

Segregated Neighborhoods, Segregated Schools: Do Charters Break a Stubborn Link?

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ABSTRACT Residential and school segregation have historically mirrored each other, with school segregation seen as simply reflecting residential patterns given neighborhood-based school assignment policy. We argue that the relationship is circular, such that school options also influence residential outcomes. We hypothesize that the expansion of charter schools could simultaneously lead to an increase in school segregation and a decrease in residential segregation. We examine what happens when neighborhood and school options are decoupled via public school choice in the form of charter schools using data from the census and the Common Core of Data on a national sample of more than 1,500 metropolitan districts. We find that Black-White school segregation increased and residential segregation declined in response to increases in the charter enrollment share from 2000 to 2010. In districts with charter schools, the average increase in the charter enrollment share corresponded to a 12% increase in school segregation and 2% decline in residential segregation. We find no relationship between charter school expansion and school segregation between White and Hispanic students, perhaps because Hispanic students attend more racially diverse charters than White or Black students. White-Hispanic residential segregation declined as charter enrollment increased. Our results demonstrate that educational policy is consequential for both school and neighborhood population processes. When these two contexts are decoupled via public school choice, school and neighborhood segregation patterns move in opposite directions, rather than mirroring each other. Our findings also provide a cautionary lesson for unfettered expansion of choice without integration imperatives.

KEYWORDS Segregation • Education • Race • Charter schools • School choice

Introduction

School districts in the United States are charged with providing equal opportunity to their whole student population, but they must do so in a context where individual families are compelled to maximize advantages for their children. This tension between the public versus private goals of schooling is particularly difficult to resolve in a setting where district populations are spatially segregated, dynamic, and responsive to changing policies (Labaree 1997; Levin 2007). Efforts to equal-

ize opportunity that involve a redistributive policy—for instance, moving resources toward disadvantaged students or reshuffling students across schools—may induce unintended changes in residential migration and segregation patterns if families move in and out of districts or school attendance zones in response to educational policies.

In the past quarter century, market-oriented school choice has emerged as a popular educational reform based on the premise that the goals of public schooling may be accomplished more efficiently through competition and parent choice, rather than through the redistribution of students or resources (Berends 2015). Empowering families to openly sort into schools according to their unique preferences, so this theory goes, requires schools to compete for enrollment and, in turn, compels them to innovate instruction and improve outcomes. What makes school choice so alluring is that it does not ask advantaged families to give up anything, instead leveraging the power of market competition to produce educational improvement (Le Grand 2007).

The alluring promise of unleashed choice in an educational marketplace may lead policymakers to overlook its potential to exacerbate segregation. Expanded school choice has already increased school segregation in some districts (e.g., Bifulco et al. 2009), but little research has examined this phenomenon nationally (for an exception, see Monarrez et al. 2019). Moreover, school choice breaks the link between neighborhood residence and school assignment by opening up alternatives to traditional, residentially zoned public schools. This feature allows parents from any neighborhood within a school district to enroll their children, provided that there are open seats (Riel et al. 2018). By unbundling residential and school selection, the expansion of school choice could therefore affect patterns of residential choice and segregation, in addition to school segregation.¹

In this study, we evaluate how expanding school choice affected population dynamics in neighborhoods and schools nationwide. We focus on the rise of charter schools in metropolitan areas. As publicly funded but independently operating “educational laboratories,” charter schools were originally conceived as local alternatives for communities frustrated by underperforming schools (Stulberg 2008). Amid a wave of bipartisan support (Bush 2002; Obama 2008), charters grew fourfold during the 2000s as a prominent form of public school choice (Logan and Burdick-Will 2016; Whitehurst 2017). We evaluate how the increase in charter school enrollment between 2000 and 2010 *simultaneously* affected school and neighborhood racial segregation within districts. This approach considers neighborhood and school segregation as contingent, reinforcing processes. We find evidence that charters increased average school segregation within school districts nationwide, supporting a cautionary view of continued charter school expansion. Simultaneously, charter expansion reduced residential segregation. These findings reveal school preferences as a social force impacting population processes beyond the domain of education. We conclude by discussing the complexity of policy choices that could promote neighborhood and school integration in the charter school era.

¹ Some have argued that school choice could promote social integration in schools (Garnett and Garnett 2000; Ryan 2010). The bulk of the research described here, however, does not support this conclusion.

Background

The Changing Link Between Neighborhoods and Schools

School segregation has a long tradition in the United States, although the mechanisms that produced it have changed (Reardon and Owens 2014). In the first half of the twentieth century, many school districts enacted policies that explicitly assigned children to schools by race, a system of de jure segregation that violated the Equal Protection Clause and was outlawed by the U.S. Supreme Court in 1954 (Rosenberg 1991). Following the *Brown v. Board of Education* (1954) decision, districts that had intentionally created racially separate schools were slow to affirmatively desegregate, citing the difficulty of addressing de facto school segregation—the downstream consequence of neighborhood segregation. The narrow focus on school assignment policy failed to address that there was nothing de facto about neighborhood segregation, which resulted from centuries of racialized land use, zoning, and economic policies whose effects endured well after civil rights legislation outlawed explicit housing discrimination (Krysan and Crowder 2017; Massey and Denton 1993). In later decisions, the Supreme Court clarified that school districts, as state actors, were responsible for racially balancing schools even if they had not originally written the housing policies producing residential segregation (*Keyes v. School District No. 1, Denver, Colorado*; *Swann v. Charlotte-Mecklenburg Board of Education*).

Desegregation plans—including bussing, magnet schools, and freedom of choice—subsequently swept through school districts across the country, in both the North and the South (Rossell and Armor 1996), peaking in the early 1980s and gradually expiring or ending by court dismissal (Reardon et al. 2012). Many lessons can be drawn from the era of mandated school desegregation, including its dramatic effect on reducing school segregation (Reber 2005; Rosenberg 1991); narrowing Black-White inequality (Johnson 2019); and, as an unintended consequence, worsening residential segregation between school districts due to White families' out-migration to predominantly White school districts beyond the reach of single-district desegregation plans (Clotfelter 2004a; Logan et al. 2017). Perhaps a simpler lesson comes from the observation that school districts had to go to great lengths—often at odds with their own constituents—to offset the mechanical link between housing and school segregation.

School desegregation plans have waned in recent decades, but many of the underlying problems they sought to address remain. School and residential segregation continue to correlate, and segregation in both contexts remains high, changing little in the last 25 years (Fiel and Zhang 2017; Logan and Stults 2011; Stroub and Richards 2013). More than three-quarters of children attend their local traditional public school (TPS), assigned by residential zoning maps within each school district (Snyder et al. 2018). These assignment policies effectively bundle residential and school choice, so that when a family moves to a neighborhood, they simultaneously choose a school (intentionally or not).

Although still the norm across the United States, the bundling of residence and schooling has changed in recent decades: the rise of public school choice provides alternatives to the neighborhood school in the form of magnet schools, charter schools, open enrollment, and other choice-based student assignment policies

(Whitehurst 2017). These changes potentially alter parents' residential and school decision-making calculus by decoupling these choices. Just as housing policies that created neighborhood segregation ultimately also had consequences for school segregation, educational policies may have implications for both school and neighborhood segregation.

We hypothesize that charter school expansion may particularly influence neighborhood and school segregation patterns by weakening the neighborhood-school link. Understanding the effect of charter schools on segregation is critical because these schools have become an increasingly popular educational reform, championed by policymakers and promoted by think tanks as a solution to school underperformance (EdChoice 2019; U.S. Department of Education 2019). Since 2000, the share of students attending charters more than quadrupled, surpassing magnet school enrollment, and is on pace to continue growing. Although only 6,885 charter schools served 5.8% of students nationally in 2015–2016 (McFarland et al. 2018), this rate was higher in many large urban districts, and charters' growth and popularity suggest that they will increasingly influence the structure of schooling in the United States. Unlike other forms of school choice, such as magnet schools, charters rarely have strong integration imperatives (Goldring and Smrekar 2000; Potter and Quick 2018; Riel et al. 2018). Therefore, this educational policy change may have repercussions for both school and residential population processes.

Charter Expansion and School Segregation

The growth of charter schools has led to an increase in public school segmentation by race in many large districts, mostly among White and Black students (Frankenberg et al. 2011; Garcia 2008). Some school districts now have essentially separate White and Black charter schools, reminiscent of older eras of *de jure* school segregation. The difference now is that the pattern comes from enrollment uptake in different schools rather than racially explicit district policy (Frankenberg and Lee 2003; Frankenberg et al. 2011; Garcia 2008; Ladd et al. 2017).

In a school enrollment system governed by market sorting rather than by district assignment rules, segregation may reflect family preferences for schools composed of predominantly same-race peers. It is difficult to definitively isolate racial preferences from factors correlated with race (so-called racial proxies) (Harris 1999; Krysan 2002), although Billingham and Hunt (2016) showed that White parents prefer fewer Black students in their children's school regardless of school test performance and resources. And even when parents espouse academic priorities, many choose charters of similar or lower quality than their TPS (Stein et al. 2011). Surveys and experiments evaluating school search processes reveal that White parents often start with school racial composition as a shorthand heuristic device (Saporito and Lareau 1999; Schneider and Buckley 2003) before weighing other educational characteristics. Perhaps this search behavior explains why White children disproportionately enroll in choice schools when their neighborhoods (and assigned local schools) have sizable Black and Hispanic populations (Bischoff and Tach 2018, 2020; Candipan 2019, 2020; Saporito 2003; Saporito and Sohoni 2007). The uniquely racialized school selection behavior of White families has thus raised

concerns that charter schools facilitate White flight from TPSs (Bifulco et al. 2009; Frankenberg et al. 2011; Renzulli and Evans 2005).

In addition to White families' avoidance of non-White schools, other social forces may contribute to the racial segmentation of charters. In the 1990s, charter schools opened in racially segregated Black and Hispanic neighborhoods of large cities. Many families were attracted to the alternative charters provided to historically underresourced TPSs that had large class sizes and offered parents little power (May 2006; Reid and Johnson 2001; Renzulli 2006). Further, in many predominantly Black cities, racially homogenous schools advance an Afrocentric mission that may be attractive to Black parents and students (Fabricant and Fine 2012; Teasley et al. 2016). Finally, because of convenience and local knowledge, many charters enroll students from their local neighborhoods (often in high-minority areas), even though they do not have official attendance zones (Pattillo et al. 2014).

Most of our understanding of charter schools and school segregation is limited to a subset of large, usually urban school districts or draws on segregation measures that do not account for demographic composition (Frankenberg et al. 2011). One exception is a recent report showing that charter growth increases the segregation of Black and Hispanic students from White and Asian students between schools within school districts (Monarrez et al. 2019), results we build on here.

Charter Expansion and Residential Segregation

Our study provides the first national estimates of how charter expansion affects both school and residential segregation. Does weakening the policy link between neighborhoods and schools decouple neighborhood and school segregation patterns? How might charter expansion affect residential segregation? On one hand, residential segregation could be unresponsive to charter expansion if families do not bundle schools into their residential decisions as much as commonly thought. In 2012, only 19% of families reported moving explicitly for the local public school (Snyder et al. 2018), and families may not be very knowledgeable about local school assignment rules (Lareau et al. 2016). Moreover, long-standing patterns of residential segregation due to house price premiums, exclusionary practices, and preferences may be too persistent to be responsive to changing school enrollment rules (Bayer et al. 2007; Krysan and Crowder 2017).

However, Tiebout theories of residential sorting suggest that families seek to maximize public goods (e.g., schools) afforded by their neighborhood, within their economic constraints (Tiebout 1956). Many parents, particularly White and middle-class parents, “shop” for schools by renting or buying homes in neighborhoods (and, at a larger scale, school districts) assigned to attractive schools that best match their preferences for academic achievement, social environment, enrichment activities, reputation, or other characteristics (Goldstein and Hastings 2019; Lareau and Goyette 2014), thus using neighborhood choice as a form of school choice. This type of residential sorting under a strict residence-based school assignment system leads to racially and socioeconomically stratified neighborhoods (Bischoff 2008; Owens 2016, 2017). Some past research has demonstrated that liberalizing school assignment does affect the residential location decisions of parents. Nechyba (2003) showed that the avail-

ability of a private school market reduces residential income segregation, whereas Brunner et al. (2012) showed that interdistrict enrollment programs affect housing values near school district boundaries. Conversely, when a neighborhood-school link is strengthened—as in North Carolina after mandatory desegregation plans expired—residential segregation increases because residential location is once again very consequential for school enrollment (Liebowitz 2018; Liebowitz and Page 2014).

Beyond the private maximization of public goods, other theories of residential segregation also suggest that loosening the link between neighborhood residence and school attendance might reduce residential segregation. First, spatial assimilation theories suggest that racial segregation arises because of differences in the housing and neighborhoods that different racial groups can afford (Massey 1985; Wagmiller et al. 2017). When school choice options proliferate, the capitalization of school quality into housing values is reduced (Schwartz et al. 2014), which could reduce racial residential segregation driven by economic differences.

Second, place stratification theories center race in positing that residential segregation occurs because White people maintain their housing advantage via institutionalized racial discrimination in housing search processes, lending, local zoning, and resistance to sharing neighborhoods with minority (particularly Black) residents (Logan and Alba 1993; Logan and Molotch 1987; Pais et al. 2012). Neighborhood schools may be one motivation for advantaged groups, such as White parents, to hoard their own opportunities and resist residential integration. Removing the school as one neighborhood opportunity to be hoarded could reduce residential segregation.

Third, underlying and intersecting with these processes, groups' preferences create and uphold racial residential segregation (Clark 1991). White people's stated and revealed preferences for White neighbors are well-documented, with evidence showing that White residents view Black neighbors as the most undesirable, after Asian and Hispanic neighbors (Charles 2000; Emerson et al. 2001; Farley et al. 1997; Howell and Korver-Glenn 2018). Black, Hispanic, and Asian householders, in contrast, prefer more racially diverse areas (Charles 2000; Krysan and Farley 2002). White parents with young children are particularly sensitive to local racial composition, exiting or avoiding neighborhoods as the proportion of Black or Hispanic neighbors and local schoolchildren increases (Goyette et al. 2012; Goyette et al. 2014; Hall and Hibel 2017; South et al. 2011). These behaviors aggregate into higher levels of racial residential segregation among families with children (Iceland et al. 2010; Jargowsky 2014; Owens 2017). If racial preferences are driven in part by concerns about schools, the expansion of choice schools could reduce residential segregation.

This Study

In contrast to the perception that neighborhood and school segregation simply reflect each other, our study evaluates the possibility that neighborhood and school segregation trends move in opposite directions as the growth of charter schools weakens their link. Prior research focusing on several dozen large districts demonstrated that when school choice options exist in neighborhoods comprising fewer White children, parents opt out of TPSSs, which are consequentially less White than their local neighborhoods (Bischoff and Tach 2018, 2020; Candipan 2019; Saporito 2003; Saporito and Sohoni 2006; Sohoni and Saporito 2009). We build on this research, leveraging

variation in charter school growth to evaluate the simultaneous and contingent system of school and residential segregation in metropolitan areas and school districts throughout the United States. In the aggregate, we hypothesize that charter school expansion will lead to a rise in school segregation and a decline in residential segregation as neighborhood and school choices are unbundled.

Residential and school segregation can occur either within or between school districts. Sorting between districts is a key driver of total segregation (Fiel 2013; Owens 2016; Stroub and Richards 2013), and charter expansion could induce population mobility by providing attractive alternatives to TPSs that draw parents into urban districts (or keep them from moving away). In many states, however, district boundaries correspond to other community characteristics, so charter expansion in one district might not provide a sufficient signal to move the needle on large-scale sorting processes across an entire metropolitan area. This bears out in the descriptive results we report below. Accordingly, we focus our analysis primarily on segregation within school districts, theorizing that charter expansion likely affects local decisions by offering alternatives to TPSs that nudge family school and residential sorting behaviors within the districts where they already live or were already prone to select.

Data and Methods

Analytical Approach

Our analyses evaluate change in both residential and school segregation as overlapping and mutually reinforcing systems. We begin by examining residential and school segregation in metropolitan statistical areas (MSAs) in 2000 and 2010, and we decompose total MSA segregation into its between- and within-school district components. Our decomposition reveals that the largest changes in school and residential segregation during the 2000s occurred within school districts (both between public school sectors and within the charter sector) rather than between school districts.

We measure segregation using the variance ratio index, also known as the separation index, the squared coefficient of variation, and η^2 (Coleman et al. 1975; Duncan and Duncan 1955; Fossett 2017; James and Taeuber 1985; Reardon and Firebaugh 2002; Zoloth 1976). When estimated for pairwise groups (e.g., White-Black, White-Hispanic), the variance ratio index can be decomposed into different administrative or geographic levels (e.g., within and between school districts or school sectors). The variance ratio index describes the difference in neighborhood (or school) racial composition between two focal groups (e.g., school or neighborhood percentage White for the average White child compared with school or neighborhood percentage White for the average Black [or Hispanic] child). A value of 0 expresses an even distribution, such that neither White nor Black (or Hispanic) people overconcentrate in a subset of schools or neighborhoods. A value of 100 indicates extreme racial polarization, such that White and Black (Hispanic) people populate entirely separate neighborhoods or schools.

In the online appendix, we elaborate on the useful properties of the variance ratio index and provide a detailed description of our decomposition method. We also present within-district analysis results using alternate segregation indices, noting that our substantive conclusions are insensitive to index choice.

School Enrollment Data

We separately measure pairwise segregation between White and Black and White and Hispanic 4th grade students.² We focus on 4th grade students because elementary school enrollment is more commonly tied to residential address, and we wish to capture segregation patterns among schools serving a single grade cohort (Stroub and Richards 2013). Results are substantively similar for 8th and 10th graders (online appendix, Table A6). We do not present results for White-Asian segregation. Prior work on racial hierarchies in the United States has shown that the presence of Asian households is perceived to provide some advantages to neighborhood and school contexts, suggesting that charter expansion may not have the same relationship with White-Asian residential or school segregation as with White-Black and White-Hispanic segregation (Abascal and Baldassarri 2015; Charles 2003). Moreover, the comparatively small and geographically concentrated Asian population limits our statistical analyses. Exploratory results are available upon request.

Public school enrollment counts by race come from the 1989–1990, 1999–2000, and 2009–2010 National Center for Education Statistics (NCES) Common Core of Data (CCD) Public School Universe. The CCD includes an identifier code, school name, address, charter/magnet status, and school district for every public school in the country, by year.³ Charter and magnet school status was first tracked in 1998–1999, but in some cases, charter schools are listed as an entity separate from their geographic school district. Using school district boundary shapefiles provided by NCES and geospatial tools, we reallocate these charter schools to the school districts where they are geographically located. The NCES Private School Survey supplies additional racial enrollment counts for nearly all private schools in the United States, which we geographically match to MSAs in the 1999–2000 and 2009–2010 academic years.

Residential Population Data

We measure residential segregation using census tract boundaries from the 1990, 2000, and 2010 decennial census TIGER files, produced by the National Historical Geographic Information System (NHGIS) (Manson et al. 2017).⁴ Our goal is to evaluate neighborhoods as discrete, nonoverlapping spatial units within school district boundaries, but there are complicated overlay issues. In 2000, for instance, nearly 30% of census tracts were bisected by one or more school districts. Accordingly, we subdivide bisected census tracts into smaller neighborhoods, where each subpartition of the orig-

² In the CCD, *Hispanic* is measured as a separate racial category, and therefore all measures of White and Black student counts are restricted to non-Hispanic. For brevity, we omit the *non-Hispanic* modifier.

³ The CCD has incomplete racial data for 14 states in 1989–1990 and one state in 1999–2000. We report findings using the nearest proximal year with available racial enrollment counts, but our conclusions do not change when we drop all such records from the analytical sample. The CCD does not provide race-by-grade counts in 1989–1990, so we multiply 4th grade total enrollment counts by total racial group proportions to infer counts of 4th graders by race.

⁴ A relevant alternative neighborhood definition is school assignment boundaries, which do not line up precisely with census tracts. However, boundaries for catchment zones are available longitudinally for only several dozen districts.

inal tract is matched to its true school district jurisdiction. We aggregate block-level census data to generate population counts for each partitioned tract. For simplicity, we refer to all census tracts as “neighborhoods,” whether partitioned or whole.

Population counts are derived from the 1990, 2000, and 2010 decennial census. The census reports race and Hispanic ethnicity as conceptually distinct. We combine these variables to define three distinct subpopulations—non-Hispanic White, non-Hispanic Black, and Hispanic—comparable to school enrollment racial categories in the NCES data.

Sample

We focus on MSAs defined as 2003 Core-Based Statistical Areas or divisions. We exclude metropolitan areas with fewer than 50 fourth graders in each pairwise racial group in 2000 or 2010 and all micropolitan areas (sample $N=309$ MSAs). In our district analysis, we restrict the sample to metropolitan elementary and unified school districts with at least two schools and neighborhoods. There were 3,385 such districts in 2000, representing 74.2% of all 4th graders enrolled in public schools nationwide and 89.8% of those living in MSAs.⁵ We further restrict to a White-Black analytical sample that includes 1,601 school districts with at least five 4th graders of each racial group and meets sample criteria across all years in the analysis. In 2000, the White-Black sample included 86.5% and 93.2% of all White and Black metropolitan 4th graders, respectively. A White-Hispanic sample ($n=1,354$) is defined using the same criteria.⁶ Table A1 in the online appendix reports district sample coverage in further detail.

Charter School Enrollment Growth

We use an indicator from the CCD to identify 584 and 2,139 charter schools nationally in 1999–2000 and 2009–2010, respectively.⁷ Table 1 reports charter growth in metropolitan school districts. To generate these statistics, we measure the percentage of 4th grade students attending a charter school among all 4th grade public school students (which includes students enrolled in charter schools, magnet schools, and TPSs), separately by year. In the White-Black sample, an average of 0.63% of 4th

⁵ The district analysis excludes Detroit Public Schools (MI) and Orleans Parish Schools (LA) because these districts experienced atypical population changes during the 2000s and implemented large-scale charter expansion. We also drop four districts with unreliable charter enrollment counts (Campbell Union, CA; Fort Leavenworth, KS; Salt Lake City, UT; and Williamsburg–James City, VA). Results hold when we include these school districts. Results are also robust to dropping outliers in charter school enrollment change and in segregation change from 2000 to 2010 (available upon request).

⁶ Analyses of alternative pairwise samples requiring 1%, 2%, or 5% representation of each racial group yield similar conclusions.

⁷ Our school count is limited to schools enrolling 10 or more 4th graders and classified by NCES as “regular” (rather than special education, vocational, or alternative education school types). New Jersey charter school indicators are not available in the CCD in 1999–2000, so we substitute the 2000–2001 data. Additionally, 13 schools nationally are not coded as a charter school but include “Charter,” “Success,” or similar words in their school name; we categorize them as charter schools, but results do not change when we exclude this step. We perform similar steps to correct misallocated magnet school records.

Table 1 Percentage of children enrolled in different school types, 2000 to 2010

	Full Sample of School Districts			Districts With Any Charter School Presence		
	2000	2010	Change	2000	2010	Change
White-Black District Sample						
Public students in traditional schools	97.74	94.39	−3.35	94.95	85.82	−9.12
Public students in charter schools	0.63	2.59	1.96	2.22	9.15	6.93
Public students in magnet schools	1.63	3.02	1.39	2.83	5.02	2.19
Resident children in private schools	11.35	11.05	−0.30	11.28	10.83	−0.44
White-Hispanic District Sample						
Public students in traditional schools	97.46	94.14	−3.31	95.05	86.53	−8.52
Public students in charter schools	0.85	3.05	2.20	2.53	9.07	6.54
Public students in magnet schools	1.69	2.81	1.12	2.42	4.40	1.98
Resident children in private schools	10.66	10.17	−0.49	10.52	10.14	−0.38

Notes: Mean percentage points reported. Public students include all 4th grade children attending traditional, charter, or magnet schools. Resident children include all children ages 5–17 living within the school district boundaries. “Districts With Any Charter School Presence” is a subset of the sample with a nonzero percentage of students attending charters in 2000 or 2010. This includes 453 of 1,601 total White-Black sample districts and 455 of 1,354 total White-Hispanic sample districts.

grade public school students attended charter schools in 2000 across districts. This increased to 2.59% in 2010, quadrupling over the decade and growing more than other sectors; however, the growth of charters was concentrated in only about one in four school districts. The right panel of Table 1 presents means for school districts with any charter school presence in 2000 or 2010 ($n=453$ in the White-Black sample). The average percentage of 4th graders in each school district attending charters increased from 2.22 percentage points in 2000 to 9.15 percentage points in 2010. We find a similar pattern of charter school growth in the White-Hispanic pairwise sample.

Table 1 also reports district enrollment rates in other sectors: traditional, magnet, and private schools. Magnet and charter schools are often compared and contrasted as public choice options, although magnet schools are more likely to have enrollment criteria designed to improve the district racial balance and thus are less likely to attract those with preferences for segregation (Goldring and Swain 2020; Riel et al. 2018; Saporito and Sohoni 2006). Moreover, as Table 1 shows, magnet school presence was established prior to the 2000s in many districts and grew more gradually than charter schools.⁸ Only 135 school districts across all three samples began offering magnet school options during this period, compared with 328 school districts that began offering charter school options, indicating that magnet school presence was concentrated in a smaller number of metropolitan school districts. Accordingly, we do not emphasize magnet enrollment as a key explanatory variable in the analysis, although we account for it statistically.

⁸ CCD indicators for magnet schools can be complex and imperfect, with some magnets operating as programs located inside TPSs. Our inspection of 2010 CCD data indicates that fewer than 1% of magnet schools are co-located in buildings with TPSs, so this does not appear to be a problem in our sample that would substantially bias results.

Analysis

We first provide a descriptive analysis of segregation within MSAs. We decompose total segregation into segregation between and within districts and school sectors, following Clotfelter (2004b) and Fiel (2013). (See the online appendix for methodological details.) Then we turn to our primary analyses, evaluating the effect of charter school expansion on segregation *within* school districts. Within-district school and residential segregation outcomes are reported in Table 2. Notably, across all years, average White-Black residential segregation was higher than White-Hispanic segregation within districts. White-Black school segregation was greater than White-Hispanic school segregation in 1990 and 2000, but it was roughly equal in 2010. White-Black public school segregation may be lower than residential segregation because White children living in districts with a large Black presence are more likely to enroll in private school and are thus selectively omitted from public school segregation (Saporito 2009).

Our hypotheses focus on the change in segregation between 2000 and 2010. Table 2 reveals that White-Black school segregation increased in school districts in our sample over this period by an average of 2.15 index points even though school district residential segregation declined by an average of 0.82 index points. District White-Hispanic school segregation also increased, as did residential segregation.

We evaluate the effect of charter school enrollment change within districts using a structural equation model in which we simultaneously estimate one regression equation predicting change in school segregation and another predicting change in residential segregation. Estimating these regressions simultaneously allows us to adjust for correlated residuals, thereby accounting for the school and residential segregation link that we hypothesize is weakened by charter schools.⁹ The key explanatory variable is change in charter school enrollment during the 2000s. We include control variables for level of segregation in 2000 and change in segregation during the 1990s. The general regression equation, where *seg* refers to a specific within-district segregation outcome, is as follows:

$$seg_{2010-2000} = \delta cht_{2010-2000} + \gamma seg_{2000-1990} + \lambda seg_{2000} + \beta \mathbf{X}_{2000} + \varepsilon.$$

The regression equation predicts that change in segregation between 2000 and 2010 is a function of preexisting trends and levels of segregation, change in charter school enrollment, and a vector of covariates, \mathbf{X} .¹⁰ We estimate models separately for each pairwise segregation measure (White-Black and White-Hispanic) and compute robust standard errors clustered by MSA. Notably, our outcome measure for school segregation within districts describes the distribution of students across all types of public schools, including TPSs, charter schools, and magnet schools. In this way, we can evaluate how change in the relative share of charter school students impacts segregation across the full system of publicly enrolled students. Private school students are not included in this portion of the analysis, but we do address this population with statistical controls.

⁹ We use the *gsem* package in Stata 16 with the option “covstructure(E.en, unstructured)” specified.

¹⁰ Findings hold when we reorient our data and run time-series panel fixed-effects models with controls for lagged segregation. We favor the structural equation model because it allows us to adjust for correlated residuals, consistent with our conceptualization of neighborhood and school segregation as linked.

Table 2 Segregation levels and change within school districts, 1990 to 2010

	White-Black		White-Hispanic	
	Mean	SD	Mean	SD
School Segregation (4th graders)				
Level in 1990	7.05	11.48	5.72	9.34
Level in 2000	8.36	12.04	7.85	10.55
Level in 2010	10.51	12.92	10.80	12.23
Change, 1990 to 2000	1.31	6.40	2.13	6.95
Change, 2000 to 2010	2.15	7.33	2.95	7.77
Residential Segregation (all persons)				
Level in 1990	12.89	16.30	5.97	8.56
Level in 2000	12.12	14.41	8.07	9.14
Level in 2010	11.30	12.73	8.96	9.10
Change, 1990 to 2000	−0.76	5.03	2.09	4.67
Change, 2000 to 2010	−0.82	4.43	0.89	3.61
School Districts	1,601		1,354	

Notes: Segregation is measured with the variance ratio index on a scale of 0 to 100, corrected for index bias (Fossett 2017). White and Black populations reported in the table are non-Hispanic. Residential segregation uses neighborhood census tracts as accounting units; when a tract is bisected by a school district line, we aggregate block population up to each unsplit portion of the tract to form a perfectly nested set of neighborhoods within school districts.

The estimation model includes a set of covariate controls to reduce the possibility that the effect of charter school expansion is confounded by other observable school district characteristics expected to influence segregation, drawing from Logan et al. (2017). Table A2 in the online appendix reports mean characteristics of all covariates, held constant in the baseline year (2000) to avoid controlling for changes that may have occurred directly or indirectly because of charter school expansion. To describe each school district’s educational context, we measure (separately) the percentage of public students enrolled in charter and magnet schools in 2000, an indicator for whether the school district was ever forced to desegregate its schools, an indicator for whether a desegregation order had been dismissed since 1990, and a categorical variable measuring school district size.¹¹ To describe the residential demographic context of each school district, we include the percentage of resident children enrolled in private school, population size (log), land area (log), racial composition, and the percentage of MSA residents living within the district (district share) by race, all measured in 2000. We also observe whether the district had a downtown area and whether the school district is located in a southern or border state. Finally, we include two variables describing households living within school district boundaries that approximate the spatial assimilation theory of segregation: (1) the difference in poverty rates between White and Black (or Hispanic) households, and (2) the median White to Black (or White to Hispanic) household income ratio.

¹¹ Desegregation orders by school district are provided by the Brown University American Communities Project (Logan et al. 2008). Desegregation dismissals come from Stanford’s “Brown Fades” database (Reardon et al. 2012).

The key parameter of interest is δ , capturing the average treatment effect of charter school enrollment change on segregation within school districts. Although this estimation incorporates prior trends and levels within the school district, we may be concerned that changes in segregation and charter school enrollment are correlated with other unobserved changes in school district characteristics, such as public demand for school choice. Relatedly, we must consider the possibility of reverse causation in which charter school enrollment grows in response to change in segregation. To explore these issues, we conduct several robustness checks, described later.

Results

Segregation in MSAs

The 2000s saw a rapid increase in charter school enrollment. Our hypotheses anticipate that this new flexible option, delinking residence from assigned school, influenced both school and residential population patterns. We begin in [Table 3](#) with a decomposition that considers segregation in MSAs, focusing on changes within and between different administrative and geographic levels. Results reveal that most segregation change in the 2000s occurred within districts, motivating our in-depth district-level analysis that follows.

Row 1 of [Table 3](#) shows that total White-Black and White-Hispanic segregation between schools in MSAs increased from 2000 to 2010. Rows 2 through 5 sum to row 1, displaying the level of segregation (2) between public and private schools, (3) among private schools, (4) between public school districts, and (5) within public school districts. A greater share of total school segregation occurred between public school districts in both years. However, within-district segregation was substantial and, for White-Black segregation, increased more during this time. (White-Hispanic segregation increased comparably within and between districts.) Rows 6 through 9 are subcomponents of within-district public school segregation that sum to row 5. Row 6 shows that segregation between public school sectors more than doubled during this time, as did segregation within the charter sector (row 8). Both mechanisms underlie our hypothesized relationship between charter expansion and school segregation: charter expansion provides both an option to sort between sectors (exiting TPSs) and more options to sort among charter schools.

[Figure 1](#) illustrates the racial segmentation of charter schools within school districts. These histograms show the distribution of Black, Hispanic, or White students by school racial composition (normed to district composition) for charter schools (gray bars) compared with TPSs (outlined bars) in our sample in 2010. Panel a shows that most Black students attended charter schools where Black students are racially overrepresented compared with the district composition. The tallest gray bar represents Black students in charter schools where the proportion Black was 40 percentage points higher than the district composition. A similar pattern appears for White students (panel c): a greater density of White students attended charter schools that were disproportionately White compared with TPSs. Racial segmentation is less evident for Hispanic students (panel b), consistent with past research (Frankenberg and Lee 2003; Garcia 2008), although there is some clustering of students in the tails.

Table 3 Decomposition of metropolitan area school and residential segregation by racial dyad, 2000–2010

	White-Black		White-Hispanic	
	2000	2010	2000	2010
Decomposition of School Segregation (4th graders)				
1. Total MSA school segregation (all schools)	29.99	32.31	20.86	26.11
2. School segregation due to private versus public enrollment	1.25	1.21	0.65	0.98
3. Segregation among private schools in MSA	1.28	1.01	1.34	1.01
4. Segregation between public school districts in MSA	16.52	17.38	9.91	12.67
5. Segregation within public school districts	10.95	12.71	8.96	11.45
6. Segregation between traditional, charter, and magnet sectors	0.36	0.82	0.23	0.55
7. Segregation among traditional public schools	10.21	10.96	8.37	10.24
8. Segregation among charter schools	0.06	0.36	0.03	0.27
9. Segregation among magnet schools	0.32	0.56	0.33	0.39
Decomposition of Residential Segregation (all persons)				
10. Total MSA residential segregation (all neighborhoods)	26.94	24.25	14.31	15.90
11. Segregation between school district jurisdictions in MSA	9.06	9.35	5.60	6.69
12. Segregation between neighborhoods within school districts	17.88	14.90	8.71	9.21
MSAs	309		273	
School districts	6,142	6,044	5,930	5,835
Schools	44,922	46,297	43,631	45,322
Neighborhoods	70,015	74,884	67,715	72,837

Notes: Segregation is measured with the variance ratio index on a scale of 0 to 100. The MSA sample requires at least 50 White and 50 non-White (either Black or Hispanic) 4th graders. We use 2003 core-based statistical area definitions of metropolitan areas, adjusted so that bisected school district boundaries are assigned to the MSA containing the largest share of its resident population. All districts nested within a sample MSA are included in this analysis, even if they do not meet the school district sample criteria used in the school district–level analyses.

The lower panel of Table 3 shifts the focus to neighborhood population processes. For both racial dyads, most residential segregation occurred within school districts (compare rows 11 and 12). Row 10 shows that White-Black residential segregation in MSAs declined during this time, but this was driven by declines within districts. White-Hispanic segregation increased slightly, primarily between districts. Of critical importance for our analysis, however, is whether these observed changes correspond to the expansion of charter school enrollment, which we explore next. Our analyses hereafter focus on within-district segregation.

Segregation Within Metropolitan School Districts

Table 4 reports selected coefficients from structural equation models testing whether charter expansion affects two simultaneous outcomes: the change in school segregation and the change in residential segregation within school districts. (Table A3 in the online appendix presents complete results for the model, including coefficients for prior levels and trends in segregation and for an extensive set of control variables.) For White-Black segregation, results from Model 1 support our hypothesis that charter school expansion corresponded to simultaneously rising school segre-

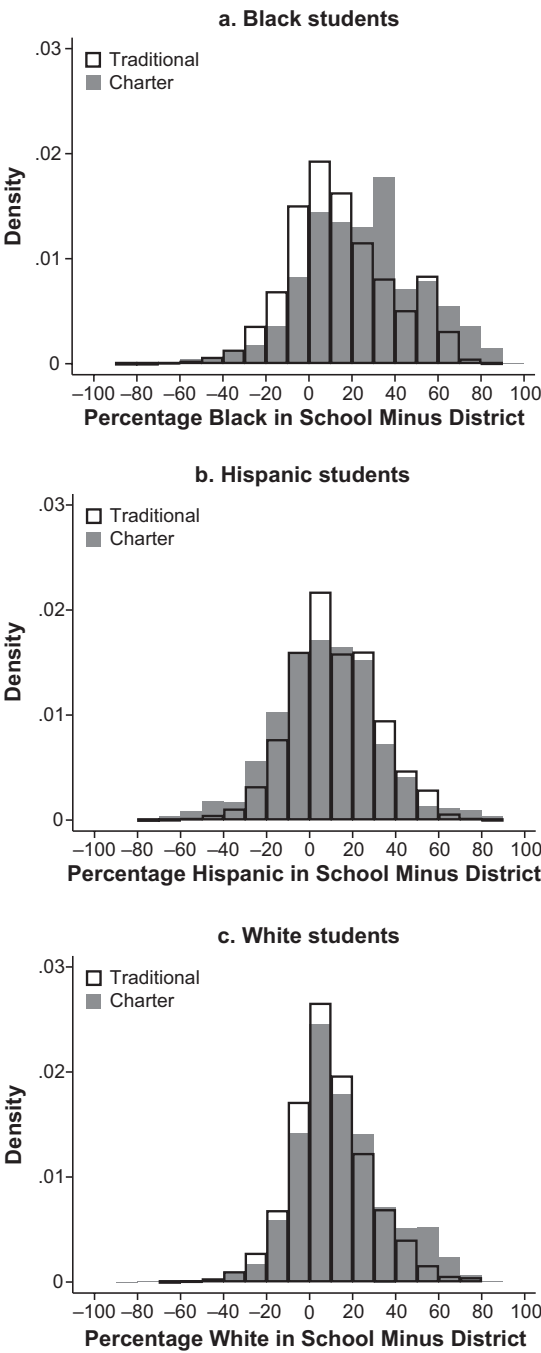


Fig. 1 Racial composition of charter and traditional public schools attended by 4th graders in 2010. The results are limited to MSA school districts with a nonzero elementary charter school presence in 2010 (2,484 districts). Each panel contains overlapping histograms that are weighted by the race-specific count of 4th grade students attending each school type. The number of traditional and charter schools is, respectively, 1,065,893 and 84,356 in panel a; 1,357,279 and 78,858 in panel b; and 1,789,349 and 95,493 in panel c.

Table 4 Change in charter school enrollment share predicting change in White-Black school and residential segregation, 2000 to 2010

	Full Sample		Restricted Sample	
	Model 1	Model 2	Model 3	Model 4
Outcome: Change in School Segregation (4th graders)				
Change in charter school enrollment share, 2000–2010	0.144** (0.045)	0.145** (0.045)	0.096* (0.043)	0.093* (0.043)
Change in charter school enrollment share, 2010–2016		–0.012 (0.021)		–0.027 (0.026)
Outcome: Change in Residential Segregation (all persons)				
Change in charter school enrollment share, 2000–2010	–0.041** (0.013)	–0.040** (0.013)	–0.040* (0.018)	–0.040* (0.018)
Change in charter school enrollment share, 2010–2016		–0.005 (0.013)		–0.002 (0.013)
School Districts	1,601	1,601	562	562
BIC	19,477.5	19,492.0	7,079.6	7,091.5

Notes: Standard errors, shown in parentheses, are clustered by MSA. Each outcome is the change in segregation (variance ratio index) between 2000 and 2010, estimated simultaneously in a generalized structural equation model with unstructured error correlation. Change in charter school enrollment is a linear measure of the percentage of 4th grade public students enrolled in 2010 minus the percentage of 4th grade public students enrolled in 2000. Models include level of segregation in 2000 and change in segregation in 1990s, as well as district covariates for proportion of students enrolled in charter schools in 2000, proportion enrolled in magnet schools in 2000, proportion enrolled in private schools in 2000, whether the district ever was under a desegregation order, whether a desegregation order had been dismissed since 1990, school size in 2000, log population in 2000, district land area in 2000, racial composition in 2000, percentage of metropolitan area residents living in the district in 2000 by race, whether the district includes a downtown area, whether the district is in a southern or border state, White-Black differences in poverty rates, and White-Black differences in median income. Models 2 and 4 provide falsification checks against reverse causal ordering by including a measure of change in charter enrollment for the period after the outcome variables are measured. Models 3 and 4 are estimated only for the subset of school districts with any charter enrollment in 2000, 2010, or 2016; 109 sample districts added charter schools between 2010 and 2016.

* $p < .05$; ** $p < .01$; *** $p < .001$

gation and declining residential segregation. Recall that the variance ratio index can be interpreted as the difference in White and Black students’ (or residents’) exposure to White students (or residents) in their school (or neighborhood). Our findings thus imply that a 1 percentage point increase in charter school enrollment simultaneously widens the exposure gap for schools by 0.144 and narrows the exposure gap for neighborhoods by 0.041 index points, on a scale of 0 to 100.

We further explore the scale of charter school expansion effects on both school and residential segregation in Table 5. The top panel of Table 5 reports the percentage change in 2000 segregation levels as a function of four policy scenarios: if charter school enrollment increased by (a) 1 percentage point (units reported previously in regression models), (b) 1.96 percentage points (the mean change across all sample districts), (c) 6.93 percentage points (the mean change among districts with any charter presence), and (d) 17.66 percentage points (the 90th percentile of charter growth among districts with any charter presence). The top left row, for instance, shows that a 1 percentage point increase in district charter enrollment predicts a 1.72% increase

Table 5 Estimated relative effect of charter school enrollment increase on school and residential segregation under varying charter growth conditions

	School Segregation (4th graders)			Residential Segregation (all persons)		
	Lower	Estimate	Upper	Lower	Estimate	Upper
White-Black Segregation (<i>n</i> =1,601)						
Scale of charter enrollment increase:						
a. 1 percentage point	0.67	1.72	2.78	-0.55	-0.34	-0.13
b. 1.96 percentage points (mean)	1.31	3.38	5.45	-1.08	-0.66	-0.25
c. 6.93 percentage points (mean, charter presence)	4.63	11.94	19.25	-3.80	-2.34	-0.88
d. 17.66 percentage points (90th percentile, charter presence)	11.78	30.41	49.03	-9.69	-5.97	-2.25
White-Hispanic Segregation (<i>n</i> =1,354)						
Scale of charter enrollment increase:						
a. 1 percentage point	<i>-0.53</i>	<i>0.72</i>	<i>1.96</i>	-1.08	-0.64	-0.19
b. 2.20 percentage points (mean)	<i>-1.15</i>	<i>1.57</i>	<i>4.29</i>	-2.37	-1.40	-0.42
c. 6.54 percentage points (mean, charter presence)	<i>-3.43</i>	<i>4.67</i>	<i>12.78</i>	-7.05	-4.15	-1.26
d. 16.47 percentage points (90th percentile, charter presence)	<i>-8.65</i>	<i>11.77</i>	<i>32.20</i>	-17.75	-10.46	-3.17

Notes: Effect sizes are the estimated change in mean segregation (variance ratio index) relative to observed baseline segregation in 2000 (reported as a percentage). All estimates are transformations of coefficients reported in Model 1 of [Tables 4](#) and [6](#). The effect of growth in charter enrollment is presented at four scales: (a) 1 percentage point increase, (b) mean change in charter enrollment across all sample districts, (c) mean change in charter enrollment among the subset of districts with any charter presence, and (d) the 90th percentile of charter enrollment growth among the subset of districts with any charter presence. Lower and upper bounds of 95% confidence intervals are reported. Estimates of charter growth effects on White-Hispanic school segregation are not statistically significant at the *p*<.05 level and are shown in italics.

in White-Black school segregation, relative to a 2000 mean segregation level of 8.36 ([Table 2](#)). The largest expansion we considered—a 17.66 percentage point increase in charter school enrollment share—accounts for a 12% to 49% increase in school segregation and a 2% to 10% decrease in residential segregation. The large width of the 95% confidence intervals demonstrate considerable heterogeneity between school districts, perhaps reflecting unobserved variation in how charter schools were implemented in the 2000s. Some districts may have intentionally limited segregative sorting (similar to magnet school criteria) while others allowed segregative sorting to occur uninhibited (Potter and Quick 2018). Under a more typical scale of charter school expansion, the estimated effects are modest: among school districts with any charter school presence, the average enrollment change during the 2000s (6.93, top panel, row c) accounts for a 5% to 19% increase in school segregation and a 1% to 4% decrease in residential segregation. Whether we should interpret these effects as practically significant is an issue we revisit in the Discussion section.

We conclude from these results that charter enrollment growth simultaneously affected White-Black residential and school segregation by breaking the traditional neighborhood-school link, but our interpretation is vulnerable to the threat of reverse causation. It is possible that change in the local population (e.g., gentrification of for-

merly high-minority neighborhoods) created new demand for alternatives to assigned neighborhood schools. Although not refuting the importance of a neighborhood-school link, this alternative explanation distinguishes between policy-driven segregation and segregation-driven policy. To test the idea formally, we add a measure of future charter enrollment growth between 2010 and 2016 to Model 2, capitalizing on the fact that expansion continued after 2010 (with 1,274 more elementary charter schools in 2016 than in 2010). If the causal direction is charter expansion affecting segregation, then the contemporaneous measure of segregation should be unrelated to charter expansion that has not yet occurred. Results of the falsification test, reported in Table 4, show that future charter enrollment growth has no discernable effect for either segregation outcome and, importantly, does not reduce the estimated main effect. Thus, Model 2 lends support to the claim that charter enrollment growth precedes changes in school and residential segregation.

We also explore the possibility that our findings are an artifact of unmeasured school district characteristics associated with both charter growth and change in segregation—that districts with a “taste” for charters differ in unobservable ways from districts without charters. Model 3 (Table 4) presents results restricted to school districts with any charter school presence in 2000, 2010, or 2016. The estimated effects of charter school enrollment on segregation are similar in direction and magnitude. These effects also hold when we add our falsification measure for future change in charter enrollment in Model 4. We conclude from the restricted analysis that the results are not driven by a latent distinction between charter-friendly and noncharter school districts. Results from Models 3 and 4 also ease the concern that a linear specification of charter enrollment share in Models 1 and 2 could be biased by zero inflation from the large proportion of noncharter school districts. We also tested this issue with nonlinear, semiparametric, and spline specifications for charter enrollment (results not shown). These models yielded similar conclusions that do not improve the simpler linear specification.

Our identification approach is imperfect: there could still be unmeasured characteristics driving both charter expansion and change in segregation among districts with any charter presence. Without experimental evidence, it is difficult to address this concern definitively. Nonetheless, lingering unknown confounders would need to exact an effect net of covariate controls, segregation levels in 2000, and preexisting trends in the 1990s. The unmeasured influence would also require a simultaneous positive effect on school segregation and negative effect on residential segregation.

We did consider several possible confounding explanations, including simultaneous changes in magnet school share, resident private school enrollment, and population racial composition between 2000 and 2010. These predictors are endogenous because they may be responsive to charter enrollment growth. Figure 2 reveals, in a series of robustness checks, that including these additional covariates has no influence on coefficient findings or effect sizes. Figure 2 also shows that our results are not sensitive to other educational changes potentially related to charter school expansion and segregation within the school district. Specifically, adding controls for level and change in per pupil spending, average student-to-teacher ratio, and number of schools has a minimal effect on the main coefficients of interest.

To further test whether we are capturing effects of charter school expansion versus some other unobservable process, we examined changes in residential segregation separately among households with and without children. Theoretically, we expect

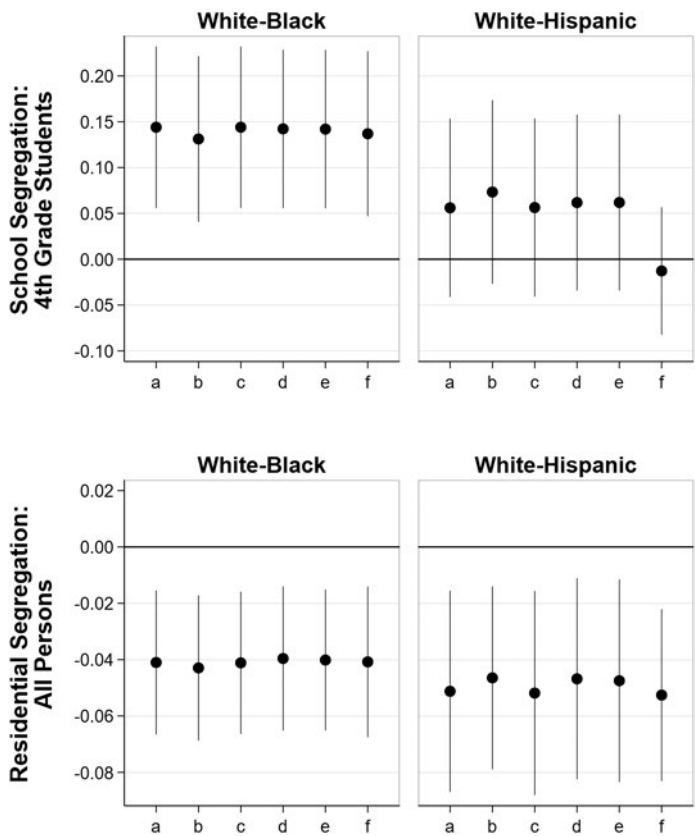


Fig. 2 Robustness checks of the estimated effect of a 1 percentage point increase in charter school enrollment share on school and residential segregation (variance ratio index). Each column of results reports the estimated coefficient for the effect of charter school enrollment change from 2000 to 2010 on segregation within school districts (see Model 1, Tables 4 and 6). The letters indicate modifications to the preferred model as follows: (a) main effect; (b) drops baseline covariates; (c) adds control for changes in magnet and private enrollment from 2000 to 2010; (d) adds control for changes in racial composition and district share of MSA racial composition from 2000 to 2010; (e) adds all covariates from modifications c and d; and (f) main effect model with controls for baseline district per pupil spending, student-to-teacher ratio, and number of schools as well as the change from 2000 to 2010. Samples are slightly smaller in Model f because of missing data in CCD (White-Black $n=1,441$; White-Hispanic $n=1,250$). Full models are available by request. Lines represent 95% confidence intervals.

that charter school expansion would have a larger effect on the residential patterns of households with children, which our findings confirm (Table A5, online appendix). The difference in the coefficients between households with and without children is only marginally significant ($p<.10$), however, perhaps because childless households include empty nesters and future parents who consider school options when choosing a neighborhood or because the residential choices of households with children spill over to affect those of childless households. We foreground results for the whole population because of data limitations in the reporting of Hispanic ethnicity over time, but this analysis provides evidence consistent with our interpretation that residential patterns are truly responding to changes in the charter enrollment share.

Table 6 Change in charter school enrollment share predicting change in White-Hispanic school and residential segregation, 2000 to 2010

	Full Sample		Restricted Sample	
	Model 1	Model 2	Model 3	Model 4
Outcome: Change in School Segregation (4th graders)				
Change in charter school enrollment share, 2000–2010	0.056 (0.050)	0.053 (0.050)	0.018 (0.062)	0.018 (0.062)
Change in charter school enrollment share, 2010–2016		0.020 (0.038)		0.007 (0.038)
Outcome: Change in Residential Segregation (all persons)				
Change in charter school enrollment share, 2000–2010	−0.051** (0.018)	−0.052** (0.019)	−0.048* (0.022)	−0.048* (0.022)
Change in charter school enrollment share, 2010–2016		0.002 (0.016)		0.001 (0.017)
School Districts	1,354	1,354	551	551
BIC	16,316.3	16,330.2	6,891.2	6,903.7

Notes: Standard errors, shown in parentheses, are clustered by MSA. See [Table 4](#) notes for additional estimation model information. Between 2010 and 2016, 96 White-Hispanic sample districts added charter schools.

* $p < .05$; ** $p < .01$; *** $p < .001$

Our analysis thus far has focused on White-Black segregation. We now turn to the effect of charter school expansion on White-Hispanic segregation within districts, reported in [Table 6](#) (full models in [Table A4](#), online appendix). We find similar evidence of a relationship between charter school enrollment growth and declining residential segregation, but we find no evidence of an effect on school segregation. This conclusion is robust to the falsification exercise in Models 2 and 4, as well as the sample restriction test in Models 3 and 4. The preferred estimates from Model 1 suggest that a 1 percentage point increase in the share of charter school enrollment is associated with a 0.051 index point decrease in residential segregation ($p < .01$). In response to the mean increase in charter enrollment of 6.54 percentage points (in districts with charter presence), our model predicts a 1% to 7% decrease in White-Hispanic residential segregation ([Table 5](#)). Results are also robust to the additional covariates tested in [Figure 2](#), and the relationship between charter expansion and residential segregation is stronger among households with children than without ([Table A5](#), online appendix).

The lack of a charter school effect on White-Hispanic school segregation matches the racial enrollment distributions by school type presented in [Figure 1](#). Unlike White and Black students, many Hispanic students attend charter schools with a lower same-race population than in TPSs. One explanation for this observed difference could be that White parents have less aversion to Hispanic students than to Black students, consistent with White families’ tendencies to avoid Black neighbors over all other groups. Thus, charter schools may not lead White parents to select into segregated non-Hispanic schools. This explanation centers the behavior of White families, but Hispanic families may also respond to charter school expansion in ways that do not increase segregation. Identifying these mechanisms is beyond the scope of our aggregate analysis, and

we point to the different dynamics of White-Black and White-Hispanic segregation in neighborhood and school contexts as a fruitful area for further research. Viewed altogether, our findings suggest that the strength of the neighborhood-school policy link—insofar as it shapes the housing and school choices families make—exists on a racialized spectrum.

Discussion

In this article, we examine how the contingent and dynamic processes of neighborhood and school segregation respond to charter school expansion. Charter schools weaken the link between residential and school selection and, as we show, alter patterns of both residential and school segregation: during the 2000s, metropolitan school districts throughout the United States saw an increase in White-Black school segregation and a decrease in White-Black residential segregation proportional to charter school growth. These findings suggest that because charter school options unbundle housing and school choice processes, White and Black families opt into marginally more integrated neighborhoods while sending their children to more racially segregated schools.

We find that in districts with any charter presence, the average charter share increase of 6.93 percentage points led to an estimated 12% increase in White-Black school segregation and a 2% decline in White-Black residential segregation. Given the general stability in segregation trends over the last 20 years, we posit that these increases are nontrivial, especially considering that charter school enrollment continues to rise. The effect on residential segregation is smaller, as we might expect given the many nonschool factors that go into residential choices, but it provides evidence that educational policy shapes processes beyond the education sphere. We note prevailing evidence of White families' preferences for predominantly White schools, and our findings imply that these preferences may have an underappreciated effect on residential population processes. White parents may not pay as high a premium to live in White neighborhoods as long as they can enroll their child in White schools, or White parents may not leave diversifying neighborhoods if their child can attend a choice school. Our findings also suggest that parents may prioritize homogenous schools over homogeneous neighborhoods, demonstrating trade-offs between these interconnected contexts.

We do not find that White-Hispanic school segregation is sensitive to charter school expansion, consistent with past research and our own descriptive findings that Hispanic students are less racially segmented in charter schools than Black or White students. We do find that White-Hispanic residential segregation declines as the charter enrollment share increases; this finding, worthy of further investigation, emphasizes the varied dynamics of segregation for different racial/ethnic dyads and for the neighborhood versus school spheres. Further research could also examine whether charter expansion affects White-Asian, Black-Hispanic, Black-Asian, and Hispanic-Asian school or residential segregation.

Our study provides fruitful ground for future research in several directions. First, our analysis focuses on segregation within school districts, where most of the change in White-Black segregation occurred in the 2000s, but school and residential segrega-

tion also occurs between districts (Bischoff 2008; Owens 2017; Stroub and Richards 2013). Future research could examine the relationship between charter expansion and all the components of residential and school segregation highlighted in our decomposition to understand whether segregation dynamics within and between districts and sectors offset or amplify one another.

Second, we measure charter expansion as district-wide enrollment. The spatial structure of charter school expansion—where charters open and whether this has changed over time—could be an important mechanism in accounting for our findings if charter schools are more or less proximate to neighborhoods of different racial compositions (Candipan and Brazil 2020). More broadly, our study of school districts as the primary units of analysis allows us to analyze systemic effects of charter school expansion, but the perspective from this ecological level prevents us from evaluating micro-level mechanisms of mobility and enrollment.

Finally, our study shares the challenges of causal identification common to many segregation studies. We attend to an extensive set of control variables and potential alternative explanations, but threats to causal interpretation remain. That said, one of the strengths of our analysis is the simultaneous investigation of neighborhood and school segregation. To undermine our results, any unmeasured variable would have to be positively associated with school segregation and negatively associated with neighborhood segregation (or vice versa), which we believe limits the pool of potential confounders. One important omitted variable is the availability of open enrollment and interdistrict school choice programs, which might also shape school and residential segregation patterns. Unfortunately, longitudinal national data on comprehensive school choice options are not currently available, to the detriment of education research.

Housing and educational policies have long affected segregation patterns. We emphasize the interrelated nature of these two contexts and show how two processes that historically moved in tandem—neighborhood and school segregation—are decoupled by choice-oriented changes to school assignment policy. A half-century ago, legal desegregation arguments defined *de facto* school segregation as a downstream result of residential segregation, itself the product of racist housing and urban policies. This characterization downplays the extent to which school and residential segregation are (and have always been) more like eddies in a stream, circling and reinforcing each other via policies and preferences. In a residentially based school assignment system, school segregation not only reflects but also contributes to neighborhood segregation, given that local school options enter into residential decisions. When charters break the residential-school link, segregation patterns move in opposite directions: families live in slightly more integrated neighborhoods and use charters to enroll their children in segregated schools. Charter school policy thus unintentionally reveals a status quo of school-driven residential segregation that has been hidden in plain sight.

Should policymakers concerned about equality consider school choice a new tool for reducing residential segregation? We do not draw that conclusion. School choice represents districts ceding responsibility for providing equitable educational opportunities to parents, letting residents sort according to their own will as consumers and addressing public goals with private choices. Most charters operate independent of any integration imperative; they were never part of a desegregation tool kit, and state

charters typically have only cursory nondiscrimination or racial balance language in their laws (Archbald et al. 2018). Unfettered choice does not lead to equality, and the other half of our findings—that school segregation increased—makes that starkly clear. Small gains in residential integration do not outweigh the costs of school segregation. Instead, we interpret our findings as demonstrating to policymakers that residential and school sorting patterns are linked and that policy choices should not be siloed between these two arenas.

We conclude by wedding our results to a growing body of scholarship arguing that when ostensibly race-neutral policies fail to account for the racialized structure of U.S. schooling, they produce results that exacerbate, rather than neutralize, the color line (Lewis and Diamond 2015; Neckerman 2008; Rich and Jennings 2015). Charter schools prove no exception because they are vulnerable to market-based racial sorting. As shown in our analyses, charter schools have, on average, led to White and Black children attending more racially homogenous schools. Thus, even if it is unintended, the allure of expanding charter schools provides a quasi-private option through which parental choices undermine integrated schooling. Local school districts could limit the intensity of this sorting problem by adopting diverse-by-design charter school policies, using levers such as weighted lotteries, controlled choice, and diversity-conscious admissions algorithms to ensure that charter schools operate more like racially inclusive magnet schools (Potter and Quick 2018). The federal Charter Schools Program could change its grants competition to reward such efforts (Potter and Nunberg 2019). As we argue, educational policies also have consequences for residential outcomes, and intentional integration policies in schools must be complemented by housing, zoning, and transportation policies that promote integration in neighborhoods to prevent White flight. Policymakers must respond strategically to both school and residential sorting issues in tandem in order to unleash the full promise of the *Brown v. Board* decision. ■

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