School Attendance Boundaries and the Segregation of Public Schools in the US

Tomás E. Monarrez

Online Appendix

A Data Construction

I use the National Center of Education Statistics' (NCES) Student Attendance Boundary Survey (SABS) as the primary data source for this study. This survey was the first attempt to collect data on school attendance boundaries of all districts in the U.S. The SABS data were collected over a web-based self-reporting system, through e-mail, and mailed paper maps. The administrators harmonized these different data types into GIS shapefiles, which facilitates their systematic analysis. The universe of school districts is defined as those included in the Census Bureau's SY 2013-14 School District Review Program and the Common Core of Data, specifically those that are denominated as a regular school district and have at least one school open during the school year. This frame resulted in more than 5,000 school districts eligible to participate in the SABS. The survey collected data on attendance boundaries for all K-12 grade levels.

I measure the spatial distribution of racial composition in school district geography using census block-level population tabulations by race from the 2010 Census, in combination with the 2010 TIGER/Line census block GIS shapefiles produced by the census. Total population, age, gender, and race are the only variables that the census makes available to the public at the census block level, but this suffices to measure racial segregation at a remarkably fine spatial level. The census protects privacy by introducing noise into block demographic estimates when they are of small population. Therefore, to minimize measurement error, I focus on total population estimates of racial composition, as opposed to looking at age-specific groups.

In urban settings, census blocks' area correspond to city blocks, while in rural areas they have larger size. By laying the SABS geographic data over the census block map of a school district jurisdiction, I can assign each block to a given school in the district. Specifically, the assignment is done by computing the block centroid and asking whether this point is inside the polygon defined by the SAB. This may lead to errors in assignment if there is imperfect overlap between census block and school boundary geographies, but this issue tends to be uncommon as both geographies tend to follow street lines. The resulting crosswalk between census blocks and schools is the policy I study empirically in this paper, a policy which school districts have authority over.

The SABS included a total of 33,638 elementary school attendance boundaries administered by 4,731 school districts. Given that I focus on the boundary-drawing problem and its relation to school segregation, I make a number of sample restrictions which discard cases in which this problem is degenerate. Table 1 of the online appendix provides a gradual depiction of how sample restrictions change the distribution of SABs in the analysis sample. The first column in Table 1 reports mean characteristics for all attendance boundaries in the sample. Column

2 shows how the sample changes when I drop de facto school districts (i.e. districts that serve a single school for each grade level). The majority of districts dropped here are rural. This is reflected in the mean SAB characteristics, with a decrease in both average population and distance to school. Further sample restrictions, such as discarding small districts that serve less than 2000 students or administer fewer than 5 schools (column (3) in Table 1), or dropping of un-diverse districts with more than 97% or less than 3% minority (column (4) of Table 1), do not seem to significantly affect the mean characteristics of SABs or districts in the sample. The final analysis sample contains 23,293 attendance boundaries across 1,578 school districts.

Table 1 of the appendix also reflects some of the complexities associated with student assignment rules. Some districts enact 'choice zones' which assign some residences to multiple schools which create overlapping SABs (I call this feature 'multiple assignment'); 13% of SABs in the sample have this feature. Discontiguous SABs reflect student busing schemes and generate 'satellite SABS'; 12% in the sample have this. Moreover, districts some times have some schools open to enrollment (no assigned residences); only about 2% of schools in the analysis sample. Not all complexities are depicted the data, however. For instance, some districts operate magnet and other special schools which do not make use of a typical address-based attendance boundary system, these schools are not present in the SABS.

The analysis focuses on elementary schools for two main reasons. First, elementary schools are smaller and generally more numerous within each district; this means that the district has more leeway in designing attendance zones for these schools than for higher grades. Second, a majority of districts operate a feeder system between schools, meaning that lower level schools feed into upper level schools systematically. Hence, middle and high school attendance boundaries can be roughly thought of as the union of a few elementary school zones. Tables 2 and 3 in the online appendix show that the distribution of segregation for middle and high school boundaries is similar to the one reported for elementary schools in Table 1 of the main text.

A.1 Definition of Minimum Distance SABs

SABs that minimize distance between residential blocks and schools are a convenient counterfactual for existing school boundary choices. This benchmark is a "neighborhood schools" assignment scheme in the strict sense – the set of residences assigned to a school is precisely those that are not closer to any other school. Neighborhoods are areas of closest proximity to schools, creating a perfect partition of the jurisdiction into a number of polygons equal to the number of schools. In mathematics, such partition of a space given a finite set of points (school locations) is called the Voronoi mapping. Drawing these zones requires a straightforward optimization procedure based on the distance matrix between census blocks and schools – each element of this matrix measuring the distance between a census block centroid and a school location.

Voronoi maps are theoretically well-defined no matter which distance metric is used. I choose Euclidean distance both for ease of exposition and elegance. However, the empirical results presented in the rest of the paper do not rely heavily on this assumption. Providing evidence for this claim, I study an example in which Voronoi maps are constructed by combining real road networks and Dijkstra's algorithm. I take census block geography of Fresno, CA as an example. I also obtain the "Roads" shapefile for Fresno County from the US Census Bureau TIGER/Line, providing precise data on the location of all roads in the locality. Using this rich spatial data, I construct the road network of the city of Fresno, with road intersections representing nodes, and the roads themselves denoting network connections.

Using the road network, I construct the distance matrix between all census block centroids in Fresno and all of its elementary schools. Each element in this matrix is the minimum road network distance between a block and a school. Minimum road network distance is computed using Dijkstra's algorithm, which finds the minimum distance path between any two nodes in a network. In my case, the two nodes are: (1) the closest road intersection to the census block centroid and (2) the closest road intersection to the location of an elementary school. Having constructed the road network distance matrix, I can quickly find the minimum road network distance Voronoi zones, by assigning blocks to their closest school, accounting for the road network.

Equipped with both minimum Euclidean distance school assignments and minimum road network distance (henceforth, RND) assignments, I can empirically assess the degree of bias generated by the use of Euclidean distance in the main analysis. The vast majority of blocks are assigned to the same school regardless of which distance metric is used. Only about 500 blocks, or 13% of blocks in the city, obtain a different assignment with minimum RND criteria compared to Euclidean. Figure A3 plots the racial composition of existing SABs against the composition of both the Euclidean and RND Voronoi zones, plotting the OLS fit for each. While there is indeed some variation in the racial composition of minimum distance zones across the Euclidean and RND metrics, the resulting relationship with real 2013-14 SABs is almost exactly the same. Therefore, the estimated decomposition of school segregation is the same regardless of which counterfactual is being used. Considering the RND Voronoi zones are much more cumbersome to deal with and harder to visualize, I opt for the Euclidean metric for the main analysis.

A.2 Construction of GSS white racial intolerance index

The National Opinion Research Center's General Social Survey (GSS) is a national survey intended to gather data on contemporary American society in order to monitor and explain trends and constants in attitudes, behaviors, and attributes. Starting in 1998, all waves of the GSS include census tract codes for respondents' residence. (This information is restricted from public use files and requires an IRB review to obtain access, see READ ME in replication files). The survey collects respondents' demographics and also asks a number of questions related to intolerance toward different racial groups. Using the the 1998-2016 waves of the GSS, I exploit this information to construct a school district level index of the racial intolerance of local white residents, as described in section 5.3 of the main text.

I use the following GSS questions to define the index:

1. On the average Blacks have worse jobs, income, and housing than white people. Do you

think these differences are . . .

(a) Mainly due to discrimination?

(b) Because most Blacks have less in-born ability to learn?

(c) Because most Blacks don't have the chance for education that it takes to rise out of poverty?

(d) Because most Blacks just don't have the motivation or will power to pull themselves up out of poverty?

2. Suppose there is a community-wide vote on the general housing issue. There are two possible laws to vote on. Which law would you vote for?

   A. One law says that a homeowner can decide for himself whom to sell his house to, even if he prefers not to sell to Blacks.

   B. The second law says that a homeowner cannot refuse to sell to someone because of their race or color.

3. Some people think that Blacks have been discriminated against for so long that the government has a special obligation to help improve their living standards. Others believe that the government should not be giving special treatment to Blacks. Where would you place yourself on this scale, or haven't you made up your mind on this?

4. The second set of characteristics asks if people in the group tend to be hard-working or if they tend to be lazy. Where would you rate Blacks in general on this scale?'

5. Do people in these groups tend to be unintelligent or tend to be intelligent? Where would you rate Blacks in general on this scale?

6. What about living in a neighborhood where half of your neighbors were Blacks? Would you be very in favor of it happening, somewhat in favor, neither in favor nor opposed to it happening, somewhat opposed, or very opposed to it happening?

7. What about having a close relative marry a Black person? Would you be very in favor of it happening, somewhat in favor, neither in favor nor opposed to it happening, somewhat opposed, or very opposed to it happening?

I follow the procedure of Card, Rothstein, and Mas (2008) to extract a racial animus index from these survey questions. For each question, I compute an indicator for an intolerant response. I estimate a linear probability model for each indicator, using only white GSS respondents who can be assigned to a NCES school district id. The models include school district fixed effects and controls for gender, age, education, a socioeconomic status index, and survey year indicators. I extract the school district effects and standardize each set to have mean zero and standard deviation one. The GSS racial animus index is the simple average of these standardized school district effects.

B Robustness Checks

In Table 5 of the online appendix I assess the robustness of my inferences to various assumptions. The dependent variable in all models is the boundary component of segregation. Columns 1, 4 , 7, and 10 show estimates across segregation definitions, controlling for baseline covariates and districts' main constraints to boundary desegregation: residential segregation, the status of court desegregation court orders, racism, and district geography and demographics. The estimates show that mean differences by court order status in the boundary component are robust to controlling for district demographics and residential patterns of segregation. The active court order indicator is highly significant, with estimates suggesting a 1.6 p.p. lower level of boundary segregation in districts under judicial supervision. In contrast, the rescinded order indicator has a coefficient less than half the size and statistically insignificant at the 5% level. This result is robust to the addition of controls for district income, racial economic gaps, region effects, and the share of student attending private and charter schools (column 2), as well as to the addition of state fixed effects (column 3). It is also robust to the definition of segregation, racial or economic (column 10).

The estimates in columns 7 through 10 (Hispanic-White) make it apparent that boundary desegregation associated with court orders impacts mostly segregation between Black and White students and not between Hispanic and White students. This is unsurprising as most orders are clustered in the South and were implemented during a time in which Black students were the underserved minority group of principal concern. Nonetheless, since racial composition and socioeconomic status are spatially correlated, columns 10-12 show that districts under court order also show marginally significant lower levels of segregation in terms of student poverty. It is also notable that, controlling for a full set of covariates, districts with a rescinded court order show no meaningfully different levels of boundary segregation to similar districts that were never under court supervision.

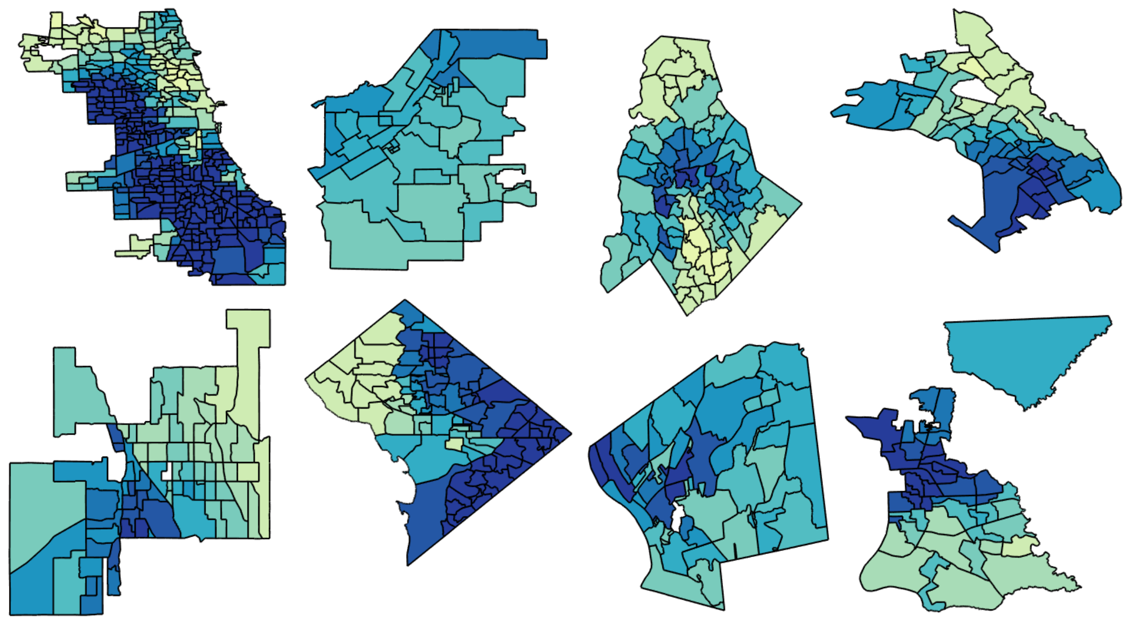
In addition, appendix Table 5 establishes that the associations between school boundary segregation and racial animus, demographics, and geography are also robust to the inclusion of different sets of controls and to the definition of segregation. In particular, the Kerry-to-Obama vote swing is significantly and positively linked across specifications (except for Hispanic-White sorting in column 9) which is suggestive evidence that animus against the Black population in particular can result in inequitable school assignment policy for Black students. The GSS intolerance index is also robustly linked to the outcome of interest across specifications, with stable point estimates across definitions. Similar patterns hold for the log population and bizarreness variables, as well as the district share of the district that is a minority (a definition that varies depending on the definition of segregation). I also test whether the gap in log income between whites and minorities is significantly associated with school boundaries, finding no significant effects in any of the models.

Appendix Table 6 presents a parallel set of estimates for models of the school site component of segregation, testing whether district characteristics are related to the extent to which school locations exacerbate racial separation. Recalling from equation (2), the site component is defined as the difference in segregation between the pure measure of residential segregation based on random school locations, and the level of segregation in minimum distance boundaries based on the actual geographic placement of schools. Across definitions, these models have about half the explanatory power compared to appendix Table 5, as noted by the difference in the models' R-squared.

Furthermore, few of the variables included in the models in appendix Table 6 are consistently significant in statistical terms. The rescinded court desegregation order indicator shows a significant and positive association with less equitable school siting, up to the addition of state fixed effects. Since point estimates are positive across models, this suggests that districts with rescinded orders have school siting detrimental to integration, but I cannot reject the hypothesis of the absence of a link. The log population coefficient also has a consistent sign across models (negative), suggesting a statistically insignificant link between district size and more equitable school siting. Taken together, the estimates in appendix Tables 5 and 6 are in line with the notion that attendance boundaries are more malleable of a policy than school siting, since the latter involves significantly higher fixed costs.

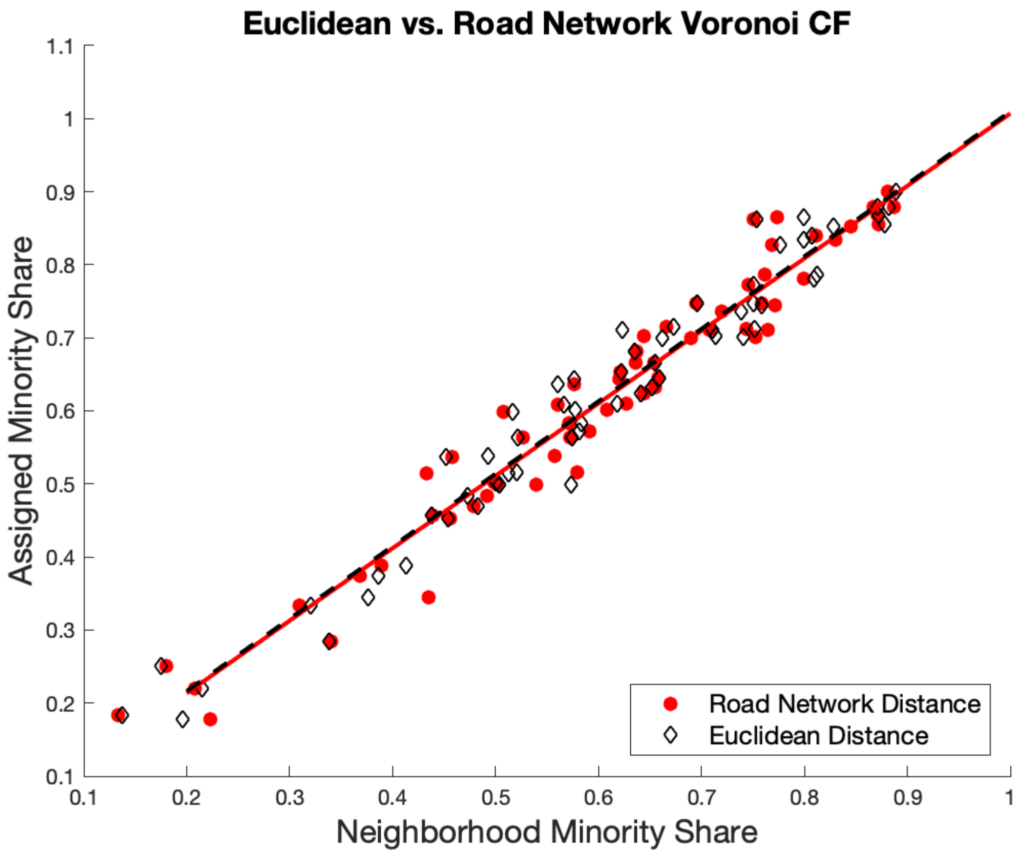
The robustness analysis concludes with a set of results that rule out additional potential threats to the main inferences made in this study. First, I show that the results are robust to the functional form specification of control variables (appendix Table 7). Second, I show that the results are robust to using the index of dissimilarity when measuring segregation, and also to using a flexible measure of school boundary segregation based on the OLS slope between neighborhood and assignment demographic compositions (appendix Table 8), an approach first exemplified in the bottom panel of Figure 2 of the main text. Finally, I establish that the results are not overly sensitive to splitting the sample into districts with (probable) recent school boundary changes versus those with 'old' school assignment maps (appendix Table 9). This last consideration is important, as it brings evidence to the concern that results could be sensitive to long-run equilibrium dynamics and sorting in the real estate market.

Figure 1: Eight school attendance boundary map observations



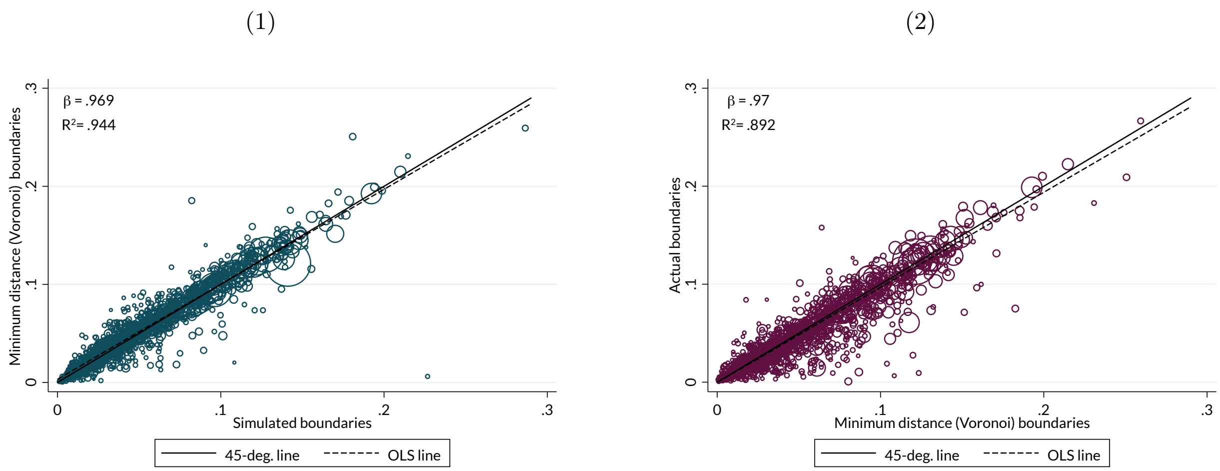
Note: Figure plots the jurisdiction and 2013-14 school attendance boundaries (SABs) of eight school district observations in the analysis dataset (in order from top left across columns) : City of Chicago SD 299, IL ; Riverside USD, CA; Charlotte-Mecklenburg Schools, NC; Oakland USD, CA; Tucson USD,AZ; DC Public Schools, DC; Springfield SD, MA; East Baton Rouge Schools, LA. The analysis dataset contains 1,578 of these maps. The heat coloring denotes the racial composition (fraction Black or Hispanic) of each SAB – lighter colors denote low fraction minority.

Figure 2: Assignment composition and composition in minimum distance zones, based on Euclidean and road network distance.



Note: Scatter plot summarizes bivariate relationship of the racial composition of Fresno USD's school attendance boundaries (SABs). In red circles, I plot the racial composition (fraction black or hispanic) of a school's existing 2013-14 SAB against counterfactual racial composition based on minimum road network distance (RND) zoning. In black diamonds, I present a similar plot, with counterfactuals defined using the minimum Euclidean distance.

Figure 3: Segregation of population below 185% of the federal poverty line in actual, minimum distance, and simulated school attendance boundaries.



Note: The figure shows two population-weighted district level scatter plots (N = 1,578) of minority (Black or Hispanic) segregation across three public school assignment rules. Estimates are based on census block data aggregated to the school boundary level. Panel (1) plots segregation from minimum distance (Voronoi) boundaries against the mean level of segregation in 1,000 simulations of Voronoi boundaries based on random school locations. Panel (2) plots the level of segregation in actual school boundaries against segregation in minimum distance boundaries. Both plots show the forty-five degree line for reference.

Table 1: SABS Summary Statistics – Sample Restriction Cascade

	(1) All disricts	(2) Non-defacto	(3) N schools > 5	(4) Diverse
Panel A: School Demographics				
Assignments (SAB)	8575.65	8311.64	8624.55	8726.66
% Black	0.11	0.14	0.15	0.15
% Hispanic	0.17	0.19	0.21	0.21
% White	0.65	0.60	0.57	0.56
% FRL	0.33	0.33	0.34	0.34
Voronoi neighborhood	6533.97	7065.94	7236.68	7311.94
% Black	0.11	0.13	0.14	0.15
% Hispanic	0.16	0.19	0.20	0.21
% White	0.66	0.61	0.58	0.57
% FRL	0.32	0.32	0.33	0.33
Enrollment	483.29	524.27	542.10	547.92
% Black	0.14	0.17	0.18	0.19
% Hispanic	0.24	0.27	0.29	0.30
% White	0.53	0.46	0.43	0.41
% FRL	0.56	0.57	0.59	0.59
Panel B: Characteristics of SABs				
Mean distance to assigned blocks (km)	3.30	2.45	2.19	2.12
Black pop. weight	3.11	2.39	2.17	2.11
White pop. weight	3.35	2.47	2.21	2.14
Mean distance to nearest blocks (km)	2.84	2.00	1.75	1.69
Black pop. weight	2.60	1.89	1.66	1.61
White pop. weight	2.91	2.06	1.80	1.74
Multiple Assignment SAB	0.12	0.15	0.15	0.15
Satellite SAB	0.13	0.11	0.11	0.11
Panel C: Characteristics of Districts				
Total population	420694.99	545037.03	632748.34	650741.12
% Black	0.11	0.13	0.14	0.14
% Hispanic	0.16	0.18	0.20	0.20
% White	0.66	0.61	0.58	0.57
% FRL	0.32	0.32	0.33	0.33
Median household income	56229.22	57213.11	56906.24	57117.54
South	0.36	0.41	0.43	0.44
Northeast	0.14	0.12	0.10	0.10
Midwest	0.26	0.21	0.18	0.18
West	0.24	0.26	0.28	0.28
N schools	37755	28894	24759	24032
N school districts (LEAs)	10369	3053	1684	1582
Defacto School Districts	✓			
Open enrollment districts	✓			
Small Districts	✓	✓		
Undiverse Districts	✓	✓	✓	

Note: This table reports mean characteristics of school attendance boundaries (SAB) in school districts included in the SY 2013-2014 School Attendance Boundary Survey (SABS), produced by NCES. Panel A summarizes the 2010 demographics of census blocks assigned to schools via attendance boundaries using GIS software. Enrollment counts for are from the Common Core of Data for the same school year. Panel B reports geographical characteristics of SABs. Distance to school per student is measured as the population-weighted mean Euclidean distance between census block centroids and school locations. Multiple assignment SABs refers to instances in which boundaries overlap. Discontiguous SABs, composed of disconnected polygons. Columns show increasingly restrictive samples. Defacto school districts administer only one school for each school grade. Undiverse districts are those with less 3% fraction minority, and those with more than 97% fraction minority.

Table 2: Decomposition of district level segregation in Middle School assignments

	URM	Black-White	Hispanic-White	FRL
	(1)	(2)	(3)	(4)
Segregation in school assignment				
Mean	9.56	8.05	6.13	4.34
Decomposition (%)				
Residential (R)	109.70	115.45	105.91	110.96
Boundaries (B)	-11.49	-18.41	-6.67	-12.28
Sites (L)	1.79	2.96	0.76	1.32
Assignment-neighborhood OLS				
	0.88	0.79	0.85	1.09
Variance	1.18	1.26	0.66	0.13
Decomposition (%)				
Var(R)	115.06	128.83	111.28	102.73
Var(B)	8.13	14.59	5.02	18.86
Var(L)	3.08	2.07	2.98	8.13
2Cov(R,B)	-22.92	-49.35	-12.79	-20.29
2Cov(R,L)	-2.03	5.16	-5.55	-1.24
2Cov(B,L)	-1.32	-1.29	-0.94	-8.18
Segregation in school enrollment				
Mean	11.71	10.61	8.51	11.37
Variance	1.40	1.94	0.99	0.99
Total Obs.	1,296	1,296	1,296	1,296

Note: Table shows the mean and variance of district level segregation in middle school assignments across four definitions. See notes for Table 1 in the main text.

Table 3: Decomposition of district level segregation in High School assignments

	URM	Black-White	Hispanic-White	FRL
	(1)	(2)	(3)	(4)
Segregation in school assignment				
Mean	9.09	8.65	5.82	3.83
Decomposition (%)				
Residential (R)	106.56	101.80	104.92	111.95
Boundaries (B)	-10.21	-8.63	-5.99	-13.82
Sites (L)	3.64	6.83	1.08	1.87
Assignment-neighborhood OLS				
	0.83	0.87	0.76	-1.11
Variance	1.02	1.63	0.61	0.10
Decomposition (%)				
Var(R)	101.94	91.91	107.90	105.06
Var(B)	9.34	5.19	7.92	22.62
Var(L)	4.79	2.64	4.01	12.27
2Cov(R,B)	-10.01	-6.64	-7.42	-25.38
2Cov(R,L)	-4.68	8.71	-11.13	-6.34
2Cov(B,L)	-1.39	-1.82	-1.27	-8.24
Segregation in school enrollment				
Mean	9.97	10.32	6.81	8.73
Variance	0.82	1.86	0.55	0.63
Total Obs.	914	914	914	914

Note: Table shows the mean and variance of district level segregation in middle school assignments across four definitions. See notes for Table 1 in the main text.

Table 4: School assignments and segregation of school enrollments

Enrollment Segregation	URM		Black-White		FRL	
	(1)	(2)	(3)	(4)	(5)	(6)
Residental Segegation	0.925***	0.998***	1.081***	1.031***	2.041***	1.923***
	(0.041)	(0.037)	(0.027)	(0.031)	(0.136)	(0.160)
School Boundaries	0.852***	0.861***	0.716***	0.831***	2.145***	1.741***
	(0.118)	(0.100)	(0.120)	(0.103)	(0.287)	(0.257)
School Sites	1.587***	1.650***	1.102***	1.025***	2.440***	2.527***
	(0.205)	(0.183)	(0.187)	(0.168)	(0.559)	(0.518)
Covariates		✓		✓		✓
Mean	.168		.142		.18	
SD	.13		.171		.128	
R^2	0.75	0.83	0.92	0.94	0.49	0.64
N	1,578	1,577	1,578	1,577	1,578	1,577

Note: Robust standard errors reported in parenthesis. In all specifications, the dependent variable is a district level racial gap, defined as $\bar{Y}_j^{nm} - \bar{Y}_j^{m}$, where $\bar{Y}_j^{r}$ is the district average of the outcome for students in racial group $r = nm, m$, non-minorities and minorities, according to the definition of segregation. The outcome is the segregation (variance ratio index, equation 1) of K-4 school enrollment based on three definitions: under-represented minorities (URM), Black or Hispanic students, from others; Black-White segregation; and free or reduced price lunch (FRL) segregation based on ACS 5-year block group estimates of the share of the population living within 185% of the federal poverty line, the cutoff for the FRL program.

Table 5: Correlates of school boundaries' contribution to segregation in school assignments

School boundary segregation	URM			Black-White			Hispanic-White			FRL		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Active order	-1.60***	-1.51***	-1.37***	-1.79***	-1.69***	-1.54***	-0.09	-0.13	-0.14	-0.64***	-0.51**	-0.44*
	(0.46)	(0.46)	(0.48)	(0.45)	(0.43)	(0.47)	(0.22)	(0.22)	(0.23)	(0.21)	(0.23)	(0.24)
Rescinded order	-0.64*	-0.42	-0.30	-1.08***	-0.77**	-0.59	-0.10	-0.11	-0.05	-0.02	0.14	0.24
	(0.36)	(0.38)	(0.39)	(0.41)	(0.39)	(0.37)	(0.16)	(0.17)	(0.18)	(0.18)	(0.21)	(0.21)
GSS intolerance	0.91**	1.06**	1.16**	0.67	0.85*	0.62	0.45**	0.43**	0.47**	0.72***	0.74***	0.63**
	(0.43)	(0.44)	(0.53)	(0.46)	(0.43)	(0.48)	(0.20)	(0.20)	(0.22)	(0.25)	(0.25)	(0.27)
Kerry-to-Obama swing	0.05*	0.08**	0.10***	0.03	0.05	0.08**	0.00	-0.00	0.01	0.00	0.02	0.03*
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Bizarreness of jurisdiction	0.34***	0.32***	0.24**	0.36***	0.33***	0.20**	0.11**	0.10*	0.06	0.20***	0.18***	0.16***
	(0.12)	(0.11)	(0.10)	(0.12)	(0.12)	(0.10)	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.05)
Log population	0.44***	0.39**	0.33**	0.34**	0.33*	0.28*	0.20***	0.20**	0.21**	0.27***	0.26***	0.22**
	(0.14)	(0.17)	(0.15)	(0.15)	(0.18)	(0.15)	(0.07)	(0.09)	(0.09)	(0.07)	(0.08)	(0.09)
District share	0.92**	1.77***	2.01***	1.13	2.02*	2.05*	-0.81***	-0.91***	-1.06***	0.20	0.51	1.28
	(0.39)	(0.58)	(0.77)	(1.18)	(1.21)	(1.19)	(0.28)	(0.32)	(0.38)	(0.38)	(1.11)	(1.16)
White-URM log income gap		-2.27*	-1.88		-0.16	-0.93		-0.24	-0.09		0.10	0.15
		(1.18)	(1.27)		(1.38)	(1.41)		(0.77)	(0.77)		(0.68)	(0.78)
Charter enrollment share		-0.46	0.04		-0.92	-0.60		-0.11	0.06		-0.30	-0.33
		(0.60)	(0.63)		(0.69)	(0.66)		(0.35)	(0.35)		(0.34)	(0.37)
Private enrollment share		-0.72	-0.45		-1.07*	-0.56		0.01	0.08		-0.34	-0.08
		(0.65)	(0.64)		(0.65)	(0.63)		(0.31)	(0.30)		(0.32)	(0.35)
Log income		-0.30	-0.14		0.14	0.19		-0.33	-0.37		0.49	0.91*
		(0.41)	(0.43)		(0.39)	(0.40)		(0.21)	(0.25)		(0.46)	(0.55)
Bachelor's degree share		2.93**	2.71**		0.12	0.17		0.42	0.43		-1.01	-1.27
		(1.19)	(1.19)		(0.86)	(0.90)		(0.55)	(0.60)		(0.81)	(0.92)
Min. dist. SAB segregation	-34.40***	-33.92***	-34.77***	-53.31***	-51.77***	-49.60***	-13.55	-13.59	-17.59**	-30.05***	-30.06***	-30.98***
	(7.83)	(7.80)	(7.56)	(14.65)	(14.18)	(14.16)	(8.56)	(8.62)	(7.46)	(4.97)	(5.17)	(4.92)
Simulated SAB segregation	31.11***	31.74***	31.62***	52.93***	51.89***	50.16***	12.89	13.15	16.20**	22.86***	23.65***	24.54***
	(7.87)	(7.90)	(7.44)	(14.58)	(14.10)	(14.13)	(8.32)	(8.42)	(7.19)	(5.36)	(5.55)	(5.28)
Constant	-5.12***	-1.55	-2.84	-3.99**	-4.72	-5.04	-2.30***	1.33	1.73	-2.96***	-7.65	-12.18**
	(1.45)	(4.84)	(4.95)	(1.56)	(4.49)	(4.90)	(0.76)	(2.45)	(2.78)	(0.73)	(5.04)	(6.18)
Region FE		✓			✓			✓			✓	
State FE			✓			✓			✓			✓
R^2	0.12	0.13	0.18	0.14	0.16	0.20	0.05	0.05	0.11	0.12	0.14	0.19
N	1,578	1,578	1,577	1,578	1,578	1,577	1,578	1,578	1,577	1,578	1,578	1,577

Note: Robust standard errors reported in parenthesis. Dependent variable in all models is the school boundary component of segregation in school assignments. SAB controls are the level of segregation in minimum distance (Voronoi boundaries based on school locations) and in simulated boundaries (based on the average of 1,000 simulations of Voronoi boundaries based on randomly located schools). Omitted covariates are US region indicators, state indicators, and indicator for missing GSS index.

Table 6: Correlates of the school siting component of segregation in school assignments

School site component	URM			Black-White			Hispanic-White			FRL		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Active order	0.09	-0.04	-0.07	0.49**	0.42**	0.40**	-0.15	-0.19	-0.20	-0.12	-0.14	-0.12
	(0.34)	(0.36)	(0.33)	(0.20)	(0.20)	(0.19)	(0.29)	(0.31)	(0.26)	(0.20)	(0.21)	(0.19)
Rescinded order	0.51**	0.29	0.24	0.19	0.10	0.09	0.27	0.21	0.23	0.04	0.00	-0.00
	(0.24)	(0.19)	(0.19)	(0.16)	(0.16)	(0.17)	(0.18)	(0.14)	(0.14)	(0.13)	(0.10)	(0.11)
GSS intolerance	0.22	0.07	0.21	0.15	0.04	0.04	0.31	0.33	0.33	0.09	0.04	0.06
	(0.23)	(0.24)	(0.26)	(0.17)	(0.19)	(0.22)	(0.21)	(0.21)	(0.20)	(0.13)	(0.12)	(0.13)
Kerry-to-Obama swing	0.00	-0.00	-0.04**	0.01	0.01	0.00	0.00	0.00	-0.01	0.01	0.01	-0.02*
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Bizarreness of jurisdiction	-0.17*	-0.14*	-0.09	0.00	0.01	0.02	-0.12*	-0.12*	-0.09*	-0.06	-0.04	-0.03
	(0.10)	(0.08)	(0.06)	(0.04)	(0.04)	(0.04)	(0.07)	(0.06)	(0.06)	(0.06)	(0.05)	(0.04)
Log population	-0.21*	-0.21*	-0.28**	0.12*	0.15**	0.17**	-0.09	-0.09	-0.17*	-0.10	-0.11	-0.15
	(0.12)	(0.12)	(0.14)	(0.06)	(0.07)	(0.07)	(0.07)	(0.09)	(0.10)	(0.08)	(0.08)	(0.09)
District share	-0.02	0.16	0.30	1.38**	1.16*	1.21	-0.59*	-0.48	-0.52	0.25	1.19	1.85*
	(0.24)	(0.33)	(0.43)	(0.60)	(0.65)	(0.80)	(0.32)	(0.35)	(0.34)	(0.30)	(0.77)	(0.97)
White-URM log income gap		-1.17	-0.33		0.22	0.40		0.81	1.35*		-0.45	-0.27
		(1.06)	(1.05)		(0.60)	(0.74)		(0.76)	(0.80)		(0.53)	(0.53)
Charter enrollment share		-0.28	-0.45		-0.09	-0.20		-0.28	-0.29		-0.23	-0.31
		(0.41)	(0.44)		(0.34)	(0.42)		(0.31)	(0.29)		(0.20)	(0.21)
Private enrollment share		0.56	0.62		0.18	0.13		0.17	0.36		0.14	0.35
		(0.52)	(0.59)		(0.36)	(0.37)		(0.36)	(0.39)		(0.31)	(0.38)
Log income		-0.48*	-0.23		-0.12	-0.10		-0.18	0.06		0.30	0.71
		(0.26)	(0.26)		(0.15)	(0.21)		(0.18)	(0.18)		(0.33)	(0.44)
Bachelor's degree share		1.24	0.68		-0.39	-0.48		0.01	-0.53		0.07	-0.35
		(0.87)	(0.84)		(0.41)	(0.52)		(0.45)	(0.56)		(0.54)	(0.58)
Simulated SAB segregation	-0.36	0.00	-0.20	-0.44	-0.48	-0.70	-0.21	-0.76	-0.98	-0.99	-0.69	-0.82
	(0.97)	(1.15)	(1.27)	(0.78)	(0.93)	(1.10)	(1.85)	(1.92)	(1.79)	(1.54)	(1.78)	(1.99)
Constant	2.64*	7.52**	5.49	-1.30*	-0.50	-0.84	1.32	3.11	1.55	1.35	-2.05	-6.32
	(1.45)	(3.62)	(3.42)	(0.74)	(1.70)	(2.56)	(0.84)	(2.46)	(2.23)	(0.95)	(3.85)	(4.62)
Region FE		✓			✓			✓			✓	
State FE			✓			✓			✓			✓
R^2	0.06	0.07	0.12	0.06	0.07	0.10	0.08	0.09	0.15	0.04	0.05	0.08
N	1,578	1,578	1,577	1,578	1,578	1,577	1,578	1,578	1,577	1,578	1,578	1,577

Note: Robust standard errors reported in parenthesis. Dependent variable in all models is the school siting component of segregation in school assignments. SAB control is the level of segregation in simulated boundaries (based on the average of 1,000 simulations of Voronoi boundaries based on randomly located schools). Omitted covariates are US region indicators, state indicators, and indicator for missing GSS index.

Table 7: Robustness of Main Results to Covariate Specification

School site component	URM		Black-White		Hispanic-White		FRL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active order	-1.528***	-1.326***	-1.353***	-1.213**	-0.192	-0.027	-0.536**	-0.462*
	(0.436)	(0.472)	(0.433)	(0.488)	(0.210)	(0.255)	(0.232)	(0.237)
Rescinded order	-0.232	-0.178	-0.079	-0.293	-0.072	-0.112	0.218	0.231
	(0.363)	(0.407)	(0.369)	(0.370)	(0.181)	(0.187)	(0.199)	(0.209)
Log population	0.546***	0.339**	0.509***	0.328**	0.232***	0.295***	0.271***	0.264***
	(0.139)	(0.143)	(0.151)	(0.144)	(0.078)	(0.098)	(0.080)	(0.084)
Bizarreness of jurisdiction	0.223**	0.233**	0.213**	0.221**	0.061	0.089*	0.170***	0.162***
	(0.091)	(0.091)	(0.094)	(0.097)	(0.047)	(0.049)	(0.053)	(0.052)
Kerry-to-Obama swing	0.082**	0.069*	0.084**	0.079*	0.016	0.010	0.031**	0.027*
	(0.038)	(0.038)	(0.042)	(0.043)	(0.018)	(0.017)	(0.015)	(0.016)
GSS intolerance	0.897*	0.766	0.517	0.524	0.457**	0.482**	0.501*	0.540**
	(0.473)	(0.505)	(0.492)	(0.445)	(0.219)	(0.237)	(0.267)	(0.267)
Discretized cov.	✓		✓		✓		✓	
Quartic polynomial cov.		✓		✓		✓		✓
State FE	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.185	0.219	0.176	0.254	0.100	0.148	0.190	0.202
N	1,577	1,577	1,577	1,577	1,577	1,577	1,577	1,577

Note: Robust standard errors reported in parenthesis. Dependent variable in all models is school boundary desegregation, defined for the racial and socioeconomic groupings denoted. Base omitted controls are the level of segregation in minimum distance and in simulated boundaries, log population and the district share minority. Omitted extra covariates are log income, the share of the population with a bachelor's degree, indicators for the status of desegregation orders, and the share of enrollment at charter and private schools.

Table 8: Robustness to segregation index definition

Panel A: OLS mapping	URM		Black-White		Hispanic-White		FRL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active order	-0.078***	-0.068***	-0.094***	-0.088***	-0.026	-0.007	-0.025*	-0.019
	(0.017)	(0.020)	(0.024)	(0.029)	(0.016)	(0.019)	(0.013)	(0.016)
Rescinded order	-0.040***	-0.021	-0.028	-0.027	0.009	0.022	-0.018	-0.007
	(0.014)	(0.015)	(0.022)	(0.024)	(0.015)	(0.017)	(0.014)	(0.015)
Log population	0.020***	0.018***	0.039***	0.043***	0.012*	0.008	0.009	0.009
	(0.006)	(0.006)	(0.009)	(0.010)	(0.007)	(0.008)	(0.007)	(0.006)
District share	-0.022	-0.037	0.073	0.074	0.007	-0.061**	-0.059*	0.018
	(0.021)	(0.040)	(0.060)	(0.075)	(0.022)	(0.031)	(0.033)	(0.105)
Bizarreness	0.013***	0.006	0.018**	0.013**	0.009**	0.006	0.015***	0.013***
	(0.004)	(0.004)	(0.007)	(0.006)	(0.005)	(0.004)	(0.005)	(0.004)
Kerry-to-Obama swing		0.004*		0.006**		0.001		0.004***
		(0.002)		(0.003)		(0.002)		(0.001)
GSS intolerance		0.027		0.021		0.038		0.037*
		(0.023)		(0.031)		(0.025)		(0.020)
Base Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Ext. Covariates		✓		✓		✓		✓
State FE		✓		✓		✓		✓
R^2	0.082	0.155	0.100	0.139	0.089	0.158	0.056	0.123
N	1,578	1,577	1,578	1,577	1,578	1,577	1,578	1,577
Panel B: Dissimilarity	URM		Black-White		Hispanic-White		FRL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active order	-2.069***	-1.888***	-2.637***	-2.356***	-0.519	-0.574	-0.962**	-0.422
	(0.599)	(0.625)	(0.651)	(0.713)	(0.505)	(0.537)	(0.403)	(0.461)
Rescinded order	-0.652	-0.400	-1.579**	-0.976*	0.270	0.221	0.015	0.572
	(0.489)	(0.496)	(0.639)	(0.588)	(0.410)	(0.417)	(0.365)	(0.386)
Log population	0.627***	0.669***	0.875***	0.929***	0.446**	0.498**	0.415**	0.428**
	(0.230)	(0.220)	(0.257)	(0.267)	(0.178)	(0.212)	(0.167)	(0.170)
District share	2.769***	4.227***	3.295**	4.654***	1.510**	0.775	0.208	5.466**
	(0.540)	(1.167)	(1.529)	(1.610)	(0.588)	(0.879)	(0.698)	(2.357)
Bizarreness	0.517***	0.402***	0.732***	0.493***	0.318**	0.228**	0.388***	0.293***
	(0.167)	(0.135)	(0.219)	(0.168)	(0.131)	(0.104)	(0.139)	(0.104)
Kerry-to-Obama swing		0.139**		0.131**		0.066*		0.054*
		(0.057)		(0.065)		(0.040)		(0.032)
GSS intolerance		1.809***		1.276*		1.714***		1.162**
		(0.670)		(0.724)		(0.586)		(0.532)
Base Covariates	✓	✓	✓	✓	✓	✓	✓	✓
Ext. Covariates		✓		✓		✓		✓
State FE		✓		✓		✓		✓
R^2	0.139	0.208	0.146	0.209	0.101	0.190	0.124	0.209
N	1,578	1,577	1,578	1,577	1,578	1,577	1,578	1,577

Note: Robust standard errors reported in parenthesis. The variance ratio-based desegregation index is the one used in the main results of the paper. The dissimilarity-based desegregation index is defined as in equation (2), but using the dissimilarity index to measure segregation. The regression-based desegregation index is defined as one minus the OLS slope of a regression of boundary on neighborhood racial composition, as in Figure 2. Omitted covariates are the level of segregation in minimum distance and in simulated boundaries, log population and the district share minority, log income, the share of the population with a bachelor's degree, indicators for the status of desegregation orders, and the share of enrollment at charter and private schools.

Table 9: Robustness to recent school boundary changes

Stable Boundary Sample	URM		Black-White		Hispanic-White		FRL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active order	-2.772***	-2.772***	-2.363***	-2.363***	-0.622*	-0.622*	-0.641*	-0.641*
	(0.746)	(0.746)	(0.678)	(0.678)	(0.350)	(0.350)	(0.341)	(0.341)
Rescinded order	-0.665	-0.665	-0.684	-0.684	-0.162	-0.162	-0.115	-0.115
	(0.513)	(0.513)	(0.491)	(0.491)	(0.222)	(0.222)	(0.221)	(0.221)
Log population	0.349**	0.349**	0.197	0.197	0.076	0.076	0.237***	0.237***
	(0.165)	(0.165)	(0.165)	(0.165)	(0.092)	(0.092)	(0.091)	(0.091)
Bizarreness	0.118	0.118	0.237**	0.237**	-0.044	-0.044	0.087	0.087
	(0.092)	(0.092)	(0.101)	(0.101)	(0.039)	(0.039)	(0.056)	(0.056)
Kerry-to-Obama swing	0.011	0.011	-0.004	-0.004	-0.005	-0.005	0.035**	0.035**
	(0.038)	(0.038)	(0.033)	(0.033)	(0.018)	(0.018)	(0.018)	(0.018)
GSS intolerance	-0.240	-0.240	-0.422	-0.422	0.107	0.107	0.048	0.048
	(0.406)	(0.406)	(0.405)	(0.405)	(0.238)	(0.238)	(0.222)	(0.222)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
State FE		✓		✓		✓		✓
R^2	0.224	0.224	0.304	0.304	0.109	0.109	0.199	0.199
N	1,103	1,103	1,103	1,103	1,103	1,103	1,103	1,103
Boundary Change Sample	URM		Black-White		Hispanic-White		FRL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active order	-0.441	-0.441	-0.569	-0.569	-0.022	-0.022	-0.200	-0.200
	(0.612)	(0.612)	(0.624)	(0.624)	(0.300)	(0.300)	(0.335)	(0.335)
Rescinded order	0.475	0.475	0.477	0.477	-0.025	-0.025	0.544	0.544
	(0.536)	(0.536)	(0.487)	(0.487)	(0.289)	(0.289)	(0.336)	(0.336)
Log population	0.105	0.105	0.401	0.401	0.336**	0.336**	0.217*	0.217*
	(0.217)	(0.217)	(0.245)	(0.245)	(0.150)	(0.150)	(0.115)	(0.115)
Bizarreness	0.196	0.196	0.042	0.042	0.066	0.066	0.118	0.118
	(0.155)	(0.155)	(0.148)	(0.148)	(0.087)	(0.087)	(0.078)	(0.078)
Kerry-to-Obama swing	0.139*	0.139*	0.092	0.092	0.016	0.016	0.011	0.011
	(0.072)	(0.072)	(0.068)	(0.068)	(0.033)	(0.033)	(0.030)	(0.030)
GSS intolerance	2.202***	2.202***	0.891	0.891	0.823*	0.823*	0.880**	0.880**
	(0.809)	(0.809)	(0.648)	(0.648)	(0.428)	(0.428)	(0.422)	(0.422)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
State FE		✓		✓		✓		✓
R^2	0.315	0.315	0.365	0.365	0.244	0.244	0.328	0.328
N	473	473	473	473	473	473	473	473

Note: Robust standard errors reported in parenthesis. Dependent variable in all models is school boundary desegregation, defined for the racial and socioeconomic groupings denoted. Base omitted controls are the level of segregation in minimum distance and in simulated boundaries, log population and the district share minority. Omitted extra covariates are log income, the share of the population with a bachelor's degree, indicators for the status of desegregation orders, and the share of enrollment at charter and private schools.