

School Closures and the Gentrification of the Black Metropolis

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ABSTRACT

Largely overlooked in the empirical literature on gentrification is the potential impact that school closures play in this process. This study examines whether the weakening of the neighborhood-school connection brought about by school closures affects the likelihood that nearby neighborhoods experience gentrification. Integrating longitudinal data from the U.S. Census with data on every urban school closure that occurred nationwide between 2000 and 2012, this study finds that college-educated White households were far more likely to gentrify Black neighborhoods following the closure of a local school. In particular, school closures increased the likelihood that the most racially segregated Black neighborhoods gentrified by 9 percentage points, a process that corresponded during this period to an average loss in these neighborhoods of roughly 200 Black residents. Results suggest that school closures do not simply alter the educational landscape, school closures are also emblematic of a larger spatial and racial reimagining of U.S. cities that dispossess and displaces communities of color.

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School Closures and the Gentrification of the Black Metropolis

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School Closures and the Gentrification of the Black Metropolis

Introduction

An underappreciated aspect of the recent back-to-the-city movement is that it is situated within a broader pattern of racialized sorting that has long guided the U.S. housing market (e.g., Krysan, Couper, Farley, & Forman, 2009; Lewis, Emerson, & Klineberg, 2011). In particular, patterns of gentrification—influxes of relatively affluent residents and subsequent rises in property values in previously disinvested urban neighborhoods—are governed by a racial logic (Hwang & Sampson, 2014). As White households have moved back to the city, taking up residence in and transforming certain parts of the urban core, many lower-income Black neighborhoods in the inner city have mostly remained structurally disinvested, racially isolated, and untouched by broader patterns of urban redevelopment (Sharkey, 2013). Notwithstanding noteworthy instances of historically Black neighborhoods being gentrified by affluent White households (e.g., McElroy & Werth, 2019; Prince, 2016; Summers, 2021), the predominant pattern of gentrification is one in which White gentrifiers move into urban neighborhoods with few Black residents (Sutton, 2020; Timberlake & Johns-Wolfe, 2017).

Scholars have advanced several theories for why higher-socioeconomic status (SES) White households have been less likely to move into inner-city Black neighborhoods than racially mixed or predominantly White urban neighborhoods, including perceptions of crime and disorder, racial anxieties, employment opportunities, social networks, and residential amenities (Couture & Handbury, 2016; Ellen, Mertens Horn, & Reed, 2017; Sampson, 2012). However, there is emerging evidence that schools may play a key part in this process (Pearman & Swain, 2017). This issue arises because children typically attend schools nearby their homes. For instance, in 2018, upwards of three-quarters of public-school children nationwide attended their assigned neighborhood school (NCES, 2019). This maps onto residential sorting patterns because living in a lower-income Black neighborhood has historically meant sending a child to a racially segregated, under-resourced school

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(Orfield, 2013). In other words, Black neighborhoods may be least likely to experience gentrification, in part, due to an unwillingness of affluent White households to send their children to economically disadvantaged Black schools.

Nevertheless, disadvantaged schools do not always stay open (Tieken & Auldridge-Reveles, 2019). In fact, school closures are becoming increasingly common in urban areas. For instance, across roughly the first decade of the twenty-first century, the number of school closures in the 100 largest metropolitan areas increased by nearly 50%, from 5.5 to 10.6 closures per 1000 schools (McFarland et al., 2017). Moreover, in recent years, a growing number of cities have issued mass school closures—where a district may close dozens of schools at once (Caven, 2019; Han et al., 2017; Nerenberg, 2020). For example, in 2013 alone, Chicago shuttered 47 of its elementary schools, and other cities, like Detroit and Philadelphia, have followed suit, closing over 50 schools, respectively, in the years that followed (Brazil, 2020).

Notably, these school closures have not only disproportionately impacted Black students, they have also disproportionately occurred in disinvested neighborhoods, the very neighborhoods most vulnerable to gentrification (Burdick-Will, Keels, & Schuble, 2013; Tieken & Auldridge-Reveles, 2019). And although school closures are often rationalized on the grounds of improved efficiency, expanded educational opportunities, and fiscal responsibility, school closures are often met with ardent resistance on the part of families, students, educators, and community residents who fear that closing schools can diminish neighborhood cohesion and negatively affect the economic health and well-being of the local community (Alexander & Massaro, 2020; Bierbaum, 2018; Ewing, 2018; Smith & Stovall, 2008).

Despite concerns about potential adverse effects on communities, there has been limited quantitative evidence about the impacts of school closures on neighborhood conditions, and virtually no evidence on whether school closures affect patterns of gentrification, a notable oversight

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given that gentrification, just like school closures, has at times been met by fierce protest from community groups who view it as a threat to the future of Black neighborhoods (Addie & Fraser, 2019; Ewing, 2018; Newman & Wyly, 2006). The current study begins to fill this gap by drawing national data from the U.S. Census and American Community Survey along with data on every urban school closure that took place nationwide between 2000 and 2012 and examining whether the shuttering of neighborhood schools affects patterns of gentrification in U.S. cities. In particular, this study is interested in whether the likelihood that affluent White households gentrify Black neighborhoods changes after the closure of a local school.

Background

In its most general sense, gentrification refers to a type of physical, economic, cultural, and demographic transition in urban areas in which previously disinvested, oftentimes minoritized neighborhoods experience an influx of higher-SES, oftentimes White households and an increase in property values (Smith, 1996). Although the literature is largely unsettled on whether racialized turnover in previously disinvested neighborhoods is required for gentrification to occur (Freeman & Braconi, 2004; Hwang & Sampson, 2014), this study foregrounds race in its conceptualization of gentrification given this study's interest in understanding prevailing patterns of racial segregation in urban areas, as well as unique role that affluent white households play in the educational landscape of gentrifying neighborhoods (Cucchiara, 2013; Cucchiara & Horvat, 2009; Pearman, 2020; Linn Posey-Maddox, Kimelberg, & Cucchiara, 2014; Stillman, 2012).

There are two general explanations for why gentrification occurs: production-side reasons related to the economic opportunities available in disinvested urban neighborhoods, and consumption-side reasons having to do with an emerging alignment between the preferences of gentrifiers and the social and cultural opportunities available in urban neighborhoods (Ley, 1996; Smith, 1982). Moreover, prior research has indicated that school closures may contribute to both.

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Production-side theories view gentrification in economic terms and conceive of the inflow of capital into lower-income neighborhoods and the revitalization of urban infrastructure as a strategic investment response to sustained disinvestment and under-valuation of certain neighborhoods. That is, gentrification is viewed as a structural product of the housing and land markets. This perspective is codified most formally in Neil Smith's "rent gap theory," which argues that the gap between actual and potential land-use values in any given locale drives investment opportunities for homebuyers, developers, and investors and structures the flow of capital into and out of disinvested urban neighborhoods (Smith, 1982).

Although most research into production-side explanations for gentrification has documented associations between gentrification and the age and quality of the housing stock, local school closures may also contribute to the so-called rent-gap in a given neighborhood. For instance, prior research has shown that perceptions of school quality are capitalized into housing prices (Black, 1999; Clapp, Nanda, & Ross, 2008; Clotfelter, Ladd, & Vigdor, 2005, 2006; Dhar & Ross, 2012; Stullich, 2011). Clapp, Nanda, and Ross (2008) found that a 1 standard deviation increase in math scores at a local school increased nearby property values by around 1.5 percent. In an earlier study, Black (1999) noted a similar pattern, documenting that households were willing to pay 2.5 percent more for housing for every 5 percent increase in achievement scores. To the extent that Black neighborhoods are tied to schools perceived to be of lower quality by gentrifiers, the shuttering of these lower-quality schools could plausibly raise the "ceiling" of the rent-gap in these neighborhoods, thereby increasing the likelihood that a given neighborhood experiences gentrification (Brunner, Cho, & Reback, 2012). On the other hand, if a school closure results in a building that is abandoned as opposed to repurposed, such a closure could plausibly lower the ceiling of the rent gap and decrease the likelihood of gentrification by depressing property values and contributing to visual cues of disorder and neighborhood blight.

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In contrast to production side explanations for gentrification, *consumption-side theories* frame gentrification as the result of consumer demand. Scholarship in this vein views gentrification as an expression of advanced capitalism and a response to the shifting consumption choices of certain parts of the middle class (Bader, 2011; Lloyd, 2010). According to this perspective, gentrification occurs because higher-SES households have become inclined toward the types of lifestyles made possible by proximity to urban amenities, including cultural institutions, cafes, and diverse residential environments. In other words, gentrification arises because of an emerging alignment between the cultural tastes and dispositions of the gentry and the structural features of urban neighborhoods.

School closures may serve as a consumption-side determinant of gentrification by changing the consumable amenities associated with urban neighborhoods. In particular, higher-SES households looking to relocate to urban areas are especially sensitive to perceptions of “fit” at local schools, i.e., perceptions of whether the demographic composition, facilities, governance, curriculum, and enrichment opportunities at local schools align with their social and educational priorities (Cucchiara, 2013; Cucchiara & Horvat, 2009; Posey-Maddox, 2014; Stillman, 2012). These preferences indicate that local schools that do not meet gentrifiers’ standards for quality, leadership, or school climate could plausibly serve as a deterrent to higher-SES White parents looking to relocate to central city areas. By extension, the shuttering of a neighborhood school that gentrifiers would have otherwise perceived to be less than desirable could in turn make the neighborhood itself more appealing. That is, in addition to school closures potentially influencing patterns of gentrification because closures may contribute to the economic viability of urban neighborhoods, school closures may influence patterns of gentrification by providing gentrifiers alternative and preferable publicly funded schooling options for them to consume.

Theoretical Framework

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Two competing theories about residential segregation provide alternative hypotheses for the role school closures may play as a moderator of the relation between neighborhood racial composition and patterns of gentrification. Both are grouped under place stratification theory. Place stratification theory maintains the primacy of race as a stratifying device in residential sorting patterns, wherein socially advantaged groups (i.e., affluent White households) maintain physical distance from socially disadvantaged groups (i.e., non-White, working class, etc.) (Alba & Logan, 1993). This hierarchy of place is reinforced and institutionalized through public policy (e.g., exclusionary zoning and urban renewal plans) and prevailing practices in the housing and lending markets (e.g., predatory lending practices, and prejudiced and discriminatory decisions on behalf of landlords, property developers, real estate agents, and banks) (Rugh, Albright, & Massey, 2015; Rugh & Massey, 2010; Shertzer, Twinam, & Walsh, 2016; Wilson, 2012). Although place stratification theory is traditionally used to describe racialized barriers to *upward* spatial mobility (i.e., moving from a less to a more socioeconomically advantaged neighborhood), at its core, place stratification theory simply assumes that spatial mobility in general (either upward mobility to a more affluent neighborhood or “downward,” strategic mobility to a gentrifying neighborhood) is governed by an enduring racial hierarchy where proximity to whiteness yields material benefits in terms of quality of life and long-term economic prospects. Therefore, according to place stratification theory, urban neighborhoods with fewer Black residents would be more likely to gentrify as compared to disinvested majority Black neighborhoods. More simply, according to place stratification theory, low-income Black communities are the least likely to be gentrified due to racialized reticence on behalf of White affluent households.

Following Pais, South, and Crowder (2012), this study draws on two variants of place stratification theory—a strong and weak version—to explain the how school closures may relate to the persistence of racial stratification in urban neighborhoods. The strong version of place

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stratification theory holds that the primacy of neighborhood racial composition would nullify any perceived improvements in school quality in Black neighborhoods associated with a local school closure. According to the strong version of place stratification theory, the impact of neighborhood racial composition on patterns of gentrification would either be invariant to whether a local school closes, net other factors, or be amplified if school closures, for instance, are more likely to depress property values in minoritized neighborhoods than otherwise similar neighborhoods with higher shares of White residents. In either case, the strong version of place stratification theory would predict that closing a local school would not encourage affluent White residents to move into a disinvested Black neighborhood due to prevailing patterns of racial animus. In contrast, the weak version of place stratification theory, which maintains the primacy of race as a stratifying device in locational attainment but allows for improvements at the margins, would posit that school closures, as an educational reform strategy that endeavors to improve the local educational landscape, would depress but not entirely account for the role of racial stratification in determining patterns of gentrification. In particular, the weak version of place stratification theory would posit that school closures would lessen the aversion that affluent White households have for moving into a Black neighborhood due to fundamental changes to the local educational landscape that are appealing to affluent White households.

Empirically, this study considers these two competing theoretical models by specifying an interaction between school closure and the share of Black residents living in disinvested urban neighborhoods. Assuming significant main effects for neighborhood racial composition where neighborhoods with more Black residents are less likely to experience gentrification, a positive interaction in which the effect of neighborhood racial composition becomes less negative when a local school closes would provide evidence in favor of a weak version of place stratification theory—indicating that White households become less deterred from moving into Black neighborhoods

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when a local school is shuttered. A lack of moderation between school closures and racial composition suggests that we cannot rule out the possibility that the effects of racial composition on gentrification are invariant to whether local schools are closed, as would be anticipated under a strong version of place stratification theory.

Method

Examining the impact of school closures on patterns of gentrification required the integration of several national datasets. Data on school closures were collected annually from the National Center for Educational Statistics' Common Core of Data for school years 2000 through 2012. Baseline and pre-baseline characteristics of individual neighborhoods were gathered from the 1990 and 2000 Neighborhood Change Database (NCDB). NCDB's proprietary software provides normalized census tract information across years that accounts for any boundary changes. Given that this study focused on school closures that occurred between 2000 and 2012, this study also used census tract data from the 2010-14 American Community Survey to determine which neighborhoods underwent gentrification during the observation period.

Primary Outcome of Interest

The primary outcome of interest in this study was whether an urban neighborhood experienced gentrification during the observation period. Given prior research on the distinct role that higher-SES White households play in the educational landscape of gentrifying neighborhoods (see Cucchiara, 2013b; Stillman, 2012), this study follows prior national studies of gentrification and schooling (e.g., Pearman & Swain, 2017; Pearman, 2020) and focuses on a racialized definition of gentrification that specifies that incoming gentry are White (Pearman & Swain, 2017). First, gentrifiable neighborhoods were defined as neighborhoods that had (a) a median income below the 50th percentile of its respective city and (b) a share of recently constructed housing, defined as the percent of housing built in the 20 years preceding baseline, also below the 50th percentile of its

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respective city. A neighborhood was considered gentrified if it met criteria (a) and (b) at baseline but also underwent between 2000 and 2012 (c) an increase in inflation-adjusted housing prices, and (d) a percentage increase in college-educated White households that exceeded the increase in college-educated White households in the city during this period (given an increase in absolute number of college-educated White households in the neighborhood). Neighborhoods that met the first set of criteria but failed to meet that latter were considered persistently disinvested neighborhoods, i.e., neighborhoods eligible for gentrification that did not experience gentrification. Neighborhoods that met all four criteria were considered gentrified neighborhoods.

Independent Variable

The primary independent variable of interest in this study was whether a neighborhood experienced a school closure nearby. As noted previously, data on school closures were gathered from the National Center for Educational Statistics' Common Core of Data, which provides annual information on school characteristics, including codes for operational status that specify whether a school was closed. This dataset provides addresses for every school, including those that were closed. These addresses were subsequently geocoded to corresponding longitude-latitude coordinates (geocoding successfully located longitude-latitude coordinates 99% of schools). For the primary analysis, this study focused on school closures that occurred within 1-mile of neighborhood boundaries, although subsequent analyses vary this distance as a robustness check. Moreover, this study narrows its focus on school closures to that which occurred to traditional neighborhood schools. Vocational, alternative, special education, charters, magnet schools, and schools classified as "other" were excluded from the measure of school closures. (Figure 2 relaxes this restriction and reports results based on the inclusion of charter and magnet schools.)

Control Variables

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To account for other factors that might influence patterns of school closures as well as gentrification, this study controls for a host of confounding factors at the neighborhood and district level. Baseline neighborhood controls were measured in the year 2000 and included the total number of residents, the percent of housing that is owner-occupied, the share of residents who are children under age 18, the share of households led by a single mother, the share of residents who are White with a bachelor's degree, the share of adult residents who are unemployed, the share of residents living at or below the federal poverty line, the share of residents receiving government-based financial assistance, the share of residents without a high school degree, median household income, and median housing price. The study also controls for neighborhood racial composition; however, to address collinearity with regard to a key predictor variable—share of neighborhood residents who are Black—this study controls for the share of Black and White residents, respectively, while controlling for whether the share of Latinx residents exceeded the national average (see Dormann et al., 2013). In addition, to capture trends in gentrification prior to baseline, pre-2000 neighborhood controls were also included that measure the observed difference in each neighborhood characteristic between the 1990 and 2000 U.S. Census. Neighborhood controls were also included for the number of schools at baseline located within 1-mile of the neighborhood. A control was also included for whether a neighborhood was located in the principal city of a metropolitan statistical area. Baseline district controls were measured in the year 2000 and include total district enrollment, per-pupil expenditures, between-school segregation, the share students in the district who are non-white, and the percent of district schools that were charter and magnets, respectively. Additionally, to account for the fact that a relation between school closures and gentrification could be observed because school choice may contribute to each (see Pearman & Swain, 2017), this study controls for whether a district experienced growth in the share of charter or magnet schools during the observation period.

Descriptive Statistics for Analytic Sample

Table 1 presents baseline descriptive statistics for all neighborhoods located in metropolitan statistical areas. As shown in the bottom row, of the 66,624 neighborhoods located in metropolitan statistical areas, 22,594 were located in gentrifiable neighborhoods at baseline—that is, neighborhoods with median incomes and shares of recently constructed housing below the 50th percentile of their respective cities. Of these gentrifiable neighborhoods, 6,842 experienced during the observation period an increase in real housing prices and an influx of White college-educated residents that exceeded the growth of White college-educated residents in the city overall, corresponding to a rate of gentrification of roughly 30% across the analytic sample.

Overall, disinvested neighborhoods at baseline were generally worse off, socioeconomically, than metro neighborhoods. For example, poverty rates in disinvested neighborhoods were 8 percentage points higher, shares of adults who did not complete high school were 9 percentage points higher, and unemployment rates were 3 percentage points higher. Gentrifiable neighborhoods also had substantially more Black residents than the average metropolitan neighborhood nationwide. When comparing gentrifiable neighborhoods to those neighborhoods that subsequently underwent gentrification, several differences were apparent. First, neighborhoods that gentrified were generally more socioeconomically advantaged than disinvested neighborhoods more generally. For instance, relative to gentrifiable neighborhoods, neighborhoods that gentrified had at baseline higher housing prices, higher median incomes, fewer shares of single-parent households, more college-educated residents, and fewer Black residents. With respect to the key independent variable, note although 31% of metro neighborhoods during the observation period experienced a school closure nearby, substantially more neighborhoods in disinvested areas did. In particular, 47% of gentrifiable neighborhoods experienced a school closure nearby, a figure that was similar for the subset of these neighborhoods that went on to experience gentrification.

Analytic Strategy

To assess whether school closures moderate the relation between neighborhood racial composition and gentrification, this study estimates a linear probability model that takes the following form:

$$y_{nt} = \beta_0 + \beta_1 SchoolClosure_n + \beta_2 PercentBlack_n + \beta_3 (SchoolClosure_n \times PercentBlack_n) + \eta Z + \theta Z_{t-1} + \lambda + \varepsilon$$

where y_{nt} represents a binary indicator of whether neighborhood n at time t underwent gentrification. $SchoolClosure_n$ takes the value of 1 if neighborhood n experienced between 2000 and 2012 a school closure within 1-mile and is 0 otherwise. $PercentBlack_n$ is a measure of the share of neighborhood residents who are Black. Z is a vector of neighborhood and district characteristics measured at baseline. As noted in the previous section, to ensure that the moderating role of school closure is not confounded by growth in school choice options more generally, Z also includes interactions between charter and magnet school growth, respectively, and baseline shares of Black residents. Z_{t-1} is a vector of neighborhood characteristics that capture pre-baseline trends in neighborhood conditions between 1990 and 2000 for each baseline neighborhood characteristic. λ is a vector of city fixed effects to account for any unobserved city-level variation in housing or urban redevelopment policies. Finally, ε is a heteroskedastic robust error term clustered at the city level.

To test whether the weak or strong version of place stratification theory best explains the relation between gentrification, school closures, and neighborhood racial composition, the relation between school closures and gentrification is allowed to vary by the share of neighborhood residents who are Black. This is accomplished by estimating a two-way interaction between school closure and the share of neighborhood residents who are Black. A significant, positive interaction term would provide evidence in favor of weak version of place stratification theory in that the adverse effect of neighborhood racial composition on the likelihood that neighborhoods experience gentrification

becomes less negative when the neighborhood experiences a school closure. A non-significant interaction term would provide evidence in favor of strong place stratification theory in that the adverse effect of neighborhood racial composition on the likelihood that a neighborhood experiences gentrification is invariant to whether the neighborhood experiences a school closure in the intervening years.

Results

Table 2 presents results from OLS estimates predicting the likelihood of gentrification across neighborhood racial composition. Column 1 presents unadjusted estimates. Column 2 adds controls for baseline neighborhood characteristics. Column 3 adds controls for baseline district characteristics. Column 4 adds controls for pre-baseline trends in neighborhood conditions. Column 5 adds city fixed effects. Overall, this study finds that school closures increase the likelihood that Black neighborhoods experience gentrification.

Consider first the coefficient for the share of Black residents in the unadjusted model, which equaled -0.263 ($p < .001$). This means that the likelihood of gentrification in neighborhoods where nearby schools remained open was 26 percentage points lower in neighborhoods in which all residents were Black compared to neighborhoods in which no resident was Black ($p < .001$). This negative association between shares of Black residents and the likelihood of gentrification in the absence of a local school closure was observed across all model specifications. This pattern aligns with prior literature and theoretical predictions that Black neighborhoods are less likely than neighborhoods with few Black residents to experience gentrification. Of prime interest in this study, however, was whether school closures changed the likelihood that Black neighborhoods experienced gentrification.

The coefficient for the interaction term in Columns 1 through 5 indicates that the negative relation between gentrification and shares of Black residents diminished when a nearby school

closed. For instance, the unadjusted model indicates that the negative relation between shares of Black residents and gentrification diminished by 9.3 percentage points when a local school closed. The magnitude of this moderated effect was generally stable across model specifications, even after accounting for a robust set of potential confounding factors, including baseline differences in neighborhood characteristics, pre-baseline trends, and unobserved time-invariant differences across cities.

To illustrate these findings graphically and to provide some intuition for what the significant interaction term means in practice, Figure 1 plots the probability of gentrification (based on the fully adjusted model) across shares of Black residents for neighborhoods that did and did not experience a school closure during the observation period. The solid line corresponds to the probability of gentrification for neighborhoods that did not experience a school closure nearby. The dotted line corresponds to the probability of gentrification for neighborhoods that did experience a school closure nearby. A flat horizontal line would indicate no relation between neighborhood racial composition and gentrification.

As illustrated in Figure 1, the slope of the dotted line, relative to the solid line, attenuates toward zero, which indicates a shift to a more race-neutral gentrification process in which White gentrifiers' aversion for Black neighborhoods was less pronounced when a local school closed. When local schools remained open, the probability of gentrification in the most racially segregated Black neighborhoods—those in which all residents were Black—was around 18%. In contrast, when a local school closed, these same neighborhoods experienced gentrification 27% of the time, an increase of 50%. This increase was significant at the $p < .001$ level. Conversely, as suggested by the overlap between the dotted and solid lines toward the left side of the figure, no evidence is found that school closures affected the likelihood that neighborhoods containing few Black residents

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experienced gentrification. In other words, the unique role that school closures played in the gentrification process was distinct to predominately Black urban neighborhoods.

Moreover, the nature of gentrification that school closures brought about in disinvested Black neighborhoods was also associated with the displacement of Black residents. Table 3 reports results from unadjusted and adjusted regressions of changes in the number of Black residents between 2000 and 2012 on school closures, shares of Black residents at baseline, and the interaction between them. Black neighborhoods in general experienced decreases in the number of Black residents during the observation period, suggesting a general outmigration of Black residents from urban neighborhoods between 2000 and 2012; however, this decline was strongest for urban neighborhoods that experienced a school closure nearby. In particular, the most racially segregated Black neighborhoods that experienced a school closure nearby saw an additional 213 Black residents ($p < .001$) leave the neighborhood during the observation period, beyond the general decline in the number of Black residents observed between 2000 and 2012.

Sensitivity Checks

Figure 2 reports results from a series robustness checks. The point estimates in Models 1 through 8 refer to the coefficient for the interaction term between school closure and shares of Black residents. The whiskers refer to 95% confidence intervals. For comparison, Model 1 reports results from the primary analysis. Models 2 and 3 show that substantive conclusions about the moderating effects of school closures on neighborhood racial composition remain the same if the definition of school closures is expanded beyond traditional neighborhood schools to include charter and magnet schools. Model 4 shows that the estimated effect of school closures on the likelihood that Black neighborhoods experience gentrification is restricted to a White-racialized version of gentrification. In particular, when measuring gentrification in SES- rather than racial terms—as an increase in college-educated households of any color—there is no evidence that school

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closures moderate the relation between gentrification and shares of Black residents. In other words, affluent White households are the ones for whom school closures in Black neighborhoods signal a green light for gentrification.

Model 5 shows that substantive conclusions were similar if the analysis was restricted to neighborhoods in the 150 largest metro areas in the United States. Column 6 shows that substantive conclusions were consistent if standard errors were clustered at the metro level as opposed to the school district level. Notably, Column 7 provides no evidence that school closures affect the likelihood of gentrification in predominately Black neighborhoods when using a more stringent threshold of baseline neighborhood disinvestment based on falling below the 40th as opposed to the 50th percentile of their respective city in terms of median incomes and shares of recently constructed housing at baseline. This suggests that school closures have little bearing on the gentrification of the most disadvantaged Black neighborhoods.

Model 8 reports results from a falsification test that assesses the likelihood of reverse causality (i.e., that gentrification causes school closures rather than school closures causing gentrification). In particular, Model 8 reports results from a model that changes the dependent variable from an indicator of whether gentrification occurred between 2000 and 2012 to an indicator of whether gentrification occurred between 1990 and 2000, the ten years prior to baseline. A significant, positive interaction between school closures and shares of Black neighborhood residents in this model would indicate that school closures in majority Black neighborhoods were more likely to occur if the neighborhood had already experienced initial waves gentrification prior to baseline. As indicated by Model 8, however, the falsification test provides no evidence of reverse causality. In fact, the negative coefficient for the interaction term suggests that predominately Black neighborhoods were actually less likely to experience a school closure if the neighborhood

experienced earlier waves of gentrification, further minimizing concerns about the causal directionality assumed in this study.

Finally, Table A.1 in the Appendix shows that substantive conclusions remain the same if probit or logit regression is used in the place of a linear probability model, and Table A.2, which varies the buffer zone used to determine whether a school closure was “nearby” a disinvested neighborhood (the primary analysis used a 1-mile buffer zone), shows that school closures moderated the relation between racial stratification and gentrification so long as the closure occurred within 2 miles of a neighborhood, beyond which the estimated effect becomes unstable and fails to reach conventional significance thresholds.

Discussion

School closures remain one of the most controversial and politically fraught issues in urban school reform today. Part of the reason for this controversy stems from the reality that little is actually known about the impacts of school closure. The few quantitative studies to date that have examined school closures have focused on student-level impacts and have arrived at mixed conclusions (Brummet, 2014; Carlson & Lavertu, 2016; Kirshner, Gaertner, & Pozzoboni, 2010; Steinberg & MacDonald, 2019). However, there is far less quantitative evidence on the effects of school closures on nearby communities, even though qualitative scholars and popular media outlets alike have long raised concerns about the potential destabilizing effects of school closures on nearby neighborhoods (Deeds & Pattillo, 2015; Ewing, 2018).

The current study sheds light on the impacts of school closures on communities by examining whether prevailing patterns of residential stratification in U.S. cities depend on whether local schools are closed. In particular, this study set out to examine whether school closures increase the likelihood that White gentrifiers move into disinvested Black urban neighborhoods. Overall, this study found evidence that school closures do indeed impact residential stratification: the negative

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relation between gentrification and the share of neighborhood residents who are Black depended on whether a local school closed. In particular, school closures increased the likelihood that the most segregated Black neighborhoods experienced gentrification by nine percentage points—more than a 50% increase over their baseline rate of gentrification. This finding provides support for a weak version of place stratification theory that holds that prevailing patterns of residential sorting in urban areas are governed by a racial hierarchy that attenuates somewhat after a local school is closed.

This study also found evidence that the nature of gentrification that school closures brought about in Black neighborhoods was also associated with a decline of roughly 200 Black residents. Although prior literature on the extent to which gentrification causes displacement is mixed—owing, in large part, to the fact that neighborhoods are more dynamic and residential instability is far more common than is typically assumed—the most rigorous evidence to date indicates that gentrification increases residential instability and that this increased instability is felt most strongly by renters, economically-disadvantaged residents, and households of color (Zuk, Bierbaum, Chapple, Gorska, & Loukaitou-Sideris, 2018). The findings from the current study align with this literature, documenting that the residential stability of Black households is highly sensitive to school closures and the socioeconomic changes school closures bring about in nearby communities.

While there is a lack of agreement about the full-range of benefits and challenges associated with school closures, scholars do appear to agree that the students most likely to have their schools closed are those who are low-income and Black (Billger, 2010; Brummet, 2014; Ewing, 2018; Lipman & Haines, 2007; Sunderman, Coghlan, & Mintrop, 2017; Ticken & Auldridge-Reveles, 2019). In an age where school districts are writing statements and promising policy in “defense of Black lives,” consideration must be made as to how educational policies are contributing to the further perpetuation of the disintegration of Black communities (Shange, 2019). This study suggests that a closed school equates to a greater number of lost neighbors, and lost and new neighbors can

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lead to the dispersal of friends and families, as well as the fragmentation of important interdependent social groups (Gibbons, Barton, & Reling, 2020). If it takes a village to raise a child, educational policymakers, stakeholders, and officials should question what responsibility they bear if the decisions they make render that village no more.

As calls for accountability in the face of “failing” schools continue, districts would do well to consider from where those appeals emerge and whether those appeals are top-down, not just administratively, but with respect to existing power structures that be (e.g., racial, political, social, economic). Importantly, Deeds and Pattillo (2015) noted that failure is “an interpretative process” that may not be identically framed or understood by all involved parties. Simply put, a school closure may make a neighborhood more appealing to affluent White households by improving perceptions of school quality but be received by Black community members as “punishment, erased local histories, and disrupt[ion of] their valued connection to the school” (p. 497). Indeed, a number of qualitative researchers have raised concerns about the impacts of school closure on the well-being of students and, notably, the impacts of school closures on the vitality of urban communities (see, Briscoe & Khalifa, 2015; Deeds & Pattillo, 2015; Green, 2017). Stakeholders who attempt to dismantle structural barriers to educational opportunities in urban areas through the apparatus of school closure by supplanting the desires of those indigenous to the local community may be at risk of doing more harm than good, specifically to urban Black neighborhoods and their expressed needs for the preservation of their communities and, most specifically, their children (see McKittrick, 2014).

Limitations

Despite providing the first quantitative evidence of the impact of school closures on patterns of gentrification, this study is not without several limitations. First, this study focused on population-average effects. Therefore, it remains possible that the observed effects of school closures on

patterns of gentrification were more pronounced in some cities and less pronounced in others. Second, this study was unable to distinguish between types of school closures. Therefore, it is possible that the effects of school closure on gentrification may differ depending on whether the closure occurred for performance reasons, fiscal considerations, or competitive pressures. Future research with more refined data about the source of school closures will be needed to parse out this issue. Third, the temporal scale of this study pertained to roughly the first decade in the twenty-first century. Although this time frame aligns with much empirical research on gentrification and urban schooling at present, future research will need to examine whether the observed effects noted in this study pertain to earlier or more recent periods.

Conclusion

Despite these limitations, this study advances research on urban inequality by providing estimates of the effects of school closures on patterns of gentrification. Based on national data, this study finds that school closures in urban areas cause nearby Black neighborhoods to gentrify and that this gentrification is associated with declines in the number of Black residents in these neighborhoods. Ultimately, these findings indicate that school closures do not simply change the educational landscape. School closures also have consequences for the future of urban Black neighborhoods. Consequently, researchers should continue to explore how educational policies – particularly school dissolution – embolden community change that is predicated on the further dispossession of Black communities. Indeed, these findings suggest that school closures, as an educational reform strategy, are emblematic of a larger spatial and racial reimagining of U.S. cities (see Addie & Fraser, 2019), fueled through gentrification and related shifts in local governance, that dispossess and displaces Black neighborhoods.

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TABLE 1: MEANS AND STANDARD DEVIATIONS OF SELECT VARIABLES, METROPOLITAN STATISTICAL AREAS

	All Metro Neighborhoods	Disinvested Neighborhoods	Gentrifying Neighborhoods
<u>Baseline Neighborhood Characteristics (2000)</u>			
Total Residents	3,894 (1,935)	3,726 (1,514)	3,629 (1,529)
Median Income	11.08 (0.42)	10.76 (0.30)	10.80 (0.30)
Poverty Rate	0.12 (0.11)	0.20 (0.11)	0.19 (0.11)
% Residents w/Gov't Aid	0.08 (0.07)	0.13 (0.08)	0.11 (0.07)
% White Bachelor's Degree	0.21 (0.16)	0.11 (0.09)	0.13 (0.10)
% Adult Residents w/o H.S. Deg.	0.20 (0.14)	0.29 (0.14)	0.28 (0.14)
Unemployment Rate	0.06 (0.05)	0.09 (0.06)	0.08 (0.05)
% Female-headed HH	0.24 (0.15)	0.34 (0.16)	0.31 (0.15)
% Black Residents	0.14 (0.23)	0.24 (0.31)	0.18 (0.25)
% White Residents	0.69 (0.30)	0.55 (0.33)	0.58 (0.32)
% Latinx Nhood	0.20 (0.40)	0.30 (0.46)	0.34 (0.47)
log(Housing Price)	11.97 (0.61)	11.61 (0.54)	11.73 (0.57)
<u>District Characteristics (2000)</u>			
% Non-White Students	9.77 (1.77)	9.95 (1.91)	10.01 (2.02)
Per-Pupil Expenditures	10,865 (2,824)	10,852 (2,663)	10,952 (2,981)
Between-School Segregation	0.12 (0.17)	0.15 (0.19)	0.15 (0.20)
Charter Expansion, 2000-12	0.27 (0.45)	0.30 (0.46)	0.33 (0.47)
Magnet Expansion, 2000-12	0.25 (0.43)	0.29 (0.45)	0.28 (0.45)
<u>Nearby Schools</u>			
School Closure	0.30 (0.46)	0.46 (0.50)	0.43 (0.49)
n=	66,624	22,594	6,603

Note: The first column refers to neighborhood located in metropolitan statistical areas. The second column refers to disinvested urban neighborhoods, defined as neighborhoods that had, at in the year 2000, a household median income and a share of recently constructed housing that was below the 50th percentile of their respective city. The third column refers to neighborhoods that met criteria for disinvestment at baseline but subsequently underwent, between 2000 and 2012, an increase in real property values, and an increase in the share of college-educated White households that exceeded the growth in college-educated households in the city overall. Estimates based on first imputed dataset. Standard deviations are in parenthesis.

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TABLE 2: OLS REGRESSIONS OF NEIGHBORHOOD GENTRIFICATION ON LOCAL SCHOOL CLOSURES

	Unadjusted (1)	(1)+Nhood Controls (2)	(2)+District Controls (3)	(3)+Pre-Baseline Trends (4)	(4)+City FEs (5)
School Closures	-0.030 (0.018)	-0.034* (0.016)	-0.036* (0.016)	-0.031* (0.016)	-0.013 (0.016)
% Black Residents	-0.263*** (0.032)	-0.168*** (0.046)	-0.217*** (0.056)	-0.189*** (0.050)	-0.159** (0.052)
Closure x % Black	0.093* (0.047)	0.101* (0.042)	0.080* (0.035)	0.068* (0.033)	0.089* (0.036)
% White Residents		-0.076 (0.065)	0.013 (0.079)	0.032 (0.069)	0.163* (0.068)
Latinx Nhood		0.018 (0.022)	0.018 (0.022)	0.035 (0.020)	0.041* (0.017)
% Owner Occupied		0.049 (0.045)	0.048 (0.048)	-0.036 (0.047)	0.006 (0.047)
Proportion of Children <18		-0.316** (0.112)	-0.312** (0.101)	-0.065 (0.111)	-0.153 (0.124)
% Female-headed HH		-0.019 (0.053)	-0.016 (0.046)	-0.063 (0.058)	0.070 (0.055)
Unemployment Rate		-0.266** (0.098)	-0.319** (0.097)	-0.888*** (0.150)	-0.479*** (0.136)
Poverty Rate		0.088 (0.099)	0.093 (0.097)	0.231* (0.106)	0.089 (0.106)
% Govn't Assistance		-0.169 (0.121)	-0.183 (0.114)	-0.312* (0.151)	-0.294** (0.114)
# Nhood Residents		-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
% W/O H.S. Degree		0.466*** (0.079)	0.457*** (0.077)	0.353*** (0.085)	0.419*** (0.101)
Log(Median Income)		0.045 (0.048)	0.017 (0.043)	-0.093 (0.062)	-0.045 (0.051)
Log(Housing Price)		0.066*** (0.019)	0.065** (0.021)	0.120*** (0.025)	0.093*** (0.026)
Log(Median Rent)		-0.057* (0.029)	-0.059* (0.028)	-0.054 (0.039)	-0.087* (0.034)
% White Bachelor's Degree		0.797*** (0.109)	0.739*** (0.108)	0.570*** (0.100)	0.358*** (0.097)
Principal City		0.008 (0.013)	0.008 (0.013)	0.017 (0.012)	0.030* (0.012)
# of Nearby Schools		0.002 (0.001)	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)
Crime Rates Per 10,000 Residents		0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
District Characteristics			X	X	X
Pre-Baseline Trends				X	X
City fixed effects					X
Observations	20,423	20,423	20,423	20,423	20,423

Note: Sample is restricted to neighborhoods classified as disinvested at baseline (i.e., those neighborhoods that had, at baseline, median household incomes and shares of recently constructed housing that were below the 50th percentile of its respective city). Neighborhoods were classified as gentrified if they experienced during the observation period a percentage increase in white college-educated residents that exceeded the growth of white college-education persons in the city overall, and an increase in real housing prices. Pre-baseline trends in neighborhood characteristics were measured as the difference in each neighborhood characteristic measured at baseline at its corresponding value during the 1990 Census. School district controls were measured in 2000 and include total number of students, total number of schools, annual expenditures per student, percentage of children receiving free-and-reduced-price lunch, the proportion of district students who were non-white, between-school racial segregation, the share of district schools that were charters and magnets, respectively, whether the district experienced growth during the observation period in its concentration of charter and magnet schools, respectively, and an interaction between charter and magnet growth, respectively, and the share of neighborhood residents who were Black. Estimates are based on 25 multiply imputed datasets, combined based on Rubin's Rules for MI inference. Standard errors are in parenthesis and are clustered at the school district level. *p<.05, **p<.01, ***p<.001 for two-tailed tests of significance.

TABLE 3: ESTIMATED EFFECT OF SCHOOL CLOSURES ON CHANGES IN THE NUMBER OF BLACK RESIDENTS

	<u>Δ Black Residents</u>	
	Unadjusted (1)	Adjusted (2)
School Closures	23.1* (11.7)	46.9*** (9.9)
% Black Residents	-374.5*** (49.2)	-610.7*** (78.5)
Closure * % Black	-333.4*** (68.3)	-213.0*** (47.5)
Nhood Characteristics		X
District Characteristics		X
Pre-Baseline Trends		X
City fixed effects		X
Observations	20,423	20,423

Note: Estimates based on ordinary least squares regressions in which the dependent variable is the change in the number of Black or White residents, respectively. Sample is restricted to neighborhoods classified as disinvested at baseline (i.e., those neighborhoods that had, at baseline, median household incomes and shares of recently constructed housing that were below the 50th percentile of its respective city). Neighborhoods were classified as gentrified if they experienced during the observation period a percentage increase in white college-educated residents that exceeded the growth of white college-education persons in the city overall, and an increase in real housing prices. Estimates are based on 25 multiply imputed datasets, combined based on Rubin's Rules for MI inference Standard errors are in parenthesis and are clustered at the school district level. * $p < .05$, ** $p < .01$, *** $p < .001$ for two-tailed tests of significance.

FIGURE 1: LIKELIHOOD OF GENTRIFICATION ACROSS SHARES OF BLACK RESIDENTS FOR NEIGHBORHOODS THAT DID AND DID NOT EXPERIENCE A SCHOOL CLOSURE NEARBY

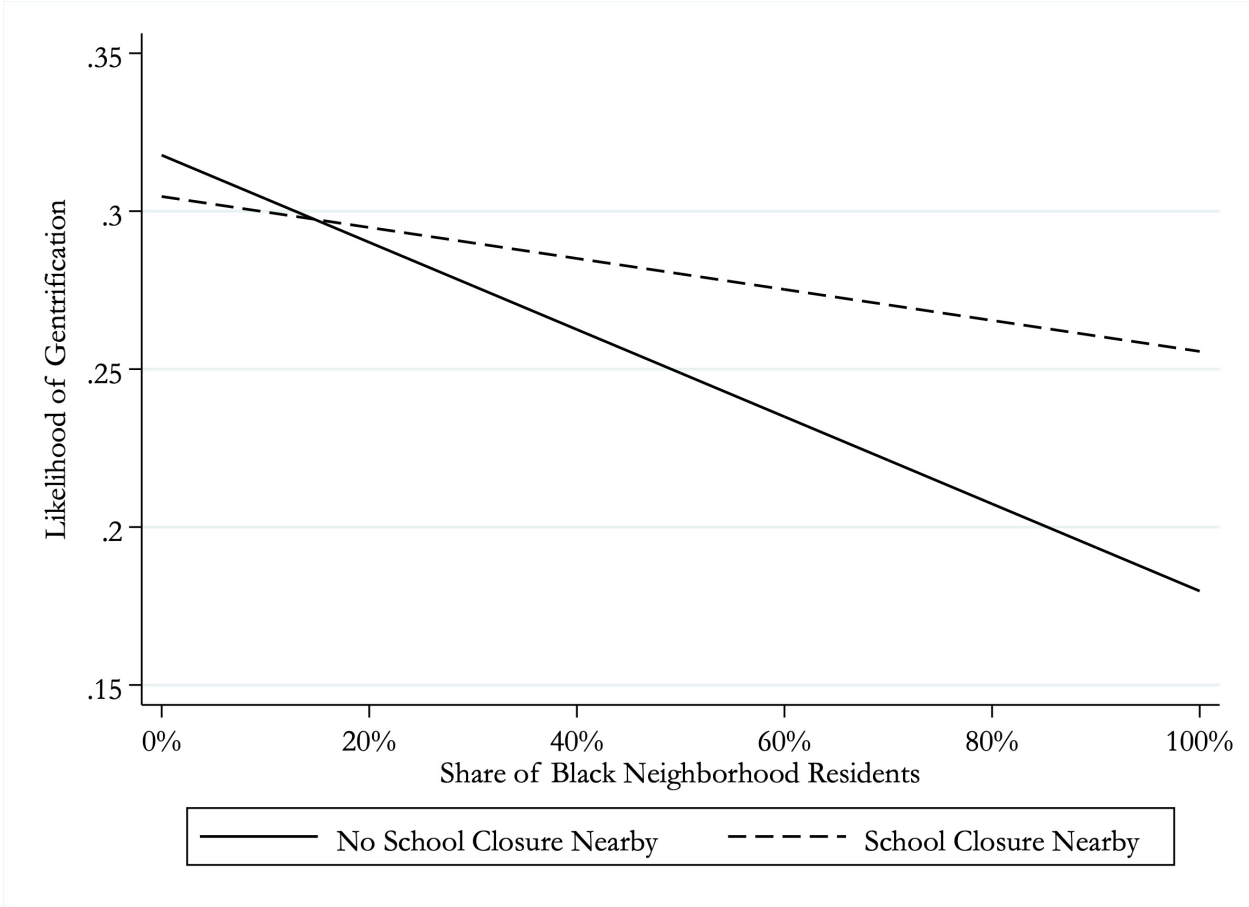
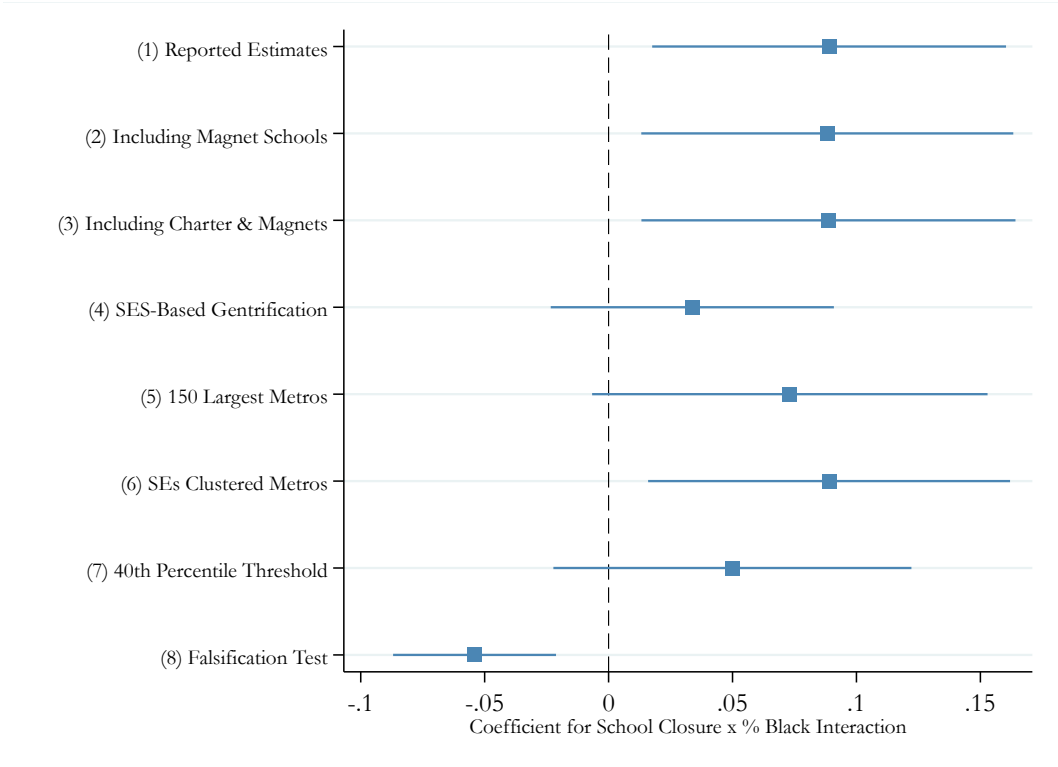


FIGURE 2: ROBUSTNESS CHECKS ON THE ESTIMATED EFFECT OF SCHOOL CLOSURES ON GENTRIFICATION



Note: Model 1 reports results from the primary analysis in which school closures were restricted to those happening to traditional neighborhood schools and gentrification was defined as disinvested neighborhoods that experienced a percentage increase in white college-educated residents that exceeded the growth of white college-education persons in the city overall, and an increase in real housing prices. Model 2 includes in the sample of school closures magnet schools. Model 3 includes in the sample of school closures magnet and charter schools. Model 4 changes the operationalization of gentrification from racialized gentrification, where gentrifiers are affluent and White, to an SES-based measure of gentrification, where gentrifiers are affluent households of any color. In particular, the stipulation in the definition of gentrification referring to an increase in college-educated White households was replaced with a stipulation referring to an increase in college-educated households of any color. Model 5 restricts the analysis to the 150 largest MSAs. Model 6 clusters standard errors at the MSA level as opposed to the school district level. Model 7 reports results in which the threshold used to determine whether a neighborhood was disinvested at baseline in terms of its median income level and share of recently constructed housing was “raised” from the 50th to the 40th percentile. Model 8 reports results from a falsification test that assesses the likelihood of reverse causality by changing the dependent variable from an indicator of whether gentrification occurred between 2000 and 2012 (the observation period) to an indicator of whether gentrification occurred between 1990 and 2000 (the pre-baseline period). All models are fully adjusted. Estimates are based on 25 multiply imputed datasets, combined based on Rubin’s Rules for MI inference. Standard errors are clustered at the school district level unless otherwise noted. Whiskers refer to 95% confidence intervals for two-tailed tests of significance.

APPENDIX

TABLE A.1: PROBIT AND LOGISTIC REGRESSION OF GENTRIFICATION ON SCHOOL CLOSURES AND NEIGHBORHOOD RACIAL COMPOSITION

	Probit Regression (1)	Logistic Regression (2)
School Closures	-0.031 (0.050)	0.951 (0.081)
% Black Residents	-0.723*** (0.182)	0.267*** (0.085)
Closure x %Black	0.303* (0.135)	1.691* (0.396)
Nhood Characteristics	X	X
District Characteristics	X	X
Pre-Baseline Trends	X	X
City fixed effects	X	X

Note: Sample is restricted to neighborhoods classified as disinvested at baseline (i.e., those neighborhoods that had, at baseline, median household incomes and shares of recently constructed housing that were below the 50th percentile of its respective city). Neighborhoods were classified as gentrified if they experienced during the observation period a percentage increase in white college-educated residents that exceeded the growth of white college-education persons in the city overall, and an increase in real housing prices. Logistic regression results are reported as odds ratios. Estimates are based on 25 multiply imputed datasets, combined based on Rubin's Rules for MI inference. Standard errors are in parenthesis and are clustered at the school district level. * $p < .05$, ** $p < .01$, *** $p < .001$ for two-tailed tests of significance.

TABLE A.2: ESTIMATED EFFECT OF SCHOOL CLOSURES ON NEIGHBORHOOD GENTRIFICATION ACROSS VARYING PROXIMITIES TO SCHOOL CLOSURE

	< 1 mile	< 1.5 miles	< 2 miles	< 2.5 miles
School Closures	-0.01 (0.02)	-0.00 (0.02)	0.00 (0.01)	0.00 (0.01)
% Black Residents	-0.16** (0.05)	-0.15** (0.05)	-0.13* (0.06)	-0.11 (0.06)
Closure x %Black	0.09* (0.04)	0.06* (0.03)	0.03 (0.03)	0.00 (0.03)
Nhood Characteristics	X	X	X	X
District Characteristics	X	X	X	X
Pre-Baseline Trends	X	X	X	X
City fixed effects	X	X	X	X
Observations	20,423	20,423	20,423	20,423

Note: Estimates based on ordinary least squares regressions in which the dependent variable is the change in the number of Black or White residents, respectively. Sample is restricted to neighborhoods classified as disinvested at baseline (i.e., those neighborhoods that had, at baseline, median household incomes and shares of recently constructed housing that were below the 50th percentile of its respective city). Neighborhoods were classified as gentrified if they experienced during the observation period a percentage increase in white college-educated residents that exceeded the growth of white college-education persons in the city overall, and an increase in real housing prices. Estimates are based on 25 multiply imputed datasets, combined based on Rubin's Rules for MI inference. Standard errors are in parenthesis and are clustered at the school district level. * $p < .05$, ** $p < .01$, *** $p < .001$ for two-tailed tests of significance.