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Racial Disparities in School Poverty and Spending: Examining Allocations Within and Across Districts

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Racial Disparities in School Poverty and Spending: Examining Allocations Within and Across Districts

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Abstract

Using recently available school-level finance data, we compare exposure to low-income classmates and average per pupil spending for black, Hispanic, and white students. Using within metropolitan area comparisons, we find that the typical black and Hispanic students attend schools with much higher proportions of low-income students than the typical white student, and that per pupil spending in the typical black and Hispanic students' schools is higher than in the typical white student's school. Drawing on estimates of the additional spending required to provide low-income students equal educational opportunity, we find that it is unlikely that the additional spending in schools where black and Hispanic students tend to enroll is sufficient to address the high level of student need in these schools. Middle range estimates indicate that cost-adjusted spending the typical black and Hispanic students' schools is only 88 percent of that in the average white student's school. Approximately 40 percent of the racial disparities in cost-adjusted spending are due to differences across schools within districts, although within district disparities play a much greater role in the South and West than in the Northeast and Midwest. Racial disparities are largest in the Northeast, and racial disparities across districts did not change significantly between 2006 and 2008.

JEL No.: I20, I22, I24

Keywords: Racial Inequality; Education Finance

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I. Introduction

Racial segregation across schools and districts in the United States remains stubbornly high. A recent analysis reports that across the 100 largest metropolitan areas during the 2018-19 school year, the percentage white in the average white student's school is 43 points higher than in the average black student's school, and 30 points higher than in the average Hispanic student's school (Potter 2022). Owens (2020) reports that while Hispanic-white segregation decreased somewhat between 1990 and 2020, black-white segregation increased over the same period, and although the majority of racial segregation is due to sorting across districts, segregation across schools within districts is growing.

One potential consequence of racially segregated schools is that access to educational resources and school quality varies by race. At least two factors influence the educational experience students receive in school. One is the educational needs of students attending the school. For instance, students from low-income backgrounds, on average, will require more compensatory education and student support services to progress successfully through school. In addition, high poverty schools have difficulty attracting and retaining high quality teachers. As a result, there tends to be greater claims on resources in schools with greater poverty and these schools often require more spending to provide opportunities to achieve education outcomes on par with the opportunities provided by schools with lower levels of poverty.

Another factor that influences educational opportunities is school spending. If schools serving concentrations of black or Hispanic students tend to receive funding equal to or greater than schools attended by most white students, then black and Hispanic students are more likely to have opportunities to learn that are on-par with the opportunities of the typical white student. If, on the other hand, schools serving concentrations of black or Hispanic students tend to be less well-funded than the typical white student's school, educational inequalities will be exacerbated. Even with equal access to educational

funding, other factors might undermine the opportunities for black or Hispanic students, but more adequate funding is likely to mitigate these inequalities.

This paper uses new school-level finance data to estimate racial differences in exposure to low-income classmates and access to school funding across schools in U.S. metro areas during the 2018 school year.¹ We begin by documenting within metropolitan area differences in average percentages of low-income students and in average per pupil spending for black, Hispanic, and white students. We consider the extent to which these disparities are due to differences across districts and to differences across schools within districts, and assess how these disparities vary across metropolitan areas, and particularly across regions. Finally, we examine the evolution of between district disparities from 2006 to 2018. This paper adds to the literature by assessing the extent to which previously documented racial disparities persist in recent years and determining whether within-district distributions of students and spending moderate or exacerbate racial disparities.

We find that, on average, black and Hispanic students attend schools with much higher percentages of low-income students than do white students. The schools attended by the average black and Hispanic students have 28.9 and 24.5 percentage points more low-income students, respectively, than the average white student. Differences across districts and differences across schools within districts both contribute to these disparities. Both black-white and Hispanic-white disparities in exposure to low-income classmates are most marked in the Northeast. Between 2006 and 2018, these racial disparities fell, but declines slowed after 2011.

We also find that, on average, black and Hispanic students attend schools that have higher levels of per-pupil spending than schools attended by white students. When compared to other students in the

¹ Throughout the article, years refer to the fall of the school year, so 2018 is the 2018-19 school year.

same metro area, the average black and Hispanic student attended schools that spent, respectively, 6.6 percent and 3.0 percent more per pupil than the school attended by the average white student in 2018. Differences in allocations across schools within districts add to spending advantages for black and Hispanic students in some places and offset these advantages in other places. Black and Hispanic advantages in average per pupil spending fell between 2006 and 2018, driven largely by declines in the Northeast.

These findings raise the question of whether higher levels of spending in the typical black and Hispanic students' schools are sufficient to offset higher levels of student need in these schools. To address this question, we use estimates of the additional cost of serving low-income students drawn from the literature to compute adjusted measures of per pupil spending. We find that the additional spending that schools attended by black and Hispanic students receive is not sufficient to address the additional costs associated with low-income students. Using middle range estimates of the costs of serving the typical low-income students, we find that the typical black and the typical Hispanic student's school receive 12 percent less in cost adjusted per pupil spending than the typical white student's school. The disparities are particularly large in the Northeast. The distribution of students and spending across schools within districts plays a significant role in generating these racial disparities, particularly in the South and the West. Finally, these disparities were virtually the same in 2018 as they were in 2006.

The estimated cost-adjusted disparities hinge on estimates of how much more it costs to educate low-income students. We find that to achieve black-white and Hispanic-white spending parity, the low-income pupil weight would need to be 0.25 and 0.13, respectively, indicating that, on average, low-income students require 25 (or 13) percent additional spending to have the same chance of achieving educational outcomes as non-poor students. These weights are well below the range estimated in the literature, suggesting that it is unlikely that the additional spending provided to the average black and

Hispanic students' schools is sufficient to provide black and Hispanic students equal educational opportunities.

The rest of the paper is organized as follows. Section II provides a conceptual framework relating school segregation, education finance, and equal educational opportunity, and reviews previous literature on this topic. Section III describes the data and sample. Sections IV and V describe racial differences in the percentages of low-income students and in per pupil spending in the schools attended by the typical black, white, and Hispanic students. Section VI presents disparities in per pupil spending adjusted for the additional costs associated with low-income students. Section VII concludes.

II. Segregation, Resources, and Equal Educational Opportunity

For several reasons, school segregation might affect educational opportunities for white, black, and Hispanic students. One important factor is differences in exposure to low-income classmates. In places where black or Hispanic families are significantly more likely to be poor than white families, racial and ethnic segregation is likely to result in larger proportions of black and Hispanic students than white students attending schools with significant concentrations of poverty. Concentrated poverty makes the challenges of providing high quality educational environments and services more costly. Ample evidence shows that teachers demand salary premiums to teach in schools with concentrated poverty and that such schools have difficulty attracting and retaining high quality teachers (Lankford, Loeb, and Wyckoff 2002; Loeb, Darling-Hammond, and Luczak 2005; Clotfelter et al. 2007; Ronfeldt, Loeb, and Wyckoff 2013). Also, students from low-income families are more likely to come to school with educational deficits and other service needs that require intensive resources to address (Downey, Von Hippel, and Broh 2004; Duncombe and Yinger 2005; Borman and Benson 2010; Gershenson 2013), which place more demands on school resources. Finally, if the needs of students from poor families are unaddressed,

classroom and peer environments may be less conducive to educational achievement (Rumberger & Palardy 2005; Hoxby and Weingarh 2005).

The isolation of black and Hispanic students in low-wealth districts might also contribute to differences in educational opportunity (Rothstein 2017; Lukes and Cleveland 2021). Given the reliance of schools on local property taxes for funding, such isolation of black and Hispanic students can lead to less than adequate access to school resources. Such effects might be compounded by low demand for education among white populations residing in districts serving high proportions of minority students (Poterba 1997; Ladd and Murray 2001; Figlio and Fletcher 2012). Many states have adopted school finance reforms that have served to equalize funding across districts and/or drive more resources to low-wealth and/or high poverty districts. Recent studies show that these reforms have improved student achievement in low-wealth districts and/or reduced achievement disparities (Jackson, Johnson, and Persico 2016; Lafortune, Rothstein, and Schanzenbach 2018). Whether these intergovernmental aid programs are enough to offset differences in local wealth and demand or the higher level of need in districts and schools where many black and Hispanic students are enrolled remains an open question.

Less is known about the allocation of resources within districts. Some large urban districts have adopted funding formulas or other programs that provide additional resources to schools with higher levels of poverty and other student needs, which might serve to drive more funding toward schools with higher proportions of non-white students. On the other hand, in many districts, teacher compensation is a primary determinant of the distribution of spending across schools. Due to assignment policies that favor the preferences of more senior teachers, schools with lower levels of poverty and fewer non-white students often have more experienced, higher paid teachers. Absent offsetting policies that drive more resources to high need schools, this dynamic can lead to higher levels of spending in schools with fewer non-white students.

Several studies have examined the relationship between segregation, school funding and student opportunities. Evidence indicates that desegregation after *Brown v. Board of Education* improved black students' outcomes through increased exposure to higher resourced schools (Reber, 2010; Johnson, 2011). However, the extent to which desegregation efforts and subsequent efforts to reform school finance systems have leveled the playing field for students from different racial groups remains unclear.

Bifulco (2005) evaluates racial spending gaps in consolidated metropolitan areas across the U.S. from 1987-2002. He finds that after adjusting for differences in teacher costs, economies of size, and the costs associated with low-income students, spending in the average black student's district is 16 percent less than is needed to allow students an equal opportunity to achieve the same standards as students in the average white student's district. Looking at a later period, Rothbart (2020) finds that school finance reforms between 1996 and 2011 resulted in school districts with higher shares of non-white, non-Asian students receiving modestly larger state aid increases than districts with lower shares of non-white, non-Asian students, providing evidence that school finance reforms may have helped to close across-district racial gaps in funding. Examining a similar period, Sosina and Weathers (2019) find that increases in racial/ethnic segregation across districts from 1999 through 2013 are associated with increased racial/ethnic disparities in spending, controlling for differences in poverty levels across districts. This finding suggests that increases in segregation among black and Hispanic students may offset some of the effects of school finance reform on equalizing educational opportunities.

A small set of studies have examined spending disparities across schools within districts. A few studies have examined variation in spending across schools in the same district (Stiefel, Rubenstein, and Berne 1998; Burke 1999; Rubenstein et al. 2007). Although somewhat dated and mostly based on small samples, these studies find that in at least some districts, schools with higher percentages of poor students receive more money and have more teachers per pupil. Lee, Shores, and Williams (2022)

update prior literature with a nationwide examination to find that spending at the state and district level favors racial and ethnic minorities and disadvantaged students; these students receive between \$200 to \$400 more per-pupil.

Three studies, however, suggest that the additional funding districts allocate to high poverty schools may not be sufficient to address needs. Rubenstein et al. (2007) and Lee, Shores, and Williams (2022) find that despite higher levels of per pupil funding, schools with larger concentrations of non-white and low-income students have less qualified teachers. Carr, Gray, and Holley (2007) examine the relationship between per-pupil budgets and poverty rates across schools in 72 high poverty districts in Ohio and compare actual school budgets to estimates of how much funding schools would receive if districts employed the state's per pupil weights to determine how much extra funding to allocate to schools with higher levels of poverty. They find that the additional funding received by high poverty schools is insufficient to address the additional cost of education in those schools.

The current study contributes to this literature in several ways. First, using recently released nationwide data on school level spending, we compare percentages of low-income students and per pupil spending in the average black and Hispanic students' schools to the average white student's school. This data allows us to examine the extent to which racial disparities are due to differences across districts within metropolitan areas and to differences across schools within districts. Second, we examine how disparities across districts within metropolitan areas have changed over time. Third, using measures developed by Bifulco (2005) and conceptually similar to those used by Carr, Gray, and Holley (2007), we develop measures of racial disparities that account for both the distribution of spending across schools and the additional costs in schools that have higher proportions of low-income students. Unlike Bifulco (2005), we compute these disparity measures using school as well as district-level spending measures, and thus, can provide more precise as well as more recent estimates.

III. Data and Sample

The data used for the analysis are drawn from National Center for Education Statistics' Common Core of Data (CCD) district-level enrollment, directory, and finance files, and the CCD school-level enrollment and directory files for the 2006 to 2018 school year. School-level spending estimates are drawn from data recently made available for the 2018 school year through the Edunomics Lab School Spending Data Hub.

We use two samples for our analysis. The first is a sample of districts and schools located in a U.S. metropolitan areas in the 2018 school year.² The sample is limited to districts classified by the CCD as "regular local school districts" or "local school district components" that serve one or more grades between kindergarten and grade 12 and the schools serving those grades in those districts. Only districts with valid school-level and district-level finance data are included in the sample.³ We also dropped schools and districts that did not have valid counts of free-lunch eligible or economically disadvantaged students. Finally, we dropped schools and districts in metropolitan areas where less than half of the schools in the metro area remained after applying the above listed sampling restrictions. The final sample includes 342 metropolitan areas, 6,181 school districts, and 57,049 schools. The sample includes 86 percent of all regular local school districts located in metropolitan areas in the U.S. in 2018, and 84 percent of all schools with enrollment in one or more grades between kindergarten and grade 12 located

² We use the United State Office of Management Budget's 2010 definition of metropolitan statistical areas, which include areas of one or more counties that contain a city of 50,000 or more inhabitants or contain a Census Bureau-defined urbanized area (UA) and have a total population of at least 100,000 (75,000 in New England).

³ Districts and schools with per-pupil expenditures greater than \$50,000 or less than \$3,000 were dropped from the sample. Individual schools within metropolitan areas were also removed from the sample if it was flagged in the NERD\$ data as having financial variable values that are missing or implausible.

in a metropolitan area. About 75 percent of all black students and 73 percent of all Hispanic students in the U.S. in 2018 attended one of the schools in our sample.

To examine changes overtime in our measures of racial disparities we also assembled a district level panel. The panel includes all districts located in metropolitan areas that have valid data on expenditures and the number of students from economically disadvantaged families for each year from 2006 through 2018. This sample contains 6,679 districts in 364 metropolitan areas, which served 81.2 percent of all black students and 84.5 percent of all Hispanic students in the U.S. in 2018. School-level measures of spending are not available prior to 2018 and so all analyses of changes in school spending overtime are limited to district level spending data.

The key variables in our analysis are school and district measures of spending and students eligible for free-lunch, which we take as an indicator of residing in a low-income family. With the onset of direct certification for free-lunch eligibility and particularly the adoption of the Community Eligibility Provision (CEP) beginning around 2011, free-lunch eligibility has become less comparable across districts and overtime. As explained by Greenberg, Blagg, and Rainer (2019), as states adopt the CEP, some report free-lunch eligibility in CEP schools as 100 percent of students receiving free-lunch, while others report information from the most recent administration of paper forms or report direct certification counts instead. To address these issues, we use free-lunch eligibility data prepared by the Stanford Education Data Archive (SEDA), which makes a number of improvements to free-lunch eligibility data reported in the Common Core. Researchers at SEDA set free-lunch eligible rates of 100 percent in CEP schools and counts of zero equal to missing, and then draw on past years free-lunch eligibility counts, the proportion of students at each school that are classified as economically disadvantaged in EDFacts data, information provided directly by state departments of education, and schools' racial and ethnic composition, urbanicity, and grades served to impute all missing free-lunch

eligibility values.^{4,5} To determine the percent of free-lunch students in a district we roll up school-level free-lunch and enrollment counts to the district level.

School-level spending estimates are drawn from data recently made available for the 2018 school year through the National Education Resources Database on Schools (NERD\$). We use the NERD\$ per-pupil total normed spending at the school level.⁶ The normed per-pupil spending variable is comparable across states and includes salary and benefits of full-time staff as well as the school's share of central expenditures. Debt, capital, equipment, special education transfers to private schools, adult education, and pre-K expenditures are excluded from school-level spending. To evaluate district-level per pupil spending differences we use the current total expenditures variable from the CCD's F-33 school district finance survey.

Table 1 compares our 2018 school-level sample to the broader populations of schools in metropolitan areas and all schools in the U.S.⁷ For reasons discussed further below, we focus on schools and districts in metropolitan areas. Although only slightly more than half of all school districts in the U.S. are located in metropolitan areas, districts outside of metropolitan areas tend to have small enrollments.

⁴ For details see Fahle et al. (2018).

⁵ In the appendix we recompute measures of racial disparity in exposure to low-income classmates using alternative measures of school and district level poverty, and assess the extent to which inconsistencies in the reporting of free-lunch eligibility might influence our findings.

⁶ The NERD\$ norming process includes two steps. The first step is constructing a comparable per-pupil expenditure variables that accurately captures spending on day-to-day school operations. This means reconstructing per-pupil spending totals for states that include transportation, food services, etc. or other atypical expenditures in their school-level per-pupil spending variable. The second step is to adjust for differences in the ways that states count enrollment in the denominator of the per-pupil expenditure figure (e.g., attendance count vs membership).

⁷ Metropolitan areas in Maine, New Hampshire, New York, Massachusetts, Rhode Island, Connecticut, New Jersey, and Pennsylvania are classified as Northeast. Metropolitan areas in Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas are classified as South. Metropolitan areas in Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Ohio, Indiana, Illinois, Iowa, Nebraska, Missouri, and Kansas are classified as Midwest. West refers to metropolitan areas in Idaho, Washington, Colorado, Utah, New Mexico, Nevada, Oregon, and California.

Also, black and Hispanic students are overrepresented in metropolitan areas, and as a result, nearly 91 percent of all black students and 93 percent of all Hispanic students in the U.S. attend a school located in a metropolitan area. Due to the data limitations described above we are not able to include all schools and districts in metropolitan areas. However, the average number of districts in metropolitan areas in our sample is similar to that for all metropolitan areas, and the racial composition of the schools and districts in our sample is similar to that for all schools and districts located in metropolitan areas, both for the U.S. as a whole and for each of the four regions we examine.⁸

The average number of school districts in a metro area varies across regions. The Northeast has the highest average number of districts per metropolitan area, more than 40, while the South only has about 8 districts per metro. This fact may have implications for how much the racial disparities we are interested in documenting are due to between district and within district distributions of students and funding. In the Northeast, we would expect differences across relatively small and homogenous districts to play a large role, while in the South, we expect more disparities to arise within the relatively large and diverse districts there. Black students are most heavily concentrated in Southern states, while the West has relatively few black students. In contrast, the West has the highest concentration of Hispanic students, while the Midwest has relatively few Hispanic students.

Table 2 presents summary statistics for our district level panel sample. Overall enrollment in our sample did not grow from 2006 to 2018 as declining enrollments in the Northeast and Midwest were offset by increases in the South. All regions lost black and white enrollments over this period and saw substantial growth in Hispanic enrollments. The percent of students eligible for free-lunch rose

⁸ Differences between our sample and the population of schools and districts in metropolitan areas arise for two reasons. First, only 342 of 383 metropolitan areas in the U.S. are included in the sample. Most excluded metros are small. Second, not all schools and districts in a metropolitan area are included in our sample. The median percentage of schools in a metro included in our sample is 95.8.

significantly in all regions. Finally, per pupil spending has consistently been substantially higher in the Northeast than in other regions.

IV. Racial Differences in Exposure to Low-Income Classmates

The fact that black, white, and Hispanic students living in the same metropolitan areas tend to enroll in different schools makes it possible that exposure to students from low-income families differs across these groups. In this section we develop and present measures of racial disparities in exposure to low-income classmates.

To develop our measures, we begin by computing the average percent free-lunch eligible for black, Hispanic, and white students in each grade and metropolitan area—a total of 3 racial groups x 13 grades x 342 metro areas = 13,338 different averages. Within each grade and metropolitan area, averages are computed as follows:

$$(1) \quad \bar{Y}_r = \sum_{i=1}^{i=S} \frac{n_{ir}}{N_r} \frac{n_{iY}}{n_i} (100)$$

Where \bar{Y}_r is the average percent free-lunch eligible for the racial group, r , in a given grade and metro area; n_{ir} is the count of students in racial group r in the grade in school i ; N_r is the count of students in the racial group in the grade in the metropolitan area; n_{iY} is the count of free-lunch eligible students in the grade in school i ; and n_i is the number of students in the grade in school i .

Next, we compute the percentage point difference in the average percent free-lunch eligible between black students and white students and between Hispanic students and white students for each grade and metropolitan area: $D_{gm} = \bar{Y}_{r1} - \bar{Y}_{r2}$. We also compute the ratio of the percent of free-lunch eligible for black (Hispanic) students over the percent for white students, again for each grade and metropolitan area: $D'_{gm} = \bar{Y}_{r1}/\bar{Y}_{r2}$

To obtain a single overall disparity measure for a metropolitan area, we take a weighted average across each of the grade specific disparities, and for a single measure across multiple metropolitan areas, we take a weighted average of each metropolitan specific disparity. The weights for the black-white disparity measures are based on the count of black students and for the Hispanic-white disparity measures we use the count of Hispanic students and are computed by dividing the number of black (or Hispanic) students in each grade-by-metropolitan area by the number of black (or Hispanic) students across all grade-by-metropolitan areas in our sample.

The resulting measures can be interpreted as the differences between or the ratio of the percent free-lunch eligible in the average black (Hispanic) student's district and in the average white student's district, controlling for metropolitan area and grade. Controlling for metropolitan area and grade is important if higher shares of black or Hispanic students enroll in lower grades, where free-lunch eligibility rates tend to be higher, or live in metropolitan areas with higher poverty rates than do white students. The measure is similar to the slope coefficient from an individual student level regression of the percent free-lunch eligible in the student's school on the student's race in a model that includes grade-by-metropolitan area fixed effects. It captures the difference in exposure to low-income classmates that we would predict for a black (Hispanic) student randomly selected from one of the schools in our sample and for a white student randomly selected from the sample of schools in the same grade and metropolitan area.

The top panel of Table 3 presents these racial disparity measures for our sample. It indicates that the average black student and the average Hispanic student attends a school where the percent low-income is substantially greater than in the average white student's school. If we compute simple exposure indices, without controlling for grade or metropolitan area, we find that the percentages of free-lunch eligible in the average black, Hispanic and white students' schools are, respectively—61.8, 59.2, and 31.9

percent. Our measures of racial disparities in exposure to low-income classmates reported in the next two rows are based on comparisons of students in the same grade and metropolitan area, as described above. After these adjustments, the percent low-income in the average black student's school is 28.9 percentage points higher or 100 percent higher and in the average Hispanic student's school is 24.5 percentage points or 84 percent higher than in the average white student's district.

Figure 1 displays the distributions across metropolitan areas for the ratio-based disparity measures. These figures show considerable variation across metropolitan areas in the extent to which black and Hispanic students face greater exposure to low-income classmates than white students. The mean of the distribution of black-white disparities is 1.51. The fact that the mean of the distribution across metropolitan areas is considerably less than the disparity measure reported in Table 3 reflects the fact that disparities are largest in large metropolitan areas, which receive weights proportional to enrollment in the disparity measures presented in Table 3. For instance, the 10 metros with the largest black enrollments all have black-white disparity ratios well above the average, and New York City, Atlanta, and Chicago—the three metros with the largest black student enrollments—have disparities measures of 2.79, 2.13, and 2.84, respectively. The amount of variation across metropolitan areas is reflected by the fact that while in 12 metropolitan areas black students' exposure to low-income classmates is actually lower than white students' exposure, in 44 metros black exposure is more than twice that of white students.⁹

⁹ All of these 12 metropolitan areas have small to very small black enrollments. These districts have a mean black enrollment of 965. In contrast, the mean black enrollment for the 44 metros where black exposure is more than twice that of white students is 51,643. In total, 0.2 percent of black students attending schools in our sample are in metropolitan areas with a black-white disparity index less than 1.0, while 41.2 percent are in a metropolitan area with a disparity index greater than 2.0.

The distribution of Hispanic-white disparities is similar to that for black-white disparities. Hispanic-white disparities also tend to be larger in large metropolitan areas. New York City, Los Angeles, Houston, Dallas and Chicago are the five metros with the largest numbers of Hispanic students, and have disparity measures of 2.68, 2.02, 1.87, 2.07, and 2.48, respectively. Hispanic students' exposure to low-income classmates is lower than that of white students in 10 metros, the Hispanic student exposure is more than twice as high as for white students in 28 metros.

To assess the extent to which the disparities documented in the top panel of Table 3 are due to disparities across districts, we recalculate our disparity measures by replacing each of the school-level counts in equation (1) with district-level counts, again for each grade and metropolitan area. The results are presented in the bottom panel of Table 3. The fact that the disparities using district-level measures are smaller than the disparities computed using school-level measures indicates that differences in exposure to free-lunch eligible students across racial groups in the same district exacerbate disparities. Comparing the measures in bottom panel to those in the top panel of Table 3 suggests that in 2018 about 64 to 69 percent of the black-white disparity in exposure to low-income students and 58 to 63 percent of the Hispanic-white disparity arises across districts, and the rest is due to differences across schools within districts.

Table 4 presents the measures of racial disparity in exposure to low-income classmates using school-level enrollment data and district-level enrollment data, for each region. Both black-white and Hispanic-white disparities are largest in the Northeast and smallest in the South. Black-white disparities are also relatively large in the Midwest. As expected, in the Northeast a large portion of the racial disparities in exposure to low-income students are due to the distribution of students across districts, and in the South the largest portion of the disparities is due to the distribution of students across schools within districts. For instance, in the Northeast, 85 percent of the black-white disparity arises between

districts, while in the South only 45 percent of the black-white disparity appears between districts.¹⁰ The Midwest is similar to the Northeast in having a relatively high proportion of racial disparities arising across districts, and the West is similar to the South in having a larger portion of the disparities due to differences across schools within districts.

Figure 2 presents the black-white and Hispanic-white ratios of exposure to low-income students computed using district level enrollment measures by region for each year from 2006 through 2018. From 2006 to 2012, black-white disparities fell from 2.03 to 1.66 and Hispanic-white disparities fell from 1.82 to 1.55. Not shown in the figure is the fact that almost all of the decreases in the exposure disparity measures are due to the increase in exposure to low-income classmates among white students. There has been no decrease in either the exposure of black or Hispanic students to low-income classmates, nor decreases in the percentage point differences in exposure to low-income classmates across racial groups. Since 2012 the declines in these disparities have slowed considerably. The sharpest declines have happened in the Northeast and Midwest, although those regions still have disparities well above those in the South and West.

In summary, black and Hispanic students face substantially higher exposure to low-income classmates than do white students. These disparities are greater in large metropolitan areas and largest in the Northeast, although black-white disparities are also high in the Midwest. The distribution of students across districts accounts for most of the disparities in the Northeast and the Midwest, but the distribution of students across schools within districts plays a larger role in the South and West regions. While these racial disparities in exposure to low-income students declined from 2006 to 2012, at least across districts, the rate of decline slowed considerably from 2012 to 2018.

¹⁰ We calculate this percentage by dividing the ratio disparity measure computed using district-level enrollment data minus one by the ratio disparity measure computed using school-level enrollment data minus one.

V. Racial Differences in School Spending

To evaluate whether racial segregation results in uneven allocation of school resources, we develop a measure of racial spending disparities similar to the disparity measures used in the preceding section. For each metropolitan area, we compute the ratio of average per pupil spending in schools attended by black (Hispanic) students to the average per pupil spending in schools attended by white students. These averages are computed by replacing n_{iY} in equation (1) with the school-level total operating expenditure measure drawn from the NERD\$ data, i.e. by weighting each school's per pupil spending by the share of students in racial group r in the metropolitan area that attend that school. We compute the ratio of average spending for black (Hispanic) students to the average spending for white students for each metropolitan area, and then compute a weighted average across metropolitan areas. The weights are equal to the share of all black (or Hispanic) students in our sample in the metropolitan area.

The resulting measure is similar to what would be obtained from a student level regression of the log of per pupil spending in student i 's school on the student's race controlling for metropolitan area-by-grade fixed effects. Basing this disparity measure on comparisons of students in the same metropolitan area ensures that the measures are not contaminated by differences in the value of a dollar or cost of educational inputs (e.g. teacher wages) across metropolitan areas. Also, by basing our measure on comparisons of students in the same grade, we do not confound differences across races with differences in the grade-level of the school. This measure captures disparities due to the combination of spending differences across districts within metropolitan areas and across schools within districts. Values over one indicate that average per pupil spending in schools attended by black or Hispanic students is greater than average per pupil spending in schools attended by white students.

To assess the contribution of differences across districts within metropolitan areas to measures of spending disparities, we also calculate measures of disparities in district-level spending similar to the school-level measures just described using district-level rather than school-level enrollment and spending data. If these district-level disparities are less (greater) than the school-level disparities, then differences in the distribution of spending across schools within districts serve to increase (offset) disparities measured across districts.

The top panel of Table 5 presents racial disparities in school funding computed using school-level spending figures. Nationally, in 2018, the typical black student in our sample attended a school that received 6.6 percent more per pupil spending than the typical white student, and the typical Hispanic student in our sample attended a school that spent 3.0 percent more than the typical white student's school. Black-white spending disparities are greatest in the Midwest, where spending in the average black student's school is 9.2 percent higher than in the average white student's school. In contrast, spending in the average black, Hispanic and white students' districts are roughly equal in the Northeast. In the South and the West, both black-white and Hispanic-white spending disparities are similar to those for all of the U.S.

Figure 3 examines how racial disparities in spending vary across the metropolitan areas included in the sample. Again, there is considerably variation across metropolitan areas. The standard deviation of the black-white and Hispanic-white disparity measures are, respectively, 0.075 and 0.051. When considered against the mean disparity estimates of 1.05 and 1.03, these standard deviations indicate that not all metros are spending more on the average school attended by black (Hispanic) students. While 268 of the metropolitan areas in the sample provide more funding to the average black student's school than the average white student's school, 74 do not. Similarly, while 264 metro areas provide more funding to the average Hispanic student's school than the average white student's school, 78 do not.

Unlike in the case of the racial disparities in exposure to low-income classmates, there is no significant correlation between the black and Hispanic enrollments in a metropolitan area and the size of the racial funding disparities.

The bottom panel of Table 5 presents racial spending differences using district-level rather than school-level expenditure measures. Any differences between the measures presented in top and bottom panels of Table 5 indicate that there are racial differences in spending across schools within districts as well as across districts. On average, for all metros in our sample, the black and Hispanic students' spending advantages relative to white students across districts are nearly as large as that at the school-level. When we look within regions, however, a variable story emerges. In the Northeast, the allocation of spending across districts favors black students slightly relative to white students. However, this small advantage for black students is completely offset by allocations across schools within districts that favor white students. In the South, both across district and within district allocations contribute to black and Hispanic student spending advantages relative to white students. Across district advantages for black and Hispanic students are, respectively, 59 and 47 percent as large as the total advantages reported in the top panel of Table 5. The remaining advantage results from allocations across schools within districts that favor black and Hispanic students. In the Midwest, large across district advantages for black and Hispanic students relative to white students are partially offset by within district allocations, and in the West, across district advantages for Hispanic students are partially offset by within district allocations. These results indicate that whether within district allocations across schools add to or offset racial spending differences varies considerably across metropolitan areas and regions.

Figure 4 presents the extent to which black-white and Hispanic-white spending disparities have changed over time. Because school-level measures of spending are limited to 2018, we focus on changes in measures of racial disparities across districts. Across the entire U.S., spending advantages for black and

Hispanic students fell slightly between 2006 and 2018, and that decrease was driven by declines in the Northeast between 2009 and 2014. In that region, the ratio of spending in the average black student's district to the average white student's district dropped from 1.094 to 1.036, and the Hispanic-white ratio dropped from 1.081 to 1.018. Spending advantages for black students relative to white students also fell in the Midwest during this period. In the South and in the West, spending advantages for black and Hispanic students changed relatively little.

VI. Difference in Spending Adjusted for Student Needs

The previous two sections have ambiguous implications. One result of school segregation is that black and Hispanic students tend to enroll in schools with much higher levels of student poverty than white students. However, black and Hispanic students also tend to enroll in schools that spend more per pupil than do white students. These findings raise the question whether the additional levels of school spending black and Hispanic students tend to have access to is sufficient to overcome the higher level of student need in the schools they attend.

One way to account for differences in the effect of student poverty on the cost of education is to apply pupil weights that reflect estimates of how much more spending is required, on average, to give low-income students the same likelihood of achieving academic standards as non-poor students. Several studies have used educational cost functions to empirically estimate the effect of poverty on the amount of expenditures a district must make so that students can achieve given academic standards, and derive pupil weights accordingly. We follow this approach to try to estimate whether or not the additional funding received in the average black and Hispanic students' school is sufficient to address the higher levels of need in those schools.

First, however, we note limitations of applying pupil weights in the context of this study. First, applying the same pupil weight for metro areas in different states introduces some error as pupil weights estimated for one state may not be applicable in other states. One reason is that free-lunch eligibility represents different levels of poverty in different areas, and another is that the state achievement standards vary. Second, pupil weights have been estimated using district-level data. Because there is some sharing of resources across schools within a district, applying district-level pupil weights to school-level may introduce additional error. Third, studies disagree on the appropriate pupil weight for low-income students, and, ultimately how much more a disadvantaged student costs (Duncombe and Yinger 2011). Some of this disagreement may be due to state-by-state variation and use of different techniques to estimate pupil weights, namely cost function and professional judgement approaches. This analysis relies on the cost function literature and applies a range of pupil weight estimates.

Pupil weights are incorporated into the calculation of the cost-adjusted disparity measures as follows:

$$(2) \quad CD_m = \sum_{m=1}^N \left[\left(\frac{B_{sm}}{B_m} \right) \left(P_{sm} / (1 + PFL_{sm} * W) \right) \right] / \sum_{m=1}^N \left[\left(\frac{W_{sm}}{W_m} \right) \left(P_{sm} / (1 + PFL_{sm} * W) \right) \right]$$

where CD_m is a measure of cost-adjusted black-white (or Hispanic-white) spending disparity in metro area m ; $\frac{B_{sm}}{B_m}$ is the share of black (Hispanic) students in metropolitan area m who attend school s ; $\frac{W_{sm}}{W_m}$ is the share of white students in metropolitan area m who attend school s ; P_{sm} is per pupil spending in school s ; PFL_{sm} equals the proportion of students in the school who are eligible for free-lunch; and W is a weight that reflects how much more, proportionally, it costs to educate free-lunch eligible students than non-poor students.

Several studies have estimated the additional costs of achieving standards associated with student poverty. Gronberg et al. (2004), Duncombe and Yinger (2005; 2011), Duncombe (2007), Imazeki (2008), Gutierrez and Yinger (2017), and Zhao (2022) have estimated pupil poverty weights using data from New York, Kansas, Missouri, Texas, California, and Connecticut. Poverty weights estimated by these studies range from 0.96 to 1.81. A survey across all state funding formulas indicates 35 states use low-income pupil weights in state aid formulas with weights ranging from 0.12 to 0.91 (Education Commission of the States 2021). However, these weights tend to be based on political will to fund districts with low-income students as much or more than empirical estimates of the additional cost associated with low-income students.

To account for variation in cost-adjusted disparity measures driven by which low-income pupil weights are used, we estimate alternative black-white and Hispanic-white disparity ratios applying poverty weights ranging from 0.50 (roughly the median value of weights used in state aid formulas) to 1.5 (roughly the median value of weights estimated using cost-functions). We chose a weight of 1.0 as a mid-range value, which indicates the cost of educating a low-income student to a given standard is twice the cost of a non-poor student. We also compute the implicit poverty weight needed to achieve parity between cost-adjusted spending in the average black (Hispanic) student's school and the average white student's school. Comparing total per-pupil expenditures adjusted using pupil weights can tell us how far spending in one school is from being sufficient to provide its students expected academic outcomes equal to those in another school. Bifulco (2005) provides a conceptual discussion of this measure linking it to common standards of equity defined in the school finance literature and argues that it can be interpreted as a measure of equal opportunity to achieve academic outcomes.

It is important to note that other factors besides poverty influence the cost of providing education such as the proportion of English language learners and special education students, school or

district size, and teacher wages. By computing disparity measures across schools in the same metropolitan area, we effectively control for differences in market wages for teachers.¹¹ If black or Hispanic students tend to enroll in schools with higher proportions of ELL or special education students than white students, then the estimates of cost-adjusted spending disparities reported would underestimate the disadvantages faced by black and Hispanic students.

The top panel of Table 6 displays estimates of cost-adjusted spending disparities. Using mid-range estimates of the additional costs associated with low-income students, the average black student and the average Hispanic student, respectively, has access to 87.8 and 87.4 percent of the cost adjusted spending available to the average white student. Of course, these estimates depend on how much additional costs are associated with low-income students. If we assume a poverty weight of 1.5, then the disparities are larger with the average black and Hispanic students having access to roughly 83 percent of the spending available to white students. With a weight of 0.5 the estimated disparities are closer to parity with white students—with black-white disparity measures of 0.949 and Hispanic-white measures of 0.934. The poverty weight must be set to 0.25 to achieve parity between black and white students, and to 0.13 to achieve parity between Hispanic and white students. Most empirical estimates place the additional costs of educating a low-income student well above these marks, suggesting it is unlikely that the additional school funding available to the average black and Hispanic students are sufficient to offset the disadvantages of concentrated poverty.

Figure 5 presents the distribution of cost-adjusted spending disparity measures across metropolitan areas—assuming a pupil poverty weight of 1.0. The mean and median of these measures in

¹¹ Schools with different working conditions that require compensating wage differentials can create differences in market wages across schools within metropolitan areas. School poverty can be a proxy for these type of differences across schools and thus we view compensating wage differentials as one reason why or mechanism through which school poverty influences of the cost of education.

Figure 5, which do not weight by the share of black and Hispanic students in the metropolitan area, are closer to parity than the figures reported in Table 6. Again, this suggests that disparities tend to be larger in large metropolitan areas with the greatest share of black and Hispanic students. The figures also indicate considerable variation across metropolitan areas. The standard deviation for the black-white disparity is 0.079 and for the Hispanic-white measure it is 0.066. The black-white disparity measure is below 1, indicating disadvantage for black students relative to white in 294 metros and above 1 in 58 metros. The average metropolitan area with a black-white ratio of cost-adjusted spending greater than 1 has only 5,000 black students and all metropolitan areas with more than 62,500 black students have ratios less than 1. The Hispanic-white disparity measure is below 1 in 309 metros and above 1 in 43. All metropolitan areas with more than 42,500 Hispanic students have a disparity measure below 1.

Table 6 shows disparity measures for each region. Both black-white and Hispanic-white disparities are greatest in the Northeast. Assuming a pupil poverty weight of 1.0, the average black student in the Northeast has access to 77.9 percent as much cost-adjusted spending as the average white student in the Northeast. Even with a low-end estimate of the additional cost associated with low-income students, the average black student and average Hispanic student has significantly less cost-adjusted spending than the average white student in the Northeast.

The bottom panel of Table 6 presents estimates of cost-adjusted spending disparities computed using district-level measures of per pupil spending and free-lunch eligibility. Comparison of the estimates in top and bottom panel of Table 6 indicates the extent to which cost-adjusted disparities documented in metro areas are due to differences in resource distribution across districts and across schools within districts. Focusing on estimates using the midrange pupil weights and looking across the entire U.S., 61 percent of the black-white disparities in cost-adjusted spending arise across districts, and 60 percent of the Hispanic-white disparities arise across districts. Although across districts disparities are important

these results suggest that roughly 40 percent of racial disparities in cost-adjusted spending arise as the result of allocation across schools within districts. Looking within regions, in the South and the West disparities across schools within districts play a large role relative to across district disparities. In Northeast and Midwest, however, allocations across districts play the dominant role. For instance, both black-white and Hispanic-white disparities across districts are roughly 40 percent as large as the disparities across schools in the West, but in Northeast disparities across districts are 86 percent as large as disparities across schools.

Figure 6 summarizes cost-adjusted spending disparities across districts over time using mid-range pupil poverty weight of 1.0. For the U.S., both black-white and Hispanic-white disparities are very similar in 2018 to what they were in 2006. Decreases in racial disparities in exposure to low-income classmates (see Figure 2) were offset by decreases in black and Hispanic advantages in per pupil spending relative to white students (see Figure 4). Over the period, small increases in black-white disparities in the Northeast were mostly offset by small decreases in black-white disparities in the West. For Hispanic-white cost-adjusted spending disparities, increases in the Northeast and South were offset by decreases in the Midwest and West.

VII. Conclusions

This paper examines how segregation, concentration of student poverty, and school spending interact to create racial disparities in educational opportunity. Because of school segregation, black, Hispanic and white students tend to enroll in separate schools creating potential for educational inequalities. We find that within metropolitan areas, the typical black and Hispanic students attend schools with much higher proportions of low-income students than the typical white student. We also

find that per pupil spending in the typical black and Hispanic students' schools is higher than in the typical white student's school.

To shed light on whether the additional spending in the average black and Hispanic students' schools is sufficient to address the high level of need in the schools black and Hispanic students attend, we compute measures of cost-adjusted spending disparities. Drawing on estimates of the additional spending required to provide low-income students equal opportunity to achieve outcomes, we find that it is unlikely that the additional spending in schools where black and Hispanic students tend to enroll is sufficient to address the high level of student need in these schools. Using mid-range estimates of the additional cost of low-income students, we find that cost-adjusted spending in the average black student's school and in the average Hispanic student's school is only 88 percent of that in the average white student's school.

Much of the racial disparities in cost-adjusted per pupil spending is the result of the distribution of student need and spending across districts. However, access to newly available school-level spending data, allows us to see that disparities in the distribution of student needs and spending across schools within districts also contribute. We estimated that approximately 39 percent of the black-white disparity in cost-adjusted spending and 40 percent of the Hispanic-white disparity in cost-adjusted spending is due to differences across schools within districts.

We also find considerable variation across regions in the disparities we document here. In metropolitan areas in the Northeast, where racial differences in the exposure to low-income classmates are large and per-pupil differences in spending are small, cost-adjusted spending disparities are quite large. In these metropolitan areas, average cost-adjusted spending for black students and for Hispanic students is only 78 percent of that for white students. The extent to which cost-adjusted spending disparities occur across and within districts also varies by region. In the Northeast and Midwest, where

districts tend to be geographically small, most of the disparities arise across districts rather than within districts. By contrast, in the South and West, where several states have county-wide school districts, differences across schools within districts play a relatively large role.

Finally, we find little progress in reducing disparities between 2006 and 2018. While racial disparities in exposure to low-income classmates decreased over this period, advantages in per pupil spending for black or Hispanic students relative to white students decreased. Racially disparities in cost-adjusted spending across districts are virtually the same in 2018 as they were in 2006.

Our results indicate that high levels of racial segregation across schools, the uneven distribution of student needs across racial groups, and the lack of political will to adequately fund high need districts and schools work together to undermine equality of education opportunity across racial groups. Such findings provide motivation for policies to reduce racial segregation across schools and to increase spending in high need schools.

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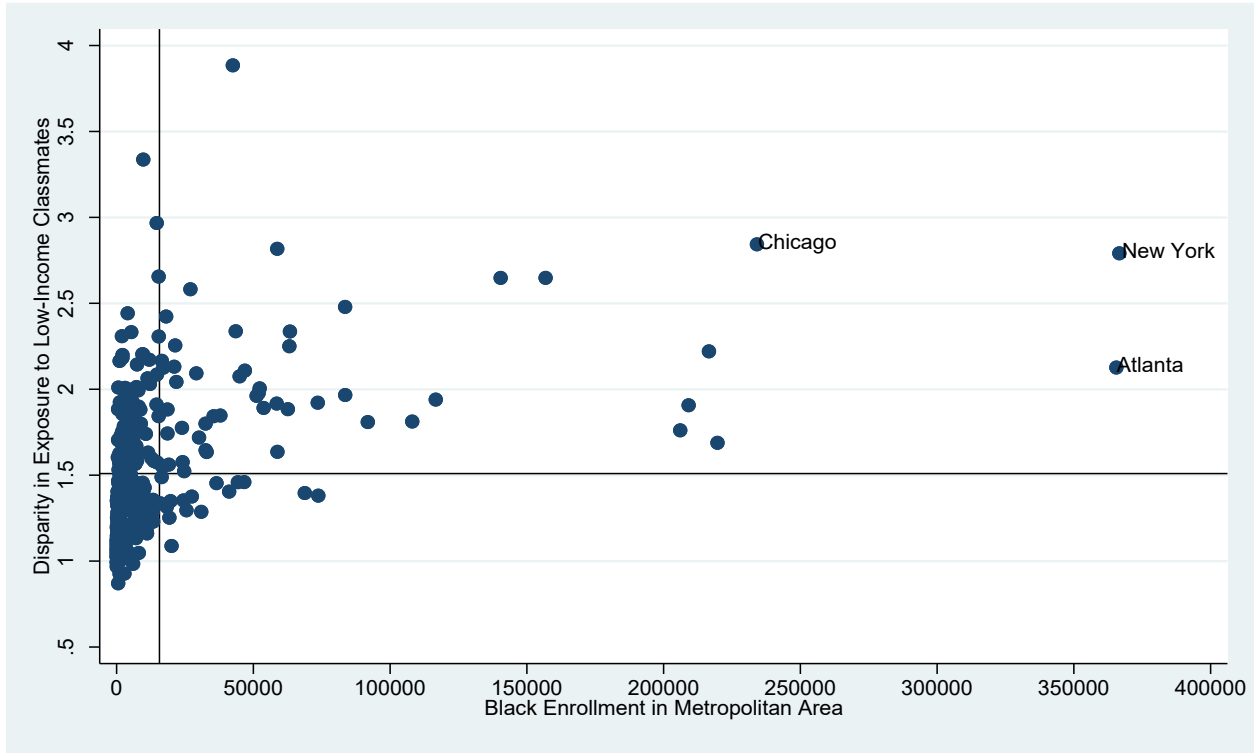
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Figure 1: Distribution of racial disparities in exposure to low-income classmates across metropolitan areas, by minority group enrollment, 2018-19

A. Black-White Disparities



B. Hispanic-White Disparities

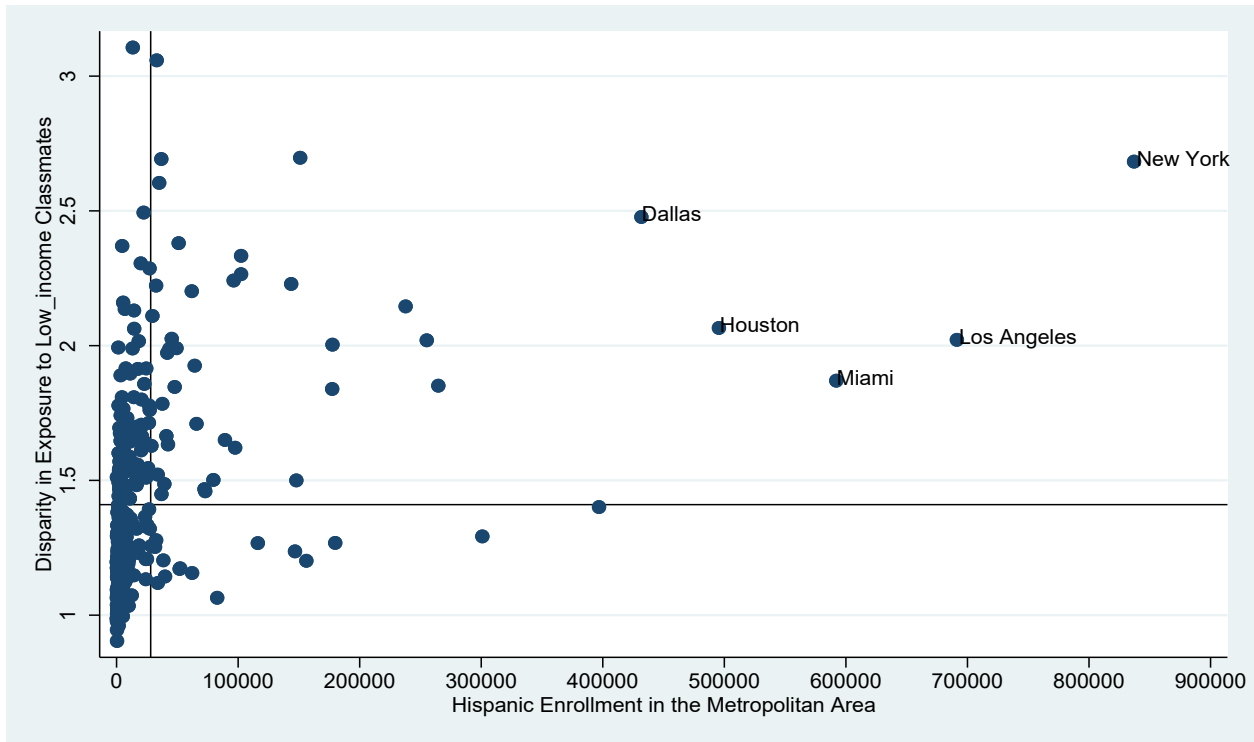
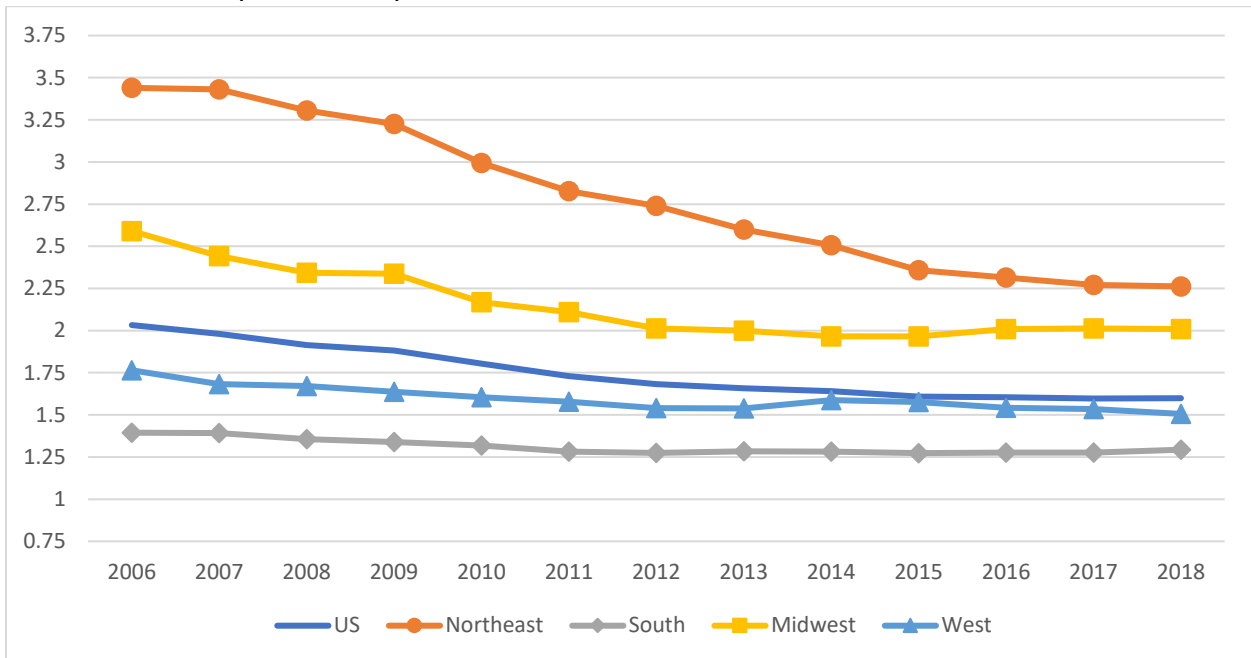


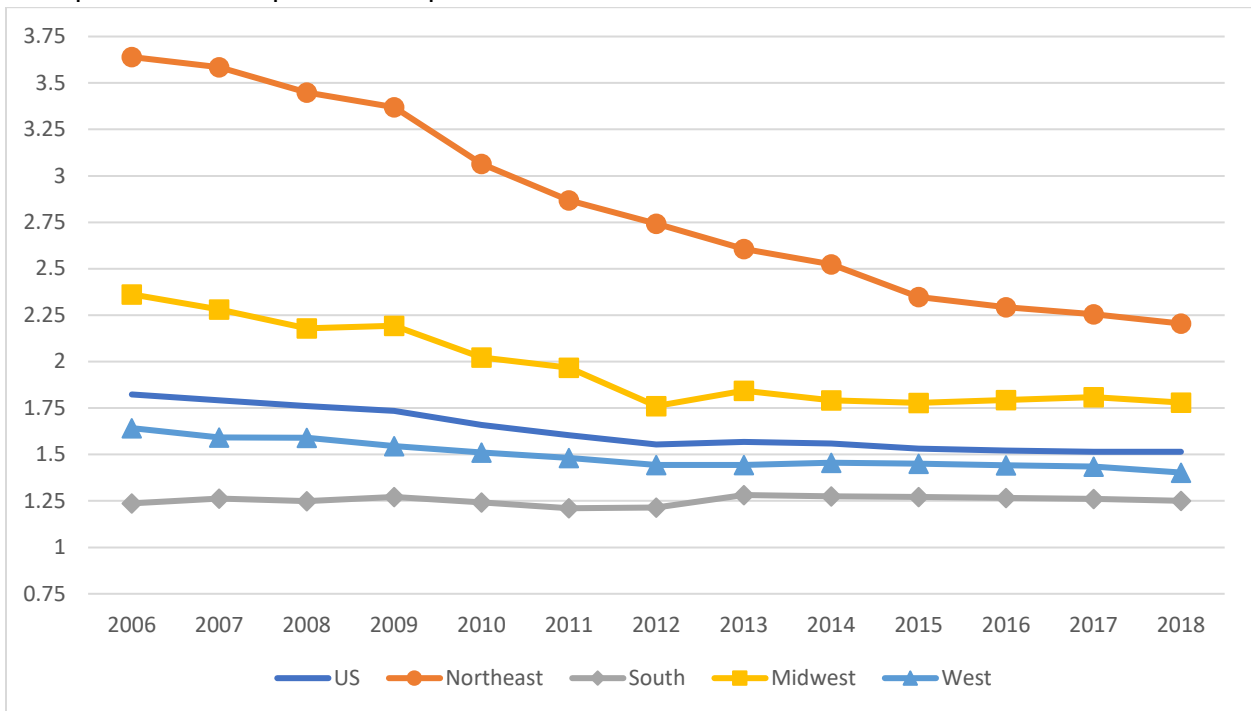
Figure 2: Racial Disparities in Exposure to Low-Income Students, 2006-2018

A: Black-White Disparities in Exposure to Low-Income Students



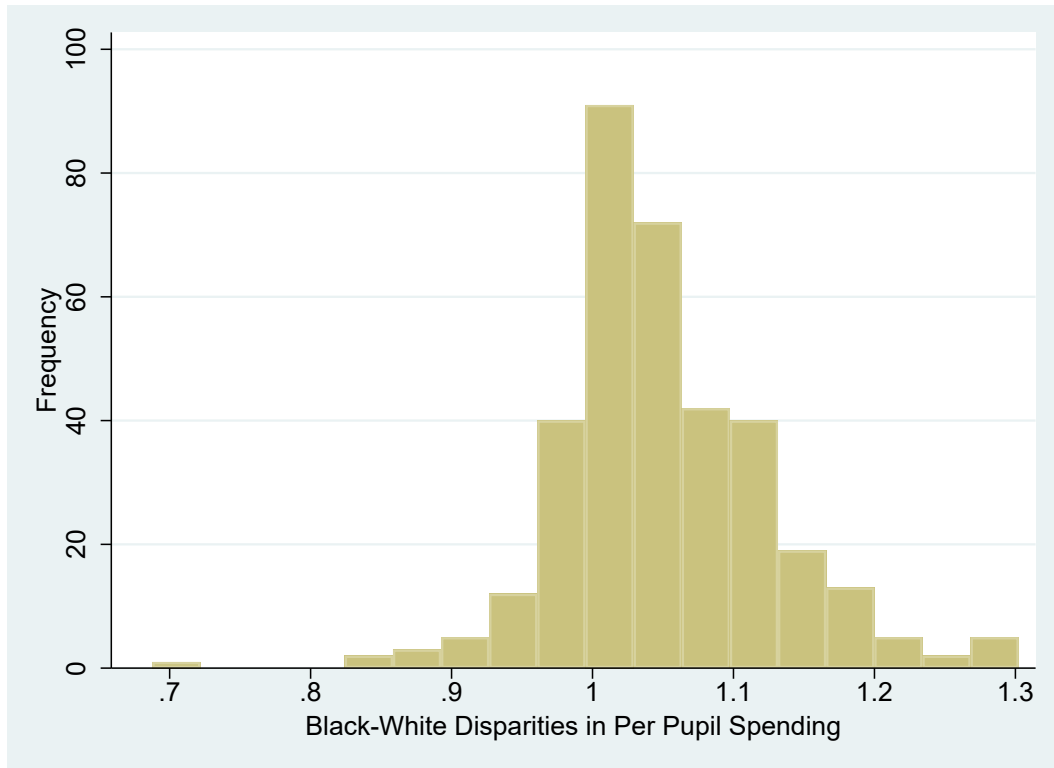
Measures presented are the ratios of percent free-lunch eligible in the average black student’s district relative to the percent free-lunch eligible in the average white student’s district, controlling for grade and metropolitan area.

B: Hispanic-White Disparities in Exposure to Low-Income Students



Measures presented are the ratios of percent free-lunch eligible in the average Hispanic student's district relative to the percent free-lunch eligible in the average white student's district, controlling for grade and metropolitan area.

Figure 3: Distribution of Racial Disparities in Per Pupil Spending, 2018-19



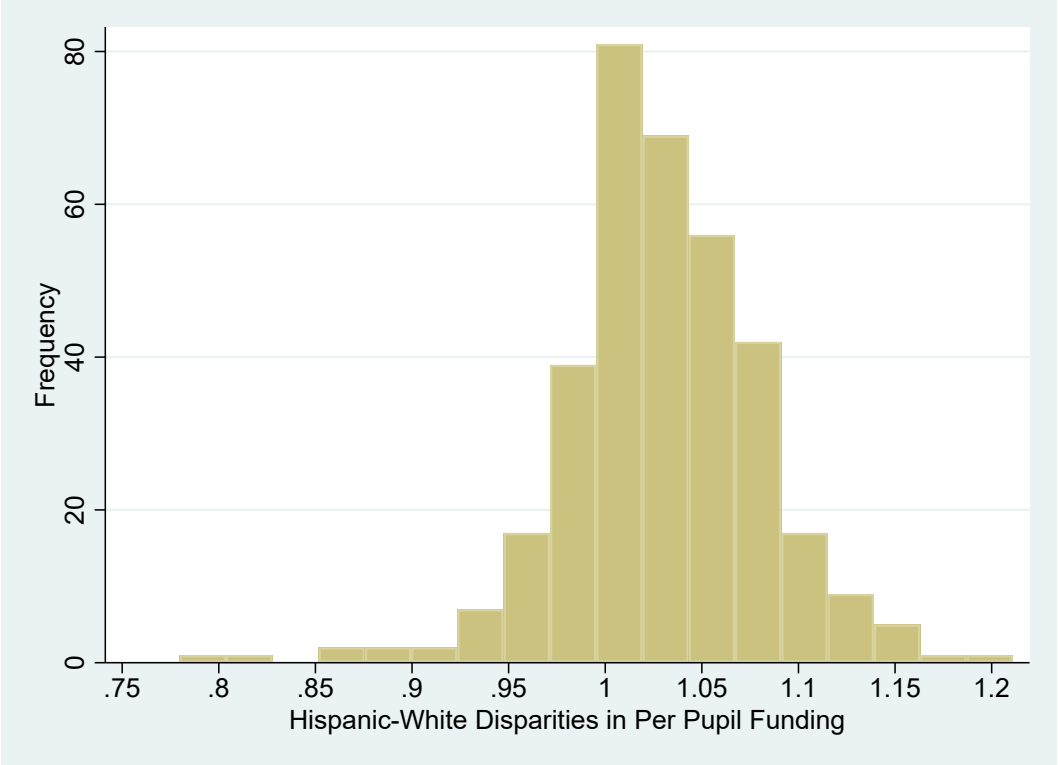
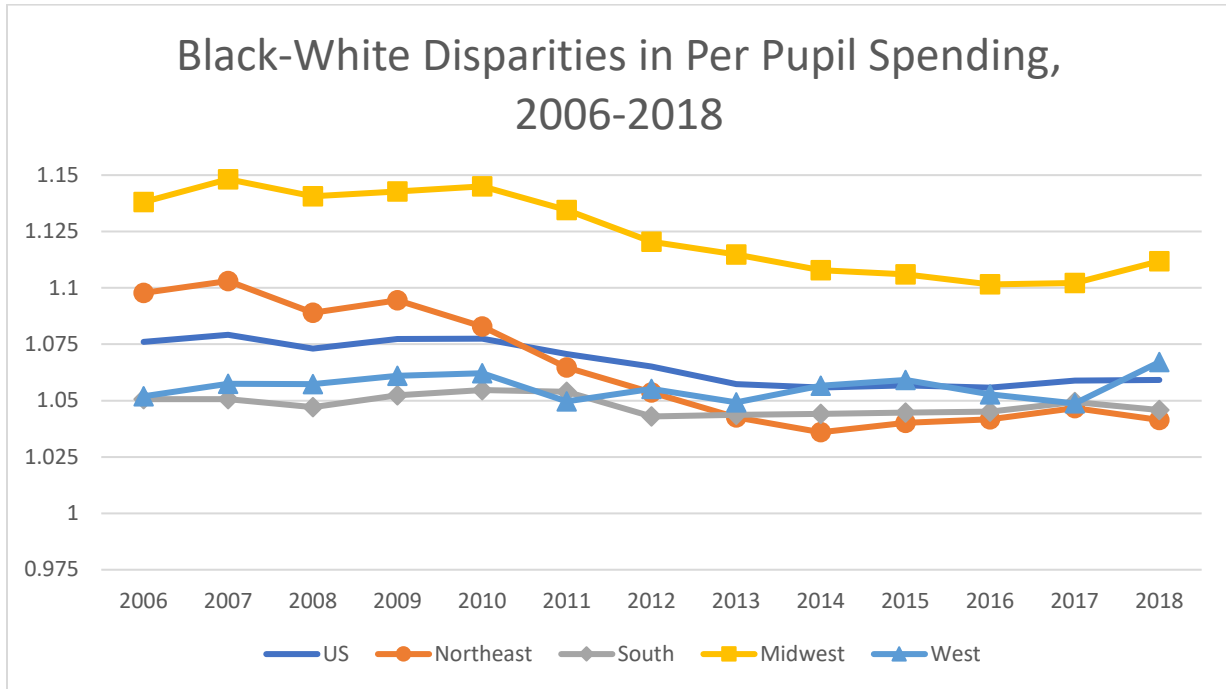


Figure 4: Racial Disparities in District Per Pupil Spending, 2006-2018

A: Black-White Disparities in Per Pupil Spending



B: Hispanic-White Disparities in Per Pupil Spending

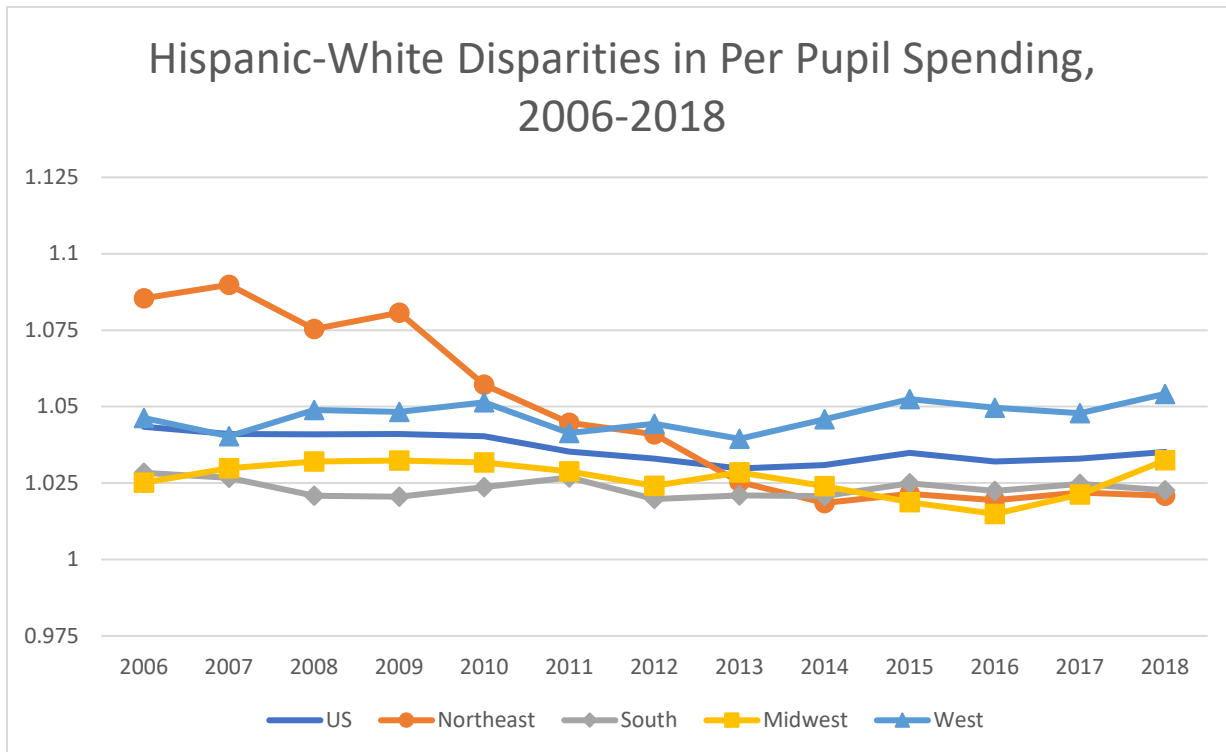
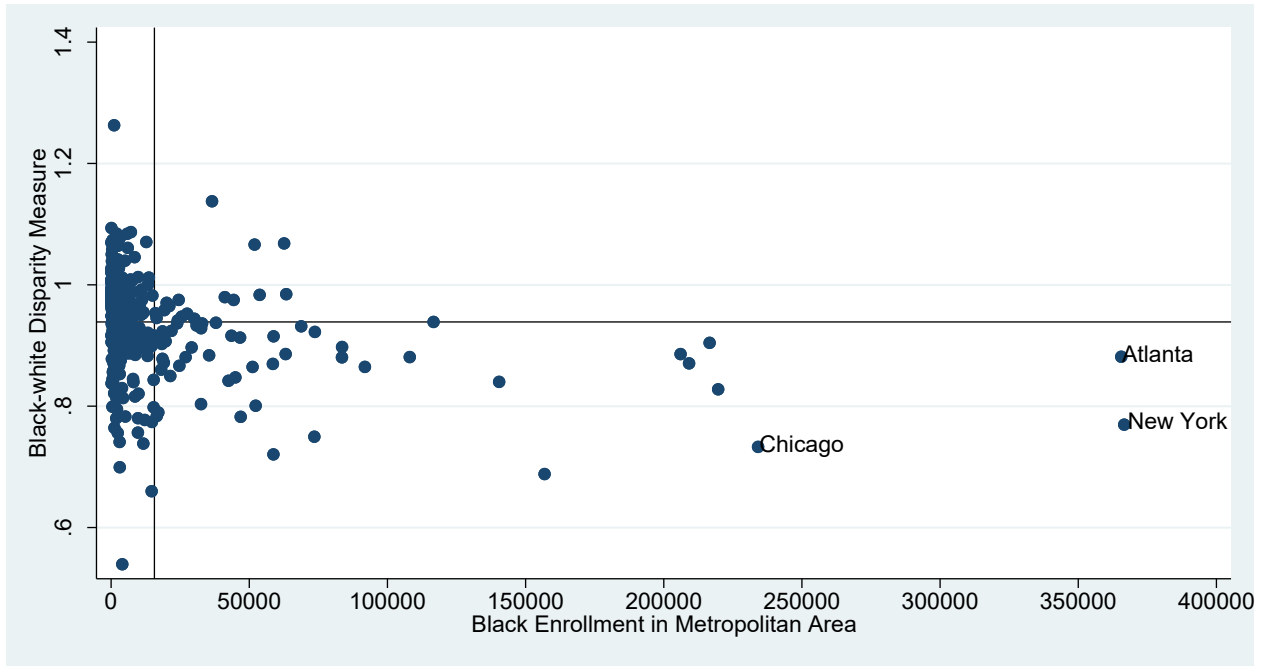


Figure 5: Distribution of racial disparities in cost-adjusted per pupil spending, 2018-19

A. Black-white disparities



B. Hispanic-white disparities

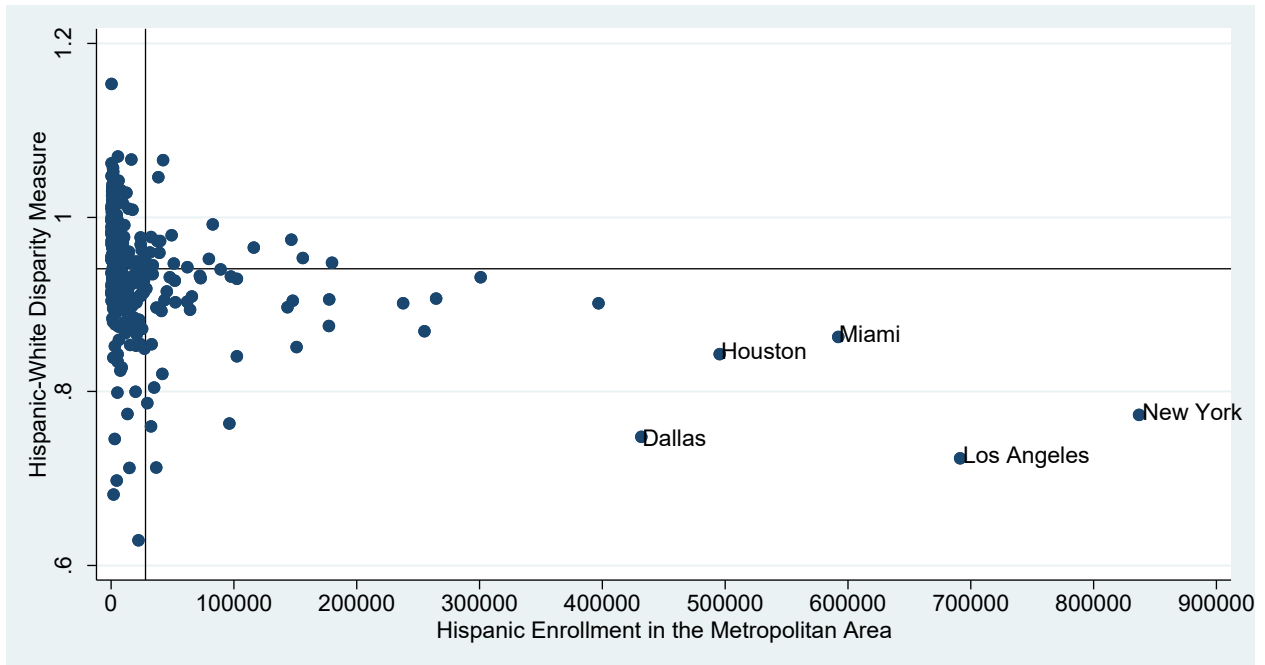
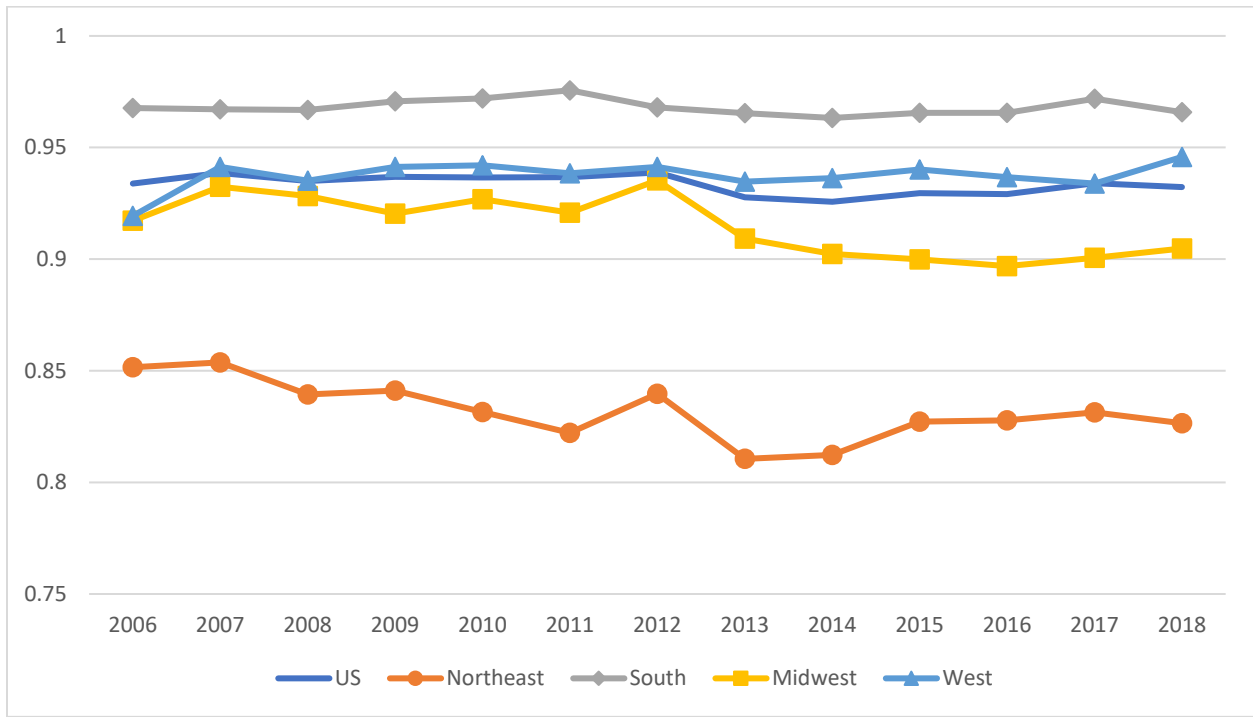


Figure 6: Racial Disparities in District Cost-Adjusted Per Pupil Spending, 2006-2018

A: Black-White Disparities in Cost-Adjusted Per Pupil Spending



B: Hispanic-White Disparities in Cost-Adjusted Per Pupil Spending

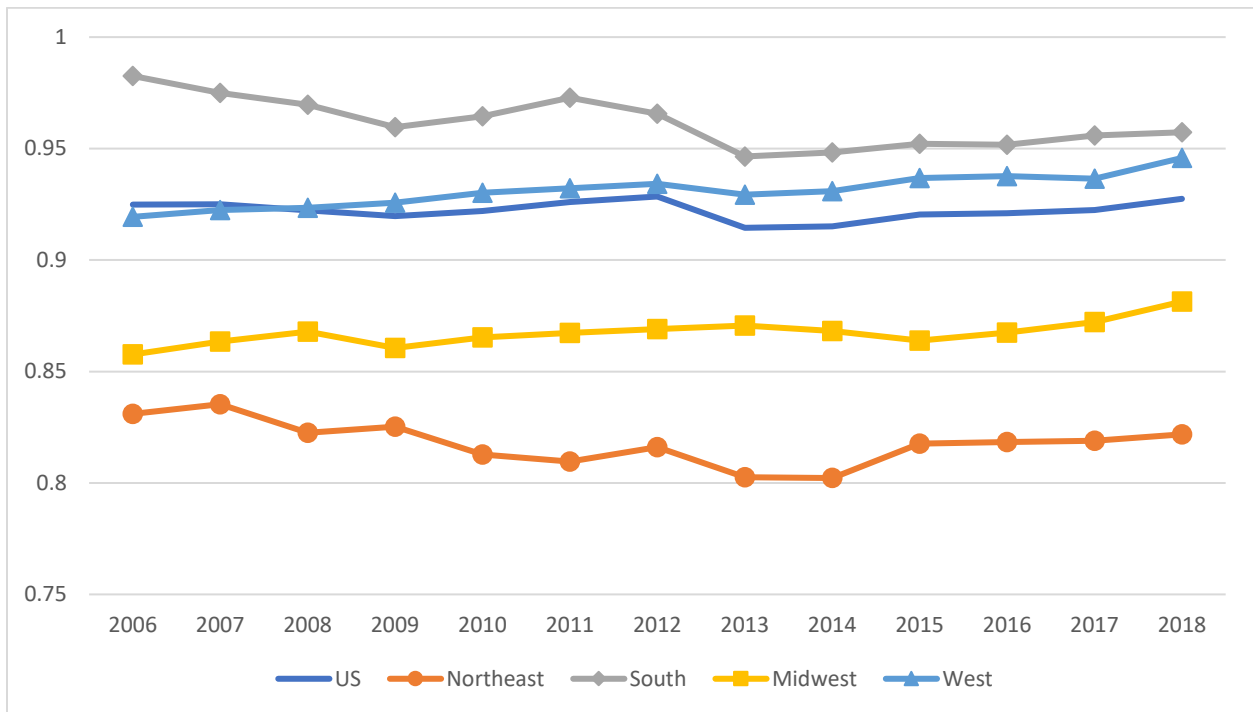


Table 1. Summary Statistics for Sample and Population, 2018-19

	Schools and Districts in:		
	Study Sample	U.S. Metropolitan Areas	U.S.
Number of schools	57,049	73,422	95,045
Number of districts	6,181	7,214	13,345
Total enrollment	35,062,863	42,467,623	49,276,441
Total number of black students	5,514,018	6,687,844	7,346,371
Total number of Hispanic students	9,862,922	12,585,361	13,537,545
Total number of white students	15,834,868	18,440,471	23,071,090
Number of Metro Areas			
U.S.	352	383	
<i>Northeast</i>	47	48	
<i>South</i>	131	154	
<i>Midwest</i>	93	96	
<i>West</i>	81	85	
Average Number of Districts in Metro Areas			
U.S.	16.8	18.8	
<i>Northeast</i>	40.7	42.8	
<i>South</i>	7.8	8.8	
<i>Midwest</i>	22.2	23.4	
<i>West</i>	14.7	17.4	
Average Enrollment in Metro Areas			
U.S.	98,148	110,882	
<i>Northeast</i>	133,747	145,826	
<i>South</i>	90,478	97,934	
<i>Midwest</i>	77,264	81,721	
<i>West</i>	105,583	140,329	
% Black Enrollment			
U.S.	15.7	15.7	14.9
<i>Northeast</i>	13.2	14.9	14.1
<i>South</i>	25.3	23.0	22.4
<i>Midwest</i>	15.1	16.7	13.6
<i>West</i>	6.9	6.8	6.3
% Hispanic Enrollment			
U.S.	28.1	29.6	27.5
<i>Northeast</i>	23.2	23.2	21.9
<i>South</i>	33.3	28.8	26.7
<i>Midwest</i>	13.9	14.0	12.9
<i>West</i>	40.4	43.2	42.0
% White Enrollment			
U.S.	45.3	43.4	46.8

Northeast	51.7	50.3	52.9
South	41.8	39.3	42.4
Midwest	61.2	59.6	64.6
West	37.8	34.9	36.7

^bRegions define as in Footnote 3.

Table 2. Summary Statistics for the District Level Panel Sample

	2006-7	2010-11	2014-15	2018-19
Enrollment				
U.S.	38,853,225	38,945,145	39,344,616	38,807,427
<i>Northeast</i>	6,962,649	6,776,971	6,596,662	6,415,706
<i>South</i>	13,244,903	13,665,642	14,148,529	14,307,705
<i>Midwest</i>	7,909,989	7,746,904	7,689,412	7,562,372
<i>West</i>	10,735,684	10,755,628	10,910,013	10,521,645
% Black Enrollment				
U.S.	17.2	16.3	15.7	15.4
<i>Northeast</i>	16.6	16.2	14.8	14.0
<i>South</i>	25.0	23.8	23.3	22.7
<i>Midwest</i>	16.5	15.6	15.1	14.9
<i>West</i>	8.4	7.4	6.8	6.4
% Hispanic Enrollment				
U.S.	22.6	25.6	28.0	29.4
<i>Northeast</i>	16.2	18.7	21.4	24.0
<i>South</i>	22.1	25.5	27.9	29.9
<i>Midwest</i>	9.1	11.4	13.1	14.3
<i>West</i>	37.3	40.4	42.4	43.0
% White Enrollment				
U.S.	52.5	49.4	46.6	44.6
<i>Northeast</i>	60.6	58.3	55.0	51.9
<i>South</i>	47.0	43.5	40.8	38.6
<i>Midwest</i>	69.0	66.5	63.9	62.1
<i>West</i>	42.0	39.1	36.7	35.6
% Free-Lunch Eligible				
U.S.	26.5	33.4	37.8	39.7
<i>Northeast</i>	17.0	21.6	26.4	30.0
<i>South</i>	39.3	46.7	51.4	52.5
<i>Midwest</i>	21.7	30.3	35.5	35.6
<i>West</i>	35.3	42.2	44.4	47.3
Per Pupil Spending				
U.S.	\$10,186	\$11,379	\$12,528	\$14,739
<i>Northeast</i>	\$13,908	\$15,640	\$17,720	\$20,632
<i>South</i>	\$8,346	\$9,071	\$9,365	\$10,583
<i>Midwest</i>	\$8,852	\$10,210	\$11,157	\$12,858
<i>West</i>	\$8,981	\$9,612	\$10,615	\$13,614

^b Regions define as in Footnote 3.

Table 3: Racial Disparities in Exposure to Low-Income Students, 2018-19

	Black	Hispanic	White
School-Level Exposure Measures			
Average exposure to low-income classmates	61.8	59.2	31.9
Group's exposure to low-income classmates - white students' exposure to low-income classmates (controlling for grade and metropolitan area)	+28.9	+24.5	0
Group's exposure to low-income class / white students' exposure to low-income classmates (controlling for grade and metropolitan area)	2.00	1.84	1.00
District-Level Exposure Measures			
Average exposure to low-income classmates	57.6	55.9	35.1
Group's exposure to low-income classmates - white students' exposure to low-income classmates (controlling for grade and metropolitan area)	+19.8	+15.5	0
Group's exposure to low-income class / white students' exposure to low-income classmates (controlling for grade and metropolitan area)	1.64	1.49	1.00

All differences and ratios are first computed across the students in the same grade and in the same metropolitan area

and then a weighted average of each difference and ratio across grades and metropolitan areas is presented here.

Table 4: Racial Disparities in Exposure to Low-Income Students, 2018-19, by Region

	Northeast	South	Midwest	West
School-Level Exposure Measures				
Average black student exposure	64.2	60.9	64.5	57.0
Average Hispanic student exposure	60.6	58.6	55.9	60.4
Average white student exposure	29.6	36.3	29.4	30.2
Avg black student's school - Avg white student's school (controlling for metro area and grade)	+37.4	+25.1	+35.6	+23.1
Avg black student's school/Avg white student's school (controlling for metro area and grade)	2.50	1.78	2.31	1.77
Avg Hispanic student's district - Avg white student's district (controlling for metro area and grade)	+34.5	+20.3	+28.3	+24.1
Avg Hispanic student's district/Avg white student's district (controlling for metro area and grade)	2.44	1.63	2.09	1.76
District-Level Exposure Measures				
Average black student exposure	62.5	55.3	61.9	54.0
Average Hispanic student exposure	58.8	55.3	53.2	56.2
Average white student exposure	30.7	42.0	30.8	34.3
Avg black student's school - Avg white student's school (controlling for metro area and grade)	+34.2	+12.9	+31.5	+12.8
Avg black student's school/Avg white student's school (controlling for metro area and grade)	2.27	1.35	2.08	1.37
Avg Hispanic student's district - Avg white student's district (controlling for metro area and grade)	+30.9	+10.0	+23.4	+13.2
Avg Hispanic student's district/Avg white student's district (controlling for metro area and grade)	2.17	1.27	1.82	1.36

All differences and ratios are first computed across the students in the same grade and in the same metropolitan area and then a weighted average of each difference and ratio across grades and metropolitan areas is computed and presented here. Regions defined as in Footnote 3.

Table 5. Racial Disparities in Per Pupil Spending, 2018-19

	Black-White	Hispanic-White
School-level spending		
National	1.066	1.030
Northeast	1.002	0.993
South	1.076	1.045
Midwest	1.092	1.023
West	1.062	1.030
District-level spending		
National	1.058	1.028
Northeast	1.025	1.009
South	1.047	1.022
Midwest	1.117	1.032
West	1.047	1.042

Measures indicate the per-pupil expenditures for the average black students in a metro area as a proportion of per-pupil expenditures for the average white student in the metro area.

Table 6. Racial disparities in cost-adjusted spending, 2018-19

	Low Poverty Weight 0.5		Medium Poverty Weight 1.0		High Poverty Weight 1.5	
	Black- White	Hispanic- White	Black- White	Hispanic- White	Black- White	Hispanic- White
School-level spending						
National	0.949	0.934	0.878	0.874	0.829	0.833
Northeast	0.864	0.864	0.779	0.785	0.722	0.731
South	0.972	0.963	0.909	0.912	0.865	0.876
Midwest	0.947	0.914	0.860	0.846	0.801	0.800
West	0.961	0.936	0.896	0.877	0.849	0.835
District Level Spending						
National	0.976	0.965	0.926	0.925	0.891	0.897
Northeast	0.893	0.890	0.811	0.815	0.754	0.763
South	0.994	0.981	0.961	0.955	0.937	0.937
Midwest	0.982	0.937	0.900	0.877	0.843	0.835
West	0.994	0.988	0.957	0.951	0.930	0.924

Measures indicate the cost-adjusted per-pupil expenditures for the average black (Hispanic) student in a metro area as a proportion of cost-adjusted per-pupil expenditures for the average white student in the metro area.

APPENDIX: RACIAL DISPARITIES IN EXPOSURE TO LOW-INCOME CLASS USING ALTERNATIVE POVERTY MEASURES

With the onset of direct certification for free-lunch eligibility and particularly the adoption of the Community Eligibility Provision (CEP), researchers have worried that free-lunch eligibility has become less comparable across districts and overtime (Greenberg, Blagg, and Rainer 2019; Gutierrez, Blagg, and Chingos 2022). Inconsistencies in how accurately free-lunch eligibility is reported across districts can distort our measures of racial disparities in exposure to low-income students. For instance, if schools where black students are concentrated are more likely to use CEP and thereby either overcount (or undercount) free-lunch eligible students relative to the schools where white students tend to enroll, then our measures of black-white disparities in exposure to low-income classmates would overestimate (or underestimate) the exposure of black students relative to white students. Also, if changes in the accuracy of free-lunch eligibility counts overtime are correlated with the racial composition of a school district, then our assessment of how racial disparities in exposure to low-income classmates have changed over time will be distorted.

To explore this issue, we recompute our measures of racial disparities in exposure to low-income classmates using alternative indicators of student poverty. For the measures based on our school level sample for 2018, we replace the percent free-lunch eligible in equation (1), $\frac{n_{iY}}{n_i} (100)$, with the Model Estimates of Poverty in Schools (MEPS) recently developed and released by researchers at the Urban Institute. MEPS are intended to be “a school-level measure of the share of students living in poverty that is comparable across states and time and reflects, as closely as possible, the students who attend each school (Gutierrez, Blagg, and Chingos 2022, p. 2).” For the figures based on our district level panel sample, we recompute exposure to low-income students using estimates of the percent of children in

each district living in poverty from the U.S. Census Bureau's Small Area Income and Poverty Estimates (SAIPE).

Both the MEPS and SAIPE estimate the percent in the school or district living in households with incomes below the poverty line. The poverty line is a lower income threshold than the threshold for free-lunch eligibility, and a substantially lower percentage of students are below the poverty line than are eligible for free-lunch. Thus, in comparing our measures of racial disparities computed using these alternative measures to those computed using free-lunch eligibility, we focus on our ratio measures of disparity. These comparisons account for the difference in baseline percentages of low-income.

Table A1 compares the school-level racial disparity measures for 2018 computed using the MEPS and using free-lunch eligibility. Measures of black-white disparities computed using the MEPS are somewhat larger than those computed using the free-lunch eligibility measures. This result might reflect that in schools where black students are concentrated, a relatively high percentage of free-lunch eligible students live in households below the poverty line. The two sets of Hispanic-white disparities measures are virtually identical. Both sets of estimates show the same patterns of disparities across regions with larger disparities in the Northeast and Midwest and smaller disparities in the South and West. Table A1 suggests that our estimates of disparities in exposure to low-income classmates in 2018-19 are not distorted by reliance on free-lunch eligibility counts.

Figure A2 recreates trends in racial disparities in exposure to low-income students computed using SAIPE measures of the percent of children in each district who are poor and district enrollment data from our district-level panel sample. In all regions, except the South, and for the U.S. as whole, the racial disparity measures computed using the SAIPE poverty estimates are somewhat lower than those computed using free-lunch eligibility during the 2006 to 2011 period. During the 2012 to 2018 period, however, the racial disparity measures using SAIPE poverty estimates and free-lunch eligibility are quite

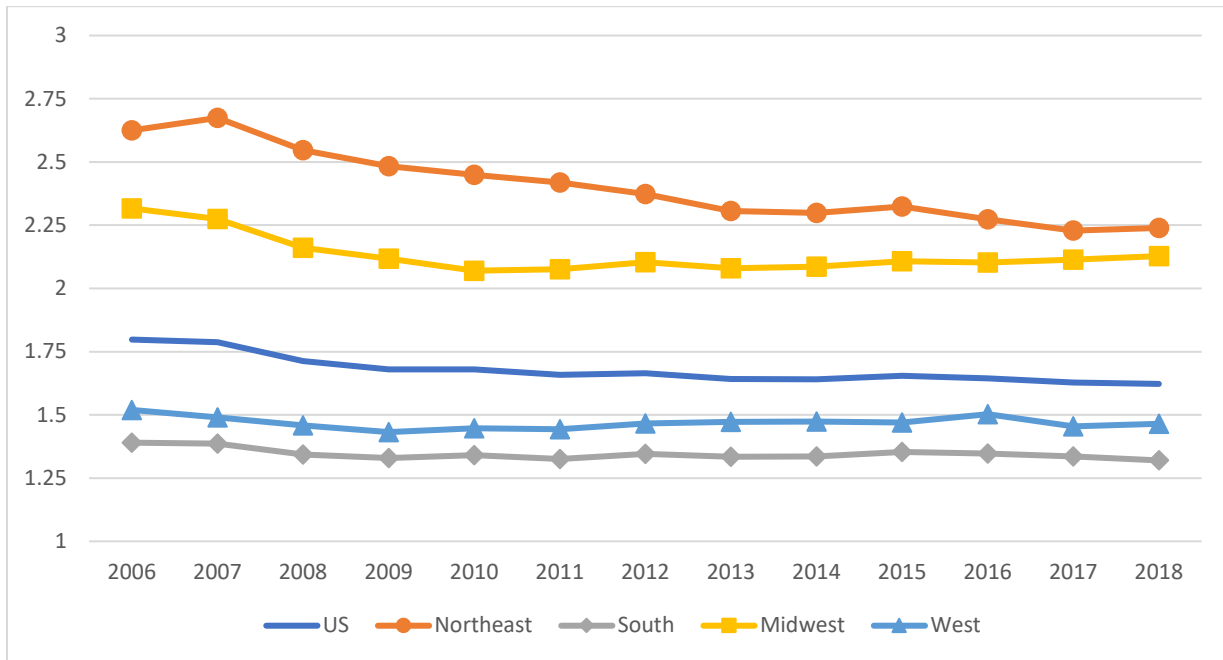
similar.¹² In addition to this difference, and partly as a result of it, the decline in the magnitude of the racial disparities over the full period appear smaller when SAIPE poverty estimates are used rather than free-lunch eligibility.

These differences notwithstanding, there are marked similarities in trends between the disparities computed using the SAIPE poverty estimates and free-lunch eligibility. For both time-series there is a decline in racial disparities in exposure to low-income classmates from 2006 to around 2011, and that decline slows considerably after 2011. Also, in both cases the declines in racial disparities during the 2006 to 2011 period are driven by declines in the Northeast and the Midwest. Finally, even after the declines, racial disparities in exposure to low-income classmates remain considerably more marked in the Northeast and the Midwest than in the South and West, regardless of the poverty indicator used. Overall, Figure A1 supports the conclusion that while racial disparities in exposure to low-income students declined from 2006 to 2011, at least across districts, the rate of decline slowed considerably from 2011 to 2018.

¹² Because CEP is adopted by more districts following 2011, we use free-lunch eligible counts imputed by SEDA for a larger percentage districts during the latter half of the time-series. By drawing on a variety of sources, the values imputed by SEDA might track differences in poverty measures more closely than the raw counts reported in the CCD.

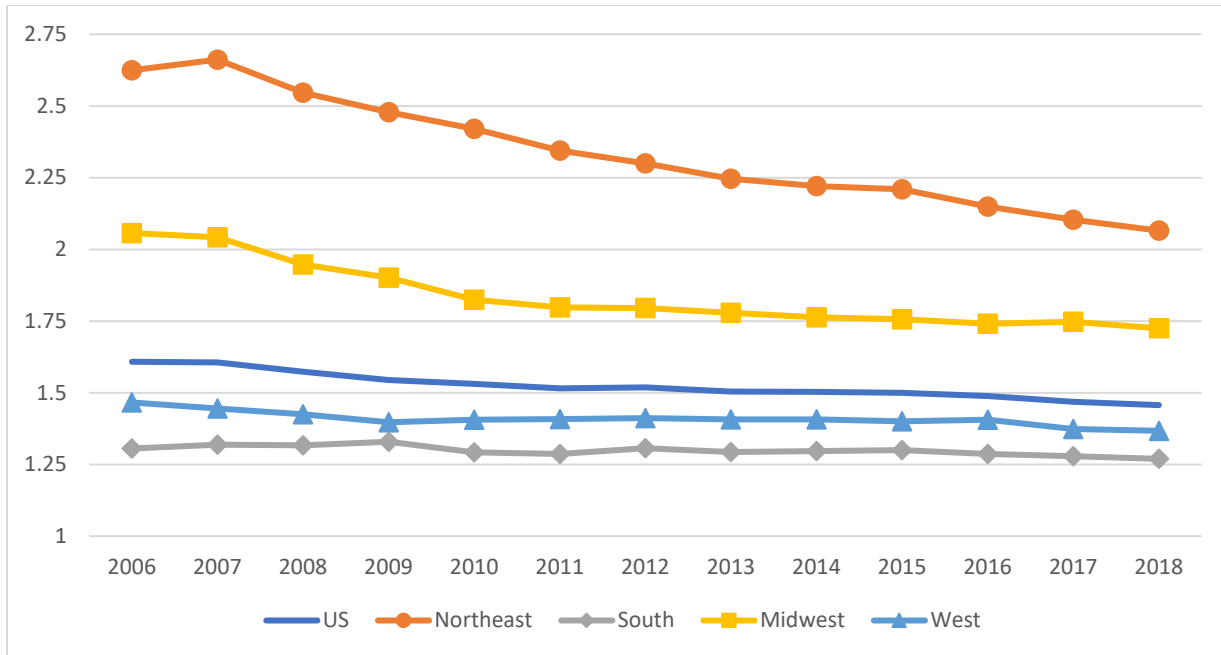
Figure A1: Racial Disparities in Exposure to Low-Income Students, 2006-2018, using district level measures of child poverty from SAIPE

Panel A: Black-White Disparities in Exposure to Low-Income Students



Measures presented are the ratios of percent of children who are poor in the average black student's district relative to the percent of children who are poor in the average white student's district, controlling for grade and metropolitan area.

Panel B: Hispanic-White Disparities in Exposure to Low-Income Students



Measures presented are the ratios of percent of children who are poor in the average Hispanic student's district relative to the percent of children who are poor in the average white student's district, controlling for grade and metropolitan area.

Table A1: Racial Disparities in Exposure to Low-Income Students, 2018-19, using alternative measures of school poverty

	Using MEPS		Using Free-Lunch Eligibility	
	Black/White	Hispanic/White	Black/White	Hispanic/White
U.S.	2.09	1.87	2.00	1.84
Northeast	2.63	2.46	2.50	2.44
South	1.83	1.67	1.78	1.63
Midwest	2.52	2.09	2.31	2.09
West	1.82	1.79	1.77	1.76

MEPS are model estimates of poverty in schools developed by the Urban Institute

(see Gutierrez, Blagg, and Chingos (2022))