size, 1-Mile Radius, 2000-2012

	Urban Schools	Gentrifiable School Nhoods	Gentrified School Nhoods	Absolute Exposure	Relative Exposure
United States	74,728	21,720	5,699	7.6%	26.2%
Region					
Northeast	13,225	2,875	858	6.5%	29.8%
Midwest	18,274	5,351	1,092	6.0%	20.4%
South	25,518	8,438	2,216	8.7%	26.3%
West	17,711	5,056	1,533	8.7%	30.3%
City Population					
More than 3 million	21,610	5,760	1,348	6.2%	23.4%
1 to 3 million	15,816	4,855	1,254	7.9%	25.8%
500,000 to 1 million	7,840	2,352	632	8.1%	26.9%
250,000 to 500,000	8,608	2,554	615	7.1%	24.1%
Fewer than 250,000	20,854	6,199	1,850	8.9%	29.8%

Note: Neighborhood data were gathered from the 2000 Census and the 2009-14 American Community Survey. School data were gathered from the 1999-00 and 2011-12 School Universe Survey.

U.S. School Children's Absolute and Relative Exposure to Gentrified School Neighborhoods by Region and Metropolitan Area Size, 1-Mile Radius, 2000-2012

	Urban Schools	*Gentrifiable School Nhoods*	*Gentrified School Nhoods*	*Absolute Exposure*	*Relative Exposure*
United States	44,561,901	11,514,832	2,809,678	6.3%	24.4%
Region					
Northeast	7,391,347	1,559,547	453,579	6.1%	29.1%
Midwest	9,197,131	2,361,949	437,590	4.8%	18.5%
South	16,813,983	4,774,378	1,187,611	7.1%	24.9%
West	11,159,440	2,818,958	730,898	6.5%	25.9%
City Population					
More than 3 million	15,226,471	3,729,459	820,754	5.4%	22.0%
1 to 3 million	10,080,023	2,609,131	631,834	6.3%	24.2%
500,000 to 1 million	4,751,539	1,232,220	323,026	6.8%	26.2%
250,000 to 500,000	4,997,118	1,313,450	307,388	6.2%	23.4%
Fewer than 250,000	9,506,750	2,630,572	726,676	7.6%	27.6%

Note: Neighborhood data were gathered from the 2000 Census and the 2009-14 American Community Survey. School data were gathered from the 1999-00 and 2011-12 School Universe Survey.

Student Exposure to Gentrified School Neighborhoods, by Race, Region and Metropolitan Area Size, 1-Mile Radius, 2000-2012

	White Student Population			Black Student Population			Hispanic Student Population		
	# Students	Absolute Rate	Relative Rate	# Students	Absolute Rate	Relative Rate	# Students	Absolute Rate	Relative Rate
United States	22,617,729	4.7	27.8	6,911,390	9.5	22.3	11,018,580	7.8	21.8
Region									
Northeast	4,397,356	3.9	33.0	1,067,536	10.3	26.5	1,305,942	9.7	27.4
Midwest	6,174,960	3.4	19.8	1,330,596	8.0	15.2	1,044,508	8.6	20.0
South	7,671,521	5.5	28.8	3,918,662	9.8	23.9	4,078,186	7.7	21.5
West	4,373,892	5.7	33.4	594,596	8.9	25.7	4,589,944	7.1	20.9
City Population									
More than 3 million	5,562,143	2.6	28.0	2,761,905	8.2	21.0	5,293,205	7.1	20.1
1 to 3 million	5,434,635	3.4	23.9	1,714,823	11.9	25.0	1,943,250	9.4	22.7
500,000 to 1 million	2,400,529	4.9	29.7	594,723	10.8	22.9	1,314,178	8.1	23.9
250,000 to 500,000	2,952,117	5.2	26.8	725,016	8.7	19.6	962,582	6.8	20.8
Fewer than 250,000	6,268,305	9.2	29.7	1,114,923	8.7	22.3	1,505,365	8.5	25.5

Note: Neighborhood data were gathered from the 2000 Census and the 2009-14 American Community Survey. School data were gathered from the 2011-12 School Universe Survey. Gentrification is assessed between 2000 and 2012. A neighborhood is considered gentrified if at baseline (2000) it had (a) a median household income below the 40th percentile of its respective city, and (b) a percentage of housing constructed in the 20 years preceding 2000 that was below the 40th percentile of its respective city, and between the assessment period subsequently experienced (c) an increase in real housing prices and (d) an influx of college-educated households that exceeded the city-wide increase in college-educated households overall. Higher-SES neighborhoods are those that failed to meet either criteria (a) or (b) at baseline. Non-gentrified neighborhoods are those that met criteria (a) and (b) at baseline but failed to meet either criteria (c) or (d) between 2000 and 2012.

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