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**School Segregation in
The Era of Immigration
and School Choice:
North Carolina,
1998-2016**

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Abstract

We document patterns and trends in school segregation in North Carolina between 1998 and 2016, a period of rapid immigration in this racially diverse state. As in other states of the South, the period of court orders enforcing racial balance has given way not only to tacit acceptance of residentially based school segregation but also to policies that offer parents alternatives to traditional public schools. Most prominent among these alternatives in North Carolina are charter schools, which have expanded rapidly with the state's blessing. Following the prevailing practice of social scientists, we measure segregation by the degree of imbalance across schools, using counties and metropolitan areas as basic geographical units. We differentiate students according to their racial/ethnic group and also to their family income. We take into account all students including those in private schools, charter schools and traditional public schools.

For the state as a whole, we find that white/nonwhite segregation increased over the period. Most of the increase was in urban areas. We also find that low-income students became more segregated from other students. Segregation measured either way increased sharply in Charlotte-Mecklenburg, which significantly changed its student assignment policy following a federal court order. Compared to metropolitan areas in other parts of the U.S., urban areas in the state have modest levels of segregation, because most districts are county-wide and thus large and diverse. We decompose metropolitan segregation, separating the portions due to private schools, charter schools, racial disparities between school districts, and racial disparities within districts. Charter schools and within-district disparities accounted for the increase in average segregation in metropolitan areas over the period. More generally, areas where school segregation increased the most tend to be large, growing, and marked by big increases in the share of students who are Hispanic.

1. Introduction

Segregation in most of its forms is inconsistent with widely held democratic principles. Martin Luther King made this point forcefully in 1964: “if democracy is to live, segregation must die.”¹ Although the particular forms of segregation to which King gave most of his attention may be different from those that occupy the attention of 21st century America, there remains a consensus that racial and economic segregation in schools is inherently suspect. It is fitting, therefore, that social scientists have continued to devote attention to documenting school segregation.

In this paper we contribute to that research literature by studying school segregation in a single state, North Carolina. We use administrative data that covers K-12 students in both public and private schools in the years 1997/98 and 2015/16 (hereafter simply 1998 and 2016). Our research yields two main conclusions. First, powerful demographic forces have produced a dramatic change in the racial and ethnic makeup of North Carolina’s schools. Over the nearly two decades spanned by our study, while the total number of white students declined and enrollments of black students increased in urban areas, enrollments of Hispanic students increased in every single county of the state. As a result, the Hispanic share of K-12 students in public and private schools rose over this period from 3% to 16%, while the share of whites fell from 65% to 51%. As in other states with sizable Hispanic immigration, these changes have transformed what was once a white-black dichotomy into a tripartite configuration, with Hispanic students representing a significant share in many parts of the state. As the very least, this altered configuration means that the white/nonwhite divide, often relied upon in studies of segregation, must now be understood in a new light, as a division between whites on the one side and blacks and Hispanics, together, on the other.

Our second main conclusion is that, for the state as a whole, racial and ethnic segregation in K-12

¹ Address at Penn State University, January 21, 1965. <http://news.psu.edu/story/340786/2015/01/14/campus-life/martin-luther-king-jr-and-future-integration> 4/4/18

schools increased over this period. Using our basic measure, which reflects enrollment imbalances between white and nonwhite students, segregation increased statewide. As whites declined as a share of all students, two forces combined to produce enrollment patterns that left more white students in majority or predominantly white schools than otherwise would have been there: (1) school assignment practices and (2) choices of parents about where to live and whether to enroll their children in a school other than the traditional public assigned to them by virtue of their street address. These alternative schools consisted of charter schools and private schools. Yet this general tendency for segregation to increase had numerous local exceptions. To illustrate, the increase was largely an urban phenomenon, but it did not characterize all urban areas equally. Of the 13 metropolitan areas of the state, for example, white/nonwhite segregation actually fell in four of them.

By focusing on one state, we are able to look at the issue of school segregation in some detail, noting in particular differences between urban and rural areas. North Carolina offers several advantages for analysis: it is racially and ethnically diverse; it has a variety of types of communities, ranging from rural to metropolitan; and, as a “new destination” state, it contains communities that experienced very rapid immigration.

It is also a state especially ripe for assessing the influence of various public policies on school segregation. In particular, North Carolina has witnessed four school-related policies that have been altered, debated, or both over the period of our study. The first of these concerned the constitutionality of enforced racial balance in the public schools. Beginning in the new millennium, federal courts handed down several decisions that prohibited most student assignment plans designed to foster racially balanced schools. One of these decisions struck down the proactive racial balancing practiced by the Charlotte-Mecklenburg school district, making it possible for the district in 2002 to replace a student assignment plan utilizing magnet schools and racial quotas with one emphasizing neighborhood schools.

² One opponent of the change stated, “We have guaranteed convenience for the most able and the

² *Belk v. Charlotte-Mecklenburg Bd of Educ*, 211 F. 3d 853 (4th Cir. 2000). The Supreme Court later codified this

most advantaged in our community.”³ Confirming the fears that this new judicial stance would increase racial imbalance, measured racial segregation in Charlotte-Mecklenburg public schools jumped by 65% between 2001 and 2006.⁴

The second school-related policy with implications for school segregation was the state’s longstanding push to consolidate school districts. From 167 separate school districts in the 1960s, the state – sometimes via direct intervention by the legislature itself – had by 1998 managed to trim the number of districts to 117. By 2016 the number had fallen to 115. Most of them are county-wide districts. For a state with a population of 10 million, this is a remarkably small number (In 2014 New Jersey, with a smaller population, had 602 districts, most of them tied to towns and cities.⁵) Because it has tended to produce spacious, mostly county-wide districts, North Carolina features many fewer of the sharp racial disparities so prevalent in the balkanized urban areas of the Northeast and Midwest. There is currently a push, however, to reverse this pro-consolidation policy. Community leaders in large districts, notably Charlotte-Mecklenburg and Wake County, have called on the state legislature to allow such large county districts to be divided once again. Although the legislative study committee empaneled to examine the question issued neither findings related to the desirability of smaller districts nor a call for their adoption, its report said nothing to quell the push for de-consolidation.⁶

The third school-related policy is charter schools. Introduced in 1996, these schools increased in

prohibition in most clearly in the 2007 decision *Parents Involved in Community Schools v. Seattle School District No. 1*.

³ “My Worst Fear was Realized,” *Educate!* November 13, 2003, p. 2.

⁴ Clotfelter, Ladd and Vigdor (2008, Table 2, p. 68). The index of white-nonwhite school-level segregation rose from 0.20 to 0.33.

⁵Governing, Total School Districts, Student Enrollment by State and Metro Area, <http://www.governing.com/gov-data/education-data/school-district-totals-average-enrollment-statistics-for-states-metro-areas.html>, 5/31/18.

⁶ On a seemingly unrelated question, the committee noted its belief that smaller schools work better than larger ones despite the lack of evidence on the question. North Carolina Legislature, *Report of the Joint Legislative Study Committee on the Division of Local School Administrative Units (2017)*, April 2018; <https://ncleg.net/documentsites/committees/bcci-6701/Final%20Report%20of%20the%20Jt%20Leg%20Study%20Committee%20on%20Division%20of%20Local%20School%20Admin%20Units.pdf>; 5/31/18. See also Keung Hui, “NC Lawmakers Will Consider Dividing School Districts, Including Wake County,” *Raleigh News and Observer*, February 13, 2018.

number, soon reaching the legislated maximum of 100. That cap was lifted in 2011, and the number quickly rose, topping 170 by 2018.⁷ One fear harbored by skeptics of charter schools has been that they would become a vehicle for segregation. Even if most parents see charter schools as philosophical or organizational alternatives to traditional public schools rather than simply as a means of avoiding high levels of interracial contact, the growth of charter schools could nevertheless facilitate racial segregation. Alternatively, if the draw of their distinct educational approaches supersedes any racial considerations, their presence might serve to diminish rather than exacerbate racial segregation.

To guard against the possibility that charter schools might become vehicles for avoiding racially integrated schools, North Carolina put into its original enabling legislation in 1996 not only a prohibition against demonstrably discriminatory practices, but also an admonition that charter schools “shall reasonably reflect” the racial and ethnic composition of their surrounding areas. The state legislature softened this language in 2013, however, requiring only that charter schools “shall make efforts for the population of the school to reasonably reflect” the surrounding area.⁸ This softening accompanied the state’s removing the cap on the total number of charter schools allowed to operate. Coincident with these changes was an increase in the number of charter schools with predominantly white or nonwhite enrollments (80% or more white or nonwhite).⁹ Adding to fears that charter schools might further contribute to racial segregation was a state law approved in June 2018 allowing several predominantly white towns within Mecklenburg County to open up charter schools catering to their own residents.¹⁰

Another state policy with the potential to influence school segregation is government support

⁷ Jane Stancill, Lynn Bonner and David Raynor, “How are Charter Schools Different? Here are the Basics,” *News and Observer*, October 9, 2017; <http://www.newsobserver.com/news/local/education/article177834016.html>, 5/31/18.

⁸ Ladd, Clotfelter and Holbein (2017, p. 538).

⁹ Ladd, Clotfelter and Holbein (2017, Figure 2, p. 543). Evidence for other states shows that charter schools most often tend to be disproportionately nonwhite, as compared to nearby school districts.

¹⁰ Jim Morrill, “Controversial NC Charter Bill Approved. Now, These Four Towns Could Open Schools,” *Charlotte Observer*, June 6, 2018; Jim Morrill and Ann Doss Helm, “Controversial NC Town Charter Schools are Closer to Reality. And Impact is ‘Monumental,’” *Charlotte Observer*, May 29, 2018. The towns mentioned as wanting to start such schools in Mecklenburg County, and their nonwhite percentages in 2017, were: Matthews (19%), Mint Hill (25%), Huntersville (19%), and Cornelius (16%). Statistical Atlas, Race and Ethnicity in Mecklenburg County, NC <https://statisticalatlas.com/county/North-Carolina/Mecklenburg-County/Race-and-Ethnicity>, 5/31/18.

for private schools. A number of states, including North Carolina, have instituted voucher programs to give tax breaks or other assistance to some students in private schools. The North Carolina Opportunity Scholarship Act, enacted in 2013, provides state-funded tuition scholarships up to \$4,200 for first-time private school students from moderate and low-income families.¹¹ Whether a voucher program like the North Carolina one is large enough to have a measurable impact on segregation is a question we do not address.

In the remainder of this paper, we measure school segregation and link patterns and changes to these policies, demographic forces, and household behavior. The next section of the paper briefly describes the demographic changes that have affected school enrollments in the state. Section 3 describes our measure of segregation, and section 4 presents some descriptive statistics showing patterns and trends. In section 5 we decompose measures of segregation in metropolitan areas. In section 6 we discuss segregation indices based on divisions other than the white/nonwhite dichotomy. In sections 7 and 8 we go beyond our numerical description of school segregation to consider what factors underlie the differences and changes in segregation.

2. The Demographic Context

North Carolina's K-12 enrollment is large, rapidly growing, and diverse. As shown in the first two columns of Table I, enrollment in public and private schools increased over this period from 1.3 million in 1998 to 1.6 million in 2016, a rate of little more than 1% a year. The state's two most populous counties, Mecklenburg and Wake (home to Charlotte and Raleigh, respectively) accounted for more

¹¹ In 2017 the maximum family income to be eligible was \$45,510. Keung Hui, "Vouchers allow low-income.." *Raleigh News and Observer*, August 2, 2017.

<http://www.charlotteobserver.com/news/local/education/article70759617.html> 2/8/18

Ann Doss Helms, "Praying for options: Religious schools dominate NC voucher program," *Charlotte Observer*, April 8, 2016. Helps families of modest means; cannot have attended private school before. max of \$4,200 per child. In 15/16 3237 of the 3460 students who received these scholarships went to religious schools.

than a fifth of all students in 2016, and the five largest counties accounted for more than a third. We divided the state's remaining counties by regional and urban/rural designations. Fastest growing of these categories were the urban counties in the piedmont. Columns 5-8 document enrollment changes in charter schools and private schools. Enrollment in charter schools increased markedly, their share increasing in every part of the state and rising as a share of all students in the state from 0.4 % to 5.0%. The share of students enrolled in a private school went the other way, declining over all from 5.8% to 4.9%.

[Table I about here]

Three important demographic facts are important for understanding the patterns and trends in the schools of North Carolina: substantial racial and ethnic diversity, rapid growth in the number of Hispanic students, and steady but uneven urbanization. The racial diversity is apparent in Table II, which shows the racial/ethnic distribution of K-12 students in 1998 and 2016. In 2016, slightly more than half of North Carolina's K-12 students were white and not Hispanic (hereafter, simply white). Non-Hispanic black (hereafter, simply black) students made up 29% of total enrollment, Hispanic students 16%, and Asian and Native American students together made up about 4.5% of the total. What is remarkable is how different that racial mix is compared to our starting point in 1998. Over the 18-year period, the decline in the share of whites, some 14 percentage points, was mirrored by an almost identical increase in the share of Hispanic students of 13 percentage points. Over the period, while the absolute number of whites declined by 3%, the number of Hispanic students increased *seven-fold*. Black students declined as a share of state enrollment, but, unlike the other two groups, their trends were not everywhere the same. While black students gained share in most of the largest counties and in the mountains, they tended to decline as a share of students in the coastal plain and piedmont. Asian students remained a small portion of North Carolina's rural and small urban communities, but their numbers grew rapidly in the state's largest urban areas. There are relatively few Native Americans in the state, but their shares

were significant in several counties of the state.¹²

[Table II about here]

To illustrate the racial/ethnic diversity across the state, Figures I and II display maps showing the concentration of black and Hispanic students by county in 1998 and 2016. Figures Ia and Ib show for 1998 and 2016 the concentration of black students, with counties divided into three groups: less than or equal to 25% black, 25 – 50% black, and greater than 50% black. The maps for both years reveal much the same pattern, with black students concentrated in the eastern half of the state. The highest concentrations were mostly confined to a cluster of counties in the northeastern part of the state. Black students were also a majority in a few other counties in the coastal plain and piedmont. One noteworthy aspect of the change in racial patterns between 1998 and 2016 is the decline in the share of black students in a number of counties in the southeast and center of the state.¹³

[Figures Ia, Ib about here]

For Hispanic students, the story was altogether different. While enrollment patterns for black students were mostly stable, they were anything but that for Hispanic students. The seven-fold increase in their numbers, noted above, was the result of a massive influx of immigrants into the state, attracted by largely low-skill job openings in industries such as meat processing, construction, landscaping, and personal services. This influx increased their shares in most counties, and their numbers in every single one. This growth was concentrated in a handful of “destination” counties, where the concentration of Hispanic students skyrocketed. Figure II, using different percentage categories from those used in the maps for black students, shows the astounding demographic transformation of the state’s schools

¹² Native Americans were concentrated in two clusters of counties. In the far west of the state, in an around the Cherokee Indian Reservation, the share of students who were Native American in 2016 exceeded 15% in two counties. Towards the east, where the unrecognized Lumbee tribe is concentrated, three counties had a tenth or more of their students classified as Native American.

¹³The percentage of blacks fell from above to below 25% in four eastern counties – Brunswick, Duplin, New Hanover, and Pender. To the west, this transition occurred in six other counties: Alamance, Chatham, Lee, Montgomery, Moore, and Rockingham.

between 1998 and 2016. The Hispanic share of all K-12 students exceeded 5% in fewer than ten of the state's 100 counties in 1998. By 2016, only about that number of counties *did not* exceed this threshold! Most of the heaviest concentrations of Hispanic students appeared in one of three clusters, in the northwest, middle, and central parts of the state.

[Figures IIa, IIb about here]

3. Measuring Segregation

Researchers who measure school segregation have employed one of two types of measures – *absolute* measures of exposure or isolation and *relative* measures of imbalance. Measures such as the share of schools that are 90-100% nonwhite, the share of black students in such schools, or the nonwhite share in the average white student's school are examples of absolute measures. Orfield et al. (2016, p.3), for example, documented “re-segregation” in American schools by using one of these, noting a rise in the percentage of schools in the country with less than 10% white students, from 5.7% in 1988 to 18.4% in 2013. Likewise, a 2018 *New York Times* op-ed stated, “Public schools have been re-segregated for decades,” using as its measure of segregation the percentage of black students attending schools with 90-100% minority enrollments.¹⁴ A drawback of measures such as these, however, is that they are unavoidably affected by a school district's overall racial composition. Because white students are becoming a smaller and smaller share of all students in many districts across the country, simple math dictates that more and more schools in the nation will be predominantly nonwhite and thus more students and more black students will attend such schools. It is impossible to judge, therefore, if increases in such absolute measures of exposure or isolation are due to practices that tend to separate students by race or merely to demographic trends.

By contrast, relative measures of imbalance, by design, are independent of a district's overall

¹⁴ Fred Harris and Alan Curtis, “The Unmet Promise of Equality,” *New York Times*, February 28, 2018.

racial composition. This may be the reason why relative measures of school segregation are the most common sort found in the social science literature. They are based on racial imbalance – how far the actual enrollment patterns depart from complete racial balance.¹⁵ The measure of segregation we use in the present paper is one such measure. For a county, for example, this index is the proportional gap between actual interracial contact, such as the percent nonwhite in the average white student’s school and the maximum possible contact, given by the county’s overall nonwhite percentage. For county c this index can be written as

$$S_c = (nw_c - E_c) / nw_c ,$$

where E_c is the calculated percentage nonwhite in the average white student’s school and nw_c is the percentage nonwhite in the county, which is the maximum value that the exposure rate E_c could possibly take if all schools in the county were racially balanced.¹⁶ For example, if white students in a 40% nonwhite county on average attend schools that are just 30% nonwhite, this segregation index would equal 0.25 $((0.40 - 0.30)/0.40)$. Because it takes the county’s overall racial composition as the statistical reference point, it is not dependent, as absolute measures are, on the county’s demographic makeup.

4. Trends in White/Nonwhite School Segregation

Table III presents our main calculations of school segregation in the state’s K-12 schools, both public and private. For the state as a whole, average white/nonwhite segregation increased by more than a quarter, from 0.15 in 1998 to 0.19 in 2016. The next two lines of the table reveal that urban counties as a whole accounted for all of the state’s increase in segregation, while it remained low and constant in rural counties, on average. Among urban counties the levels and changes in segregation

¹⁵ Among the relative measures that have been employed is the dissimilarity index, the gap-based segregation index (used in the present study), and the entropy index, which can accommodate more than two contrasting groups of students.

¹⁶ The exposure rate E_c can be written as: $E_c = (\sum nw_i W_i) / (\sum W_i)$. See Appendix A for a fuller discussion and illustration of the segregation index.

varied quite a bit, illustrated by index values for the five largest counties. Among them, the biggest increase occurred in Mecklenburg County, home of the Charlotte-Mecklenburg school district. Once the celebrated symbol of cross-town busing for racial balance, the district drastically altered its approach to student assignment after federal courts released it from previous desegregation orders. In proportional terms the increase in Wake County (home to Raleigh) was even larger, the doubling from 0.09 to 0.18 reflecting that district's easing of a policy of balancing schools by SES. Other substantial levels of segregation occurred in Guilford (principal city, Greensboro) and Forsyth (Winston-Salem). In smaller urban counties the levels and increases were generally lower, with a few notable exceptions, such as Lenoir (Kinston) (0.30), Alamance (Burlington) (0.28), and Durham (0.27).

[Table III about here]

5. Segregation in Metropolitan Areas

Since the 1960s most of the focus of American research and policy interest related to school desegregation has focused on metropolitan areas. One reason is that segregation in urban schools today has been shown to arise as much from racial disparities between school districts as within them. These between-district disparities are especially significant in Northeastern and Midwestern metropolitan areas, where multitudes of small districts evoke the adjective "balkanized." As shown in Clotfelter (2004) and subsequent studies, as desegregation efforts reduced racial imbalances within school districts, white families gravitated toward predominantly white suburban districts, thus undoing some of the aggregate impact of desegregation efforts. In states where school districts tend to cover large areas, there is less scope for this kind of between-district segregation. But the potential certainly exists.

To compare segregation levels in North Carolina to those in metropolitan areas elsewhere and to assess how important between-district disparities are in North Carolina, we examine metropolitan-level school segregation in the state's 13 designated metropolitan areas. We apply the same white/nonwhite measure of segregation, but to all the counties in a metropolitan area, not just a single

county. To the extent that racial compositions of counties in the same metropolitan area differ in racial composition, overall metropolitan area segregation will be higher.

We decompose total white/nonwhite segregation into four additive parts.¹⁷ They are the portions of segregation attributable to (1) private schools, (2) charter schools, (3) racial disparities between traditional public school districts, and (4) racial disparities between schools *within* the traditional public school districts.

Table IV shows the resulting calculation for the 13 metropolitan areas in the state, using for the areas that cross state lines only the counties in North Carolina. In 2016, the most segregated metropolitan areas were Roanoke Rapids (with a white/nonwhite segregation index of 0.39), Winston-Salem (0.34), Charlotte (0.33), and Greensboro (0.31). These had also been the most segregated metros areas in 1998. In comparison to metropolitan areas in the rest of the country, the ones for North Carolina areas are below average. As documented in Clotfelter (2004), calculations for the year 2000 using the same segregation index reveal that the country's most segregated metropolitan areas had much higher white/nonwhite indices. In that year the metro areas with the highest white/nonwhite segregation indices were Detroit (0.63), Monroe, LA (0.59), Cleveland (0.59), Birmingham (0.58), and Gary-Hammond (0.58).¹⁸ In 2000 the average among smaller metropolitan areas, a better reference group, was 0.265, a value well above the average of North Carolina areas in 1998 and also above, but by less, the 0.25 average in 2016.¹⁹

[Table IV about here]

Among the North Carolina areas, the characteristic of Roanoke Rapids that put it on top in this dubious competition is the same feature that has been at work in most of the nation's large metropolitan areas – the disparities between its various public school districts, between a majority-

¹⁷ See Appendix B for a fuller description of the decomposition.

¹⁸ Clotfelter (2004, Table 2.3, p. 62).

¹⁹ Clotfelter (2004, Table A2.3, p.73).

white district and several predominantly black city and county districts.²⁰ This between-district component accounted for 0.29 of its 0.39 overall white/nonwhite segregation in 2016. A similar but less pronounced racial disparity among districts is also important in the Winston-Salem metropolitan area, accounting for half of its 0.34 index.²¹

But these metro areas are exceptions in a state like North Carolina because of the preponderance of large, county-wide school districts. More important in North Carolina are racial disparities *within* districts, as illustrated by Charlotte, Greensboro, and Wilmington. Across the state's 13 metropolitan areas in 2016, such within-district disparities explain about half of overall segregation (0.13), followed by the between-district disparities (0.06). Racial disparities introduced by private schools (0.03) and charter schools (0.02) account for the rest. Taken together, the disparities associated with private schools and charter schools in 2016 accounted for sizable degrees of segregation in several areas, notably Durham (0.10), Roanoke Rapids (0.09), Charlotte (0.06), and Rocky Mount (0.06). Regarding the increase in average metropolitan-level segregation between 1998 and 2016 for all metro areas, 0.20 to 0.25, part was due to charter schools and part was due to increased segregation within districts.

6. Variations on the White/Nonwhite Dichotomy

We rely primarily on the white/nonwhite split in calculating segregation for two reasons. First, since previous researchers have often employed this definition of racial segregation, using it here makes comparisons to previous findings, such as the ones discussed in the previous section, straightforward. Second, we believe that among the possible two-way divisions that can be used, that between whites

²⁰ These disparities are evident in comparing the nonwhite percentages of this metropolitan area in 2000/2001: Roanoke Rapids City, 24%; Northampton County, 82%; Halifax County, 94%; and Weldon City, 95% (Clotfelter, Ladd and Vigdor 2003, Appendix A.)

²¹ The racial disparities among districts in the Winston-Salem metro area were substantial but less than those in Roanoke Rapids, with the percentage nonwhite in 2000/2001 ranging from 4.5% in Davidson County to 69.1% in Lexington City (Clotfelter, Ladd and Vigdor 2003, Appendix A.)

and nonwhites is the most illuminating single one, for it sets apart the racial group that has historically had the most political and economic power to influence the school assignment of its children.

Still, information is surely lost when groups as different as African Americans and Latinos are combined. It is instructive, therefore, to compare our basic measure of segregation with calculations based on other two-way divisions that explicitly recognize these two major racial groups. In Table V, we compare calculated indices of imbalance using a variety of definitions. The first pair of columns show white/black imbalance. As can be seen by comparing these calculated indices to those for white/nonwhite segregation (shown in the last column), the two sets of indices are quite similar. In 1998 white/black segregation tended to yield about the same index values as white/nonwhite segregation. 18 years later white/black segregation had generally increased by more in urban counties, rising to 0.44 in Mecklenburg and 0.34 in Guilford, for example. In rural counties, average white/black segregation closely tracked white/nonwhite segregation in both years.

[Table V about here]

For white/Hispanic segregation, both levels and changes differed greatly from corresponding white/nonwhite index values. Whereas white/nonwhite segregation rose by 0.04 for the state, white/Hispanic segregation jumped by 0.14, from 0.06 in 1998 to 0.20 in 2016. The index rose in rural counties as well as urban ones. In three of the largest counties, the increases easily exceeded the increase in white/black segregation. As we will see below in several illustrative counties, the extreme degrees of segregation that developed between white and Hispanic students reflected the latter's high concentration in schools serving heavily Hispanic neighborhoods.

The third and fourth pairs of columns measure segregation of black and Hispanic students, respectively, in relation to all other students. When we measure segregation for the state by examining how evenly black students were distributed across schools, we actually see a decline in segregation. For the state as a whole the decline was 0.15 to 0.12. Among the counties and groups shown, only Mecklenburg and Wake experienced increases in this measure of black/non-black imbalance. So,

although white/nonwhite segregation tended to rise in the state, black/non-black imbalance went down. In contrast, segregation between Hispanic and non-Hispanic students increased. Starting from very low readings in 1998, this index increased across the board, rising in urban and rural counties alike. As with white/Hispanic segregation, this general increase reflects the high concentration of Hispanic students in relatively few schools.

These calculations illustrate the advantage of adopting a multi-dimensional perspective on school segregation. What becomes clear from this perspective is that the reality of enrollment patterns in the state, particularly in light of the rapid growth in Hispanic enrollments, is too complex to be described entirely using only the white/nonwhite dichotomy. For white students, the calculations clearly indicate increased separation from the other two major groups of students. The increase we observe in white separation could have occurred by way of predominately white private schools or charter schools, or by way of disparities in the racial composition of across traditional public schools, mechanisms that we explore in the next section.

Table V's fifth pair of columns traces changes in economic segregation. This index compares enrollment patterns for two groups: public school students eligible for free lunch versus all other students, including all private school students. This measure of imbalance increased across the board in most of the counties and groups shown in Table V. For the state the average index increased from 0.14 to 0.19. The increases tended to be largest in urban counties, increasing on average from 0.17 to 0.23. Among the largest counties, the biggest increases were in Mecklenburg (+0.16) and Forsyth (+0.13).²²

7. What Accounts for Differences and Changes in School Segregation?

Before raising the question of underlying causes, we consider here the mechanisms or circumstances that appear to be associated with variations in segregation. Some of the very large

²² Two of the largest increases were in rural counties: Hyde (0.05 to 0.40) and Vance (0.21 to 0.38).

differences in levels of segregation loudly suggest rather specific mechanisms. In several counties, for example, private schools were clearly implicated in the high calculated segregation indices. One of these is the eastern, rural, and predominantly African American county of Bertie, where 44% of the county's white students in 2016 attended one of two mostly white private schools. The result was marked imbalance across the county's schools, yielding a white/nonwhite index of 0.38. Decomposing this index reveals that the racial disparity between public and private schools accounted for 0.36 of that total. Similarly, in adjoining Northampton County, where 76% of students were black, some 23% of white students attended one of its two private schools, both nearly all-white. As in Bertie County, the racial gap between public and private schools accounted for 0.19 of the county's total 0.21 segregation index. In most counties, however, private schools did not play a major role in fostering segregation.

The other obvious culprit in explaining high indices in a few counties is the one identified in our discussion of metropolitan segregation: the coexistence of racially disparate school districts within a single county. In two counties, both of them parts of metropolitan areas listed in Table IV, such racial disparities explain for the bulk of measured segregation at the county level. They are Halifax, where these disparities accounted for 0.40 of the total 0.46 segregation index, and Davidson, where they accounted for 0.30 of the 0.32 total.

To go beyond private schools and multiple school districts in our search for handmaidens of segregation, we turn to counties where segregation increased markedly between 1998 and 2016. This closer inspection of selected counties over time will show that no one explanation fits even a handful of cases, but it will suggest several additional mechanisms. We begin with the large and rapidly growing Mecklenburg County, home to some 175,000 K-12 students in 2016. White/nonwhite segregation in the county rose by more than in any other county, from 0.21 in 1996 to 0.37 in 2016. (White/black segregation rose at a faster rate, from 0.22 to 0.44, but even faster than that was the jump in white/Hispanic segregation index, which more than tripled, from 0.12 in 1998 to 0.46 in 2016.) Over this period Hispanic enrollments increased as a share of the county's K-12 students from 3% to 19%. No

doubt a contributing factor in the elevated values of white/Hispanic segregation was the fact that this Hispanic population was tightly bunched in a few residential areas to the east and southwest of downtown Charlotte. Adding to these demographic features was the school district's distinctive legal history. As noted above, the federal court rulings followed by the decision of a newly constituted school board in 2002 to alter student assignment policy allowed more white parents to select schools close to their homes. Also at work were a raft of new charter schools – the number ballooned over the 18-year period from 1 to 25 – many of which differed from the county's overall racial composition.²³ As a result of this racial gap and the sheer number of such schools, charter schools accounted for roughly a seventh of the county's segregation by 2016.²⁴

Another county with almost as large an increase in white/nonwhite segregation was Chatham, a rapidly growing county near the center of the state, where Mexican immigrants poured in to take jobs in the meat processing industry.²⁵ Between 1998 and 2016 the Hispanic share of the county's students rose by 20 percentage points, from 7% to 27%, while the shares for white and black students each fell by 10 percentage points, to 56% and 16%, respectively. Over the period white/nonwhite segregation rose sharply, from 0.11 to 0.25, as did white/Hispanic segregation (0.19 to 0.38). Most of the Hispanic population in Chatham County was concentrated around Siler City, whose census tracts recorded more than 45% of the population was Hispanic in 2010.²⁶ As in Mecklenburg County, the concentration of the Hispanic population would certainly have posed a challenge to any effort to racially balance the county's schools. Three developments in school enrollments appear to have facilitated the increase in measured segregation in Chatham: a new, largely Hispanic elementary school built in Siler City; two new and a third greatly expanded, largely white charter schools; and, within the county's public school system,

²³ Of the 25 charter schools operating in 2016, five were less than 25% nonwhite and nine for more than 95% nonwhite.

²⁴ Decomposition of white/nonwhite segregation attributes 0.05 of the total 0.37 index to racial disparities between charter schools and the composition of students attending traditional public schools.

²⁵ Information on the largest employers by county is available from the North Carolina Department of Commerce, <https://d4.nccommerce.com/QCEWLargestEmployers.aspx> 6/19/18.

²⁶ The source for tract-level data is the Statistical Atlas (<https://statisticalatlas.com/about>, 6/5/18), which uses data from the 2010 Census and American Community Survey for the years 2009 to 2013.

disproportionately large numbers of Hispanic and black students clustered into four schools.²⁷

A third county, one that registered the same 0.14 increase in white/nonwhite segregation that Chatham experienced, was rural, predominantly black Washington County, a coastal county with sparse employment in paper processing whose school enrollment plummeted by 40% over the 18-year period. The number of Hispanic students increased modestly, while whites declined as a share of all students. The county had neither private schools nor charter schools in our bookend years. Segregation increased simply because two of the five public schools, located in the predominantly white eastern third of the county, remained close to half white while the other three schools, located some 20 miles to the west, went from three-quarters to nine-tenths nonwhite. The county's five public schools, all of them shrinking in size, simply became more racially imbalanced.²⁸

A fourth county illustrative of intensifying segregation was Alamance, a growing urban county situated between Greensboro and Durham. Between 1998 and 2016, immigrants moved to the county and clustered tightly in communities along an east-west swath near I-85 cutting through the center of the county. The Hispanic share of students grew from 4% to 22% while that of whites fell from 69% to 51%. White/nonwhite segregation rose from 0.16 to 0.28, and white/Hispanic segregation increased even more, from 0.09 to 0.32. The proximate contributors to this increase were three new predominantly white charter schools (all with white enrollments more than 75%) and marked disparities in the racial compositions of traditional public schools. In 2016, for example, the county's five high schools had white percentages ranging from 76% to 8%. Private schools, all predominantly white, grew modestly.²⁹

Although these cases do not provide us with an underlying model, ultimate cause, or definitive explanation for segregation, they do suggest several distinct mechanisms that appear to have facilitated

²⁷ See Appendix Table A.2-1 for enrollments by race for all the schools in the county in 1998 and 2016. The new school was Virginia Cross Elementary.

²⁸ See the enrollment figures in Appendix Table A.2-2.

²⁹ See Appendix Table A.2-3.

school segregation. Four mechanisms are plainly illustrated in the examples just cited: private schools, balkanization of traditional public school districts, charter schools, and residential segregation. A fifth mechanism, implicit but nonetheless vital, was districts' tolerance of racial disparities between schools. In every case described, there was a school board that established or maintained a set of attendance zones and exceptions thereto, such as magnet schools or other avenues for parental choice among traditional public schools. As obvious as these five mechanisms might appear to be, however, they are in truth as complicated in their operation as they are unsatisfactory as "explanations" for segregation.

8. Correlates and Causes

Had we ever entertained the hope of explaining definitively why school segregation differs across communities or why it may go up or down over time, our aspirations are at this writing decidedly more modest. The previous section identified mechanisms but not causes. In the present section, we depart from straight description to offer tentative thoughts concerning the underlying causes of the school segregation we have documented. We start by estimating several simple models using ordinary least squares, shown in Table VI. Since we seek to "explain" segregation statistically, measures of segregation serve as the dependent variables. We include explanatory variables we consider to be reasonably exogenous. Therefore, we do not include measures of either private schools or charter schools. Instead, we include variables reflecting five characteristics of counties. The first is racial composition, since that feature seems to be a basic fact conditioning every decision about student assignment. In each equation we enter the share of students who were black and the share who were Hispanic. The logic behind including racial composition rests on the supposition that white parents prefer predominantly white schools. It follows that there would be little need for segregated schools in counties with few nonwhite students.

Second, we add an indicator for counties having more than one school district. This feature is

clearly associated with segregation, for the same reason it is in metropolitan areas, and it is reasonably exogenous because districts are rarely eliminated. Next, we add two characteristics that could well affect the difficulty that a school board might have in racially balancing schools: total enrollment and density. The more populous the county, the more schools, and therefore the more opportunities for variations in racial composition. Density distinguishes rural and urban counties; if urban neighborhoods are racially segregated, then neighborhood schools will tend to be racially segregated as well. We express enrollment as a logarithm and density in hundreds of students per square mile. A fifth variable, probably not so exogenous, is a measure of income, the percentage of households in the top fifth of the national income distribution. We reason that two of the principal alternatives to public schooling for households, private schools and charter schools, are more easily attained by affluent, as compared to less well-off, households.

[Table VI about here]

Comparing equations (1) and (3) serves to illustrate the powerful association between racial composition and segregation. In both 1998 and 2016 counties with high shares of black students tended to be markedly more segregated than other counties. For example, a difference in the share of black students of 20 percentage points between two counties, say between 10% and 30%, was associated with a 0.08 higher white/nonwhite segregation index in the latter.³⁰ (The findings in equations (2) and (4), using the low income/higher income segregation index, are qualitatively similar to those using the white/nonwhite index, and they are not discussed separately.)

For the Hispanic share, the statistical association differed between the two years. In 1998 the Hispanic share was actually negatively associated with segregation. In practice, the implied quantitative difference was small because the shares of Hispanic students were so tiny. In 2016, as shown in equation (3), the Hispanic share shows a coefficient that is roughly the same as that for black shares in

³⁰ The 20-percentage point difference in the illustration is approximately equal to the standard deviation for the share of students who were black. Across the 100 counties the black share ranged from less than 1% to as much as three quarters.

both years. In sum, the coefficients for black and Hispanic students suggest that, by 2016, the higher Hispanic shares were associated with greater segregation to the same extent as higher black shares were. Researchers sometimes have referred to the “racialization” of Mexican immigrants who are stereotyped as inferior and treated like African Americans.³¹ The convergence of coefficients we observe between 1998 and 2016 may reflect this phenomenon.

The table illustrates several other correlates of segregation. As expected, the indicator for counties with multiple districts is associated with higher segregation indices, a difference that was bigger in 1998 than 2016. In addition, segregation tended to be more severe in counties with large enrollments and dense settlement, underlining the fact that schools in urbanized areas were more segregated, other things equal, than rural ones. Urban counties such as Mecklenburg, New Hanover, Guilford, Forsyth, and Durham, combine these characteristics with sizable black and Hispanic shares; all of them have above-average segregation indices. The share of households in a county with incomes in the top quintile nationally is negatively associated with segregation, other things equal, a finding for which we have no ready explanation.

To explore the relationship between segregation, racial mix, and affluence, we estimated an additional regression explaining changes in white/nonwhite segregation. Explanatory variables were changes in the black and Hispanic shares and the changes in log of enrollment and density.³² This simple regression shows that segregation increased in counties where the share of Hispanic students increased, and where density increased. Small negative coefficients were attached to changes in the black share and log of enrollment. To illustrate the implied relationship, comparing a county whose Hispanic share increased by 20 percentage points and one whose share went up by only 3 percentage points, the regression implies that segregation in the first would increase by 0.04 and the second by just 0.01.

³¹ See, for example, Portes and Rumbaut ((2014, pp. 294-295).

³² The estimated regression (with standard errors in parentheses) was: (change in white/nonwhite segregation index) = -0.028 (0.000) + 0.184 (0.001) (change in Hispanic share) – 0.075 (0.001) (change in black share) - 0.005 (0.000) (change in log of enrollment) + 0.118 (0.000) (change in density).

Regressions such as these do little to uncover the ultimate causes of segregation. In thinking about such causes, it is instructive to consider the dilemma facing the school board in any racially diverse district. Racial balance is an easily measured feature of schools, but what weight the board gives to it is surely conditioned by legal constraints, such as court orders, constituent preferences, and the geographic distribution of the population. The board can always increase racial balance across its schools, but only by bearing the financial costs of reassigning students and teachers and transporting students (thanks to residential segregation) and the political costs of upsetting many parents. If boards choose not to bear these costs, segregation is the result.

In more than one county marked by residential segregation, for example, school boards evidently tolerate the existing racial disparities between schools, forgoing an expensive and probably unpopular effort to racially balance its schools. Another school board deals with a burgeoning immigrant population in its county by building a school to accommodate the children of those immigrants and allows other schools to differ in racial composition. Again, any instinct to balance schools racially confronts logistical difficulties, due to residential segregation, as well as opposition from parents who prefer to send their children to schools close to home. In one of the counties we have examined, Mecklenburg, the tradeoffs confronting its school board were abruptly altered when federal courts did an about-face regarding the board's duty to balance its schools by race. Once the courts had stepped away, it came down to school boards having to weigh the costs of various assignment plans. The only research we know of that has attempted to assess how boards might differ in evaluating this tradeoff is a paper by Macartney and Singleton (2017). Using data for North Carolina, they show that school districts where school boards have Democratic majorities have lower levels of racial segregation; the authors make a convincing case that this connection is not mere correlation but is causal.³³

As important as they are, school boards are not the only actors whose decisions affect segregation. Households can also have an impact, especially white and affluent ones.

³³ They examine the outcomes of narrowly-decided elections using a regression-discontinuity setup.

They have historically possessed the political and economic wherewithal to respond to school desegregation orders – when they cannot influence decisions by school boards – by relocating or by transferring their children to schools other than their assigned conventional public schools. Research going back decades, for example, established a close link between school desegregation orders and surges in private school enrollment (Clotfelter 1976). One reasonable working hypothesis is that white families desire to avoid schools where their children will be outnumbered by nonwhites. Such preferences not only would be consistent with research done related to charter schools (Bifulco and Ladd 2007; Ladd, Clotfelter and Holbein 2017; Ladd, Clotfelter and Turaeva 2018), they would also explain the popularity of private schools in counties with high percentages of nonwhite students. But to focus exclusively on racial composition will surely not explain the actions of all parents. Consider as suggestive evidence three letters to the editor of a local weekly newspaper about an article about predominantly white charter schools in Orange County, written by parents:

Our decision to move our child to a charter was 100 percent the result of wanting our child to be motivated and inspired to learn. Project-based learning supplies this; more traditional educational methods of memorizing and regurgitating used by district schools do not. It is very disappointing that Orange County charters are not more diverse, but if local schools can't motivate even a gifted child, then parents are going to send their kids to schools that can, even if they value diversity. The author should interview parents with students at charters and district schools. I suspect he will find a much more nuanced picture of what different parents value for their children's education, and it won't be that they are looking to avoid minorities.

My children attend an [Orange County Schools] charter because 1) it is a more socially conscientious environment for the difficult middle school years, 2) it is the right place for my child with special needs, and 3) I feel it is a safer situation during this time of gun violence in

schools. I would love to see more diversity in the student body and certainly did not choose it because there is less.

Having been there a few years, I can say that the division you see between charters and others is almost completely due to socioeconomic factors. How many economically disadvantaged parents can drive their children to school and pick them up every day? If your child needs free or reduced lunch/breakfast to be able to eat, then why would you even apply to a school that doesn't provide it? You wouldn't. Because of this, the applicant pool for charter schools is going to closely mirror the affluent or upper-middle-class residents of the community. If you want to talk about racial disparity, then let's talk about the socioeconomic disparities that disproportionately have a negative impact on people of color, but don't just opine that charter school parents are racist.³⁴

What then are the ultimate causes of the differences in the degree of racial imbalance across counties that school boards and citizens create and tolerate? One easy answer is to blame all such imbalance on racial animus, prejudice. But surely that is overly simplistic, as these letters explicitly argue. To take any segregation index greater than zero as evidence of bigotry is to assume that the logistical costs of reassignment across the schools of a county are themselves zero and that the only meaningful difference between any two schools is their racial composition, neither of which propositions is tenable. At the same time, to ascribe the increases in racial segregation observed over our period of study entirely to factors other than racial animus is equally simplistic. We have documented and discussed five vehicles through which changes in segregation can occur. But our research simply gives us no basis on which to ascribe motivations to those who employ these vehicles.

³⁴ “The Flight is Not White,” *Indy Week*, June 6, 2018, p. 5.

9. Conclusion

Racial segregation in schools is a subject of perennial interest and importance. Not only are segregated schools discordant with notions of diversity and inclusion, research has consistently shown that they are associated with racial disparities in school resources. Our aim in this paper is largely descriptive. Using administrative data on K-12 enrollments in public and private schools, we measure racial segregation in North Carolina in 1998 and 2016. We use as a measure of segregation an index that reflects the degree of racial imbalance in the schools located within a geographical area. Most of our calculations use counties as the geographical reference, implicitly measuring the degree to which schools within a county differ in racial composition from that of the county's enrollment as a whole. We do not examine segregation that may occur within schools.³⁵

Over the 18 years covered by our study, North Carolina witnessed three noteworthy changes with the potential to have significant effects on segregation in schools. None was more significant than the massive wave of immigrants and first-generation Hispanic students who enrolled in schools across the state. This wave upended the racial and ethnic composition of the state's schools, with the Hispanic share jumping from 3% in 1998 to 16% in 2016. Many of the newly arrived Hispanic students settled in tightly clustered ethnic enclaves in areas whose local employers badly needed workers. Second, the state legislature embraced and expanded the state's legion of charter schools. Over time the state relaxed the original strictures on these schools to be racially representative of their locales, allowing them in more than a few instances to become the racially distinct schools that critics originally feared they would be. Third, federal courts removed any pressure remaining from the days of aggressive desegregation orders on local districts to advance racial balance in schools.

Using our basic measure of segregation, which compares the enrollment patterns for white students with those of all other students, we find that segregation went up in North Carolina by about

³⁵ Clotfelter, Ladd, and Vigdor (2003, 2008, 2013) document significant racial imbalances across classrooms within schools in many North Carolina districts, particularly in middle school and high school.

25% between 1998 and 2016. The increase was mainly confined to urban areas, where segregation increased on average by more than a third. Among the state's 13 metropolitan areas, segregation increased in nine. By way of comparison to other metropolitan areas in the country, those in North Carolina registered a lower average level of segregation in 1998 (0.20) than that for smaller metropolitan areas in the U.S. in 2000 (0.265).³⁶ The feature that accounts for the state's lower levels of metropolitan segregation is the large size of most districts. In the few areas where counties are split into multiple districts, segregation tends to be higher.

It is natural to ask what is behind this rise in school segregation. We identify five mechanisms associated with increases. But, like the automobile used in a bank robbery, these do less to explain why segregation increased than merely to show how it was accomplished. The five mechanisms we identify are: private schools, balkanization of school districts, charter schools, residential segregation, and official tolerance of racial disparities. Employing or being subject to one or more of these mechanisms, two groups of actors – households and school boards – then determine the degree of segregation we observe. Some households want to avoid racially diverse schools. The reasons may be reprehensible or benign. For their part, school boards have several objectives, among them to have high-quality schools, to have racially diverse schools, and to avoid making too many parents angry with them.

Whatever the root causes may be, public policy has a role in influencing how much racial segregation there will be in the schools. At least three state policies invite particular scrutiny. One is a policy allowing towns to open and operate their own charter schools. Whether it represents the first in a series or a unique event, this was exactly the consequence of HB 514, a bill passed in June 2018 permitting four towns in Mecklenburg County to do just this. It is difficult to imagine a policy that could lead more quickly to an increase in racial segregation. A second policy idea along the same lines is to break up large county-wide districts. One result might be to create districts more responsive to their constituents, but another would likely be an increase in racial segregation. A third policy with likely

³⁶ Clotfelter (2004, Table A2.3, p. 73).

effects on segregation relates to what requirement is placed on individual charter schools to represent their local community racially. As noted above, the original admonition to reflect the surrounding community has been allowed to wither away.

Appendix A: Measuring Segregation

In the modern parlance of contemporary social science, the term “segregation” usually refers not to a legal regime but rather to an imbalance in racial composition across units such as schools or neighborhoods. The degree of imbalance is typically measured by mathematical indices that can vary between two extremes: zero (signifying perfect racial balance across all schools, for example) and one (signifying schools that are entirely segregated by race). Using as a comparison point schools that are entirely racially balanced within a geographic area, such measures show the degree to which actual interracial contact in the schools falls short of that standard. The most popular such index is the index of dissimilarity, which can be interpreted as the percentage of one group that would have to change schools or neighborhoods to achieve racial balance.³⁷ In this paper we employ a similar index, but one that has the advantage of being suitable for decomposition, as we explain below.

Our index starts with a measure of what is usually referred to as the rate of exposure between two groups. For example, the white/nonwhite exposure rate is the percentage of nonwhite students in the typical white student’s school.³⁸ If schools in a county were completely segregated by race, this exposure rate would be zero, since no white student would be attending schools with any nonwhite student. At the other extreme, if schools throughout the county were racially balanced, this exposure rate would be identical to the percentage nonwhite of all students in the county. Our measure of segregation is the percentage gap between the *actual* degree of interracial contact and this second, maximum degree that would occur if schools were racially balanced. An index of 0.20, for example, would indicate that actual interracial contact in the schools is 20% less than it would be if schools were perfectly balanced. Like the widely used index of dissimilarity, this measure ranges from 0 (signifying

³⁷ The index of dissimilarity is calculated as: $D = \frac{1}{2} \sum |NW_i / NW - W_i / W|$, where NW_i and W_i are the number of nonwhites and whites, respectively, in school i and NW and W are the total numbers of each group in the district.

³⁸ This exposure rate for county c is the weighted average of each school i ’s percentage nonwhite (nw_i), where the weights are each school’s white enrollment (W_i): $E_c = (\sum nw_i W_i) / (\sum W_i)$.

schools that are perfectly balanced in racial composition, and thus are not segregated) to 1 (signifying total separation of students, with no schools having more than one type of student). Thus, in the pre-1954 South, for example, all counties and school districts had segregation indices of 1.

To illustrate how this measure is calculated, we present in Appendix Table A.1 calculations for Alamance County, North Carolina, a county near the center of the state that contains several towns, including Burlington. In 1997/98 (hereafter, 1998) the white/nonwhite exposure rate in the county was 0.26, meaning that the typical white student attended a school that was 26% nonwhite. In that year, some 31% of all K-12 students in the county's public and private schools were nonwhite, meaning that the actual rate of exposure fell short of the maximum possible by 5 percentage points, or about 16%. This percentage gap, 0.16, is our measure of white/nonwhite segregation.³⁹ As the table shows, white/nonwhite segregation in Alamance County increased between 1998 and 2016, from 0.16 to 0.28. Note that in the present paper, we account for students in private as well as public schools.

[Appendix Table A.1 about here]

In at least one respect this measure is inadequate, however, in that it fails to account explicitly for the other two major racial/ethnic groups in North Carolina's schools – black (or African American) students and Hispanic (or Latino/Latina/Latinx) students. Because the history and policy contexts of these two groups of students are very different from each other and from that of white students, we calculate separate measures of segregation for each group, using measures that exactly parallel those for the white/nonwhite measures described above. Thus, the black/nonblack segregation index represents the percentage gap between the rate of exposure of black students to non-black students and the percentage non-black in the county. As shown in Appendix Table A.1, this rate of black/non-black exposure in the Alamance County schools in 1998 was 0.66, meaning that the average black student in the county attended a school where 66% of the students were not black. This exposure rate

³⁹ For county c , this index is $S_c = (nw_c - E_c) / nw_c$

to non-blacks was some 12% short of the exposure that would have occurred if the schools had been racially balanced, yielding a segregation index of 0.12.⁴⁰ By 2016, segregation for the county's black students had actually declined, slightly, with the index falling from 0.12 to 0.10. For Hispanic students, whose numbers increased markedly over the 18 years in Alamance County, as they did across the state, the story was very different from those of either of the other two groups. In 1998 the relatively few Hispanic students in the county (they made up just 4% of all students) experienced virtually no imbalance or isolation at the school level, as denoted by the low segregation index of 0.04. By 2016, however, their segregation index, 0.13, was higher than that for black students.

We used the same gap-based index to examine economic as well as racial segregation. To assess students' economic standing, like many other education researchers, we rely on information on eligibility for the federal free lunch program to indicate low family income.⁴¹ We were able to estimate for every public school in both 1998 and 2014 the percentage of students eligible to receive free lunch.⁴² Comparable data for private schools were not available; indeed, our supposition is that most but not all students in private schools would not be eligible. Our measure of economic segregation therefore contrasts two groups of students: those attending public schools who received free lunch (whom we designate as low income) and all other students.⁴³ We acknowledge that this treatment implicitly assumes there are not many low-income students in private school, an assumption we believe is not far from the truth. The last section of Appendix Table A.1 shows the calculated segregation for Alamance County based on economic status. The calculations point to a marked increase in segregation. Between

⁴⁰ Calculated as $(0.74-0.66)/0.66 = 0.12$.

⁴¹ Eligibility for free lunch is set at 130% of the poverty rate. U.S. Department of Agriculture, Child Nutrition Program: Income Eligibility Guidelines, *Federal Register*, vol. 82, No. 67, April 10, 2017; <https://www.gpo.gov/fdsys/pkg/FR-2017-04-10/pdf/2017-07043.pdf>, 12/13/17.

⁴² Due to a change in the program, comparable data were not available for 2015/16.

⁴³ Data on receipt of free lunch was not available for 2016. We therefore used information on each school's percentage in 2014. For schools that did not exist in 2014, we estimated the percentage receiving free lunch based on the percentage of students in the school who applied for it in 2016, using the estimated regression: $(\text{pct FL } 2014) = 0.02 + 0.94*(A_i/ADM_i)$, where A_i was the number of applications for free lunch status in 2015/16 at school i and ADM_i was the average daily membership at the school in 2015/16.

1998 and 2014 the index of economic segregation doubled, rising from 0.12 to 0.24. Over this period the percentage of students in either private schools or not classified as free lunch in the public schools fell from 76% to 54%. The corresponding exposure rate declined by an even larger extent, thus opening up a larger gap between actual and potential contact between students on either side of the economic demarcation line.

Appendix B: Decomposition of White/Nonwhite Segregation

As noted in section 5, we decompose total white/nonwhite segregation into four additive parts. The first measures the contribution of private schools, by comparing a hypothetical situation in which all schools in the metropolitan area were racially balanced with one where just the public schools were racially balanced and private schools had their actual enrollments. If private schools are whiter on average than public schools or if those private schools differ among themselves in racial composition, whites' average exposure to nonwhites will be lower, creating imbalance. The difference in segregation between those two hypothetical situations is the portion of segregation in the metropolitan area that can be attributed to private schools. In a similar fashion, we can compare that second hypothetical scenario to a third, in which charter schools are assigned their actual enrollments rather than being assumed to share the racial composition of all public schools, thus reducing further the average exposure of whites to nonwhites. The difference between the segregation under this scenario and the second one then yields the portion of overall segregation attributable to charter schools. A fourth scenario measures the contribution to overall segregation due to racial composition differences between districts, and the difference between the fourth scenario and the actual pattern of enrollment yields the portion due to differences in racial composition across schools within districts.

More precisely, our decomposition of segregation can be represented algebraically, as follows. Subscripts are: i =school; j =sector (1=traditional public schools; 2=charter schools; 3=private schools); k =district within sector 1; c =county; m =metropolitan area.

The white/nonwhite exposure rate for county c is the weighted average of each school i 's

percentage nonwhite (nw_i), where the weights are each school's white enrollment (W_i):

$$E_c = (\sum nw_i W_i) / (\sum W_i) = (\sum nw_i W_i) / W,$$

where W is the total number of whites in the county. Segregation between whites and nonwhites is the proportional gap between actual exposure (E_c) and the maximum possible exposure rate, that which would occur if each school had the same proportion of nonwhite students (nw_c). This gap is given by:

$$S_c = (nw_c - E_c) / nw_c$$

This segregation index can be divided into pieces that measure the contribution to overall segregation of several factors. This decomposition is calculated as a matter of accounting by comparing the differences among several idealized situations, or scenarios, beginning with a highly idealized, and highly unrealistic one – an idealized world in which all the schools in a county had the same racial composition. This scenario of perfectly balanced schools is one extreme point of comparison; under it every school would have the percentage of nonwhite students that the county as a whole has. Beginning with this maximum possible racial balance and ending with the actual distribution of students across schools, one can imagine five scenarios, each successive one offering more ways in which schools might differ in racial composition:

1. Perfect racial balance across all schools – traditional public, charter, and private.
2. Every public school, including charter schools, reflects the racial composition of all public school students, and private schools have their actual enrollments.
3. Every traditional public school reflects the racial composition of all traditional public school students; charter schools and private schools have their actual enrollments.
4. Every traditional public school reflects the overall racial composition of its district (that is, there is racial balance within each district); charter schools and private schools have their actual enrollments.
5. Actual enrollment patterns.

Consider the exposure rate of whites to nonwhites that each scenario implies:

1. $E_1 = nw_c$ (because every school reflects the county's overall racial composition)
2. $E_2 = [(pct\ nw\ in\ all\ public\ schools)*(W_1 + W_2)] + (exposure\ rate\ in\ private\ schools)*W_3] / W$, where W_j is the number of white students in sector j (traditional public schools, charter schools, and private schools, respectively), ($W = \sum W_i$) is all white students in the county, and nw_3 is the proportion of nonwhites among private school students.
3. $E_3 = [(pct\ nw\ in\ all\ traditional\ public\ schools)*(W_1) + (exposure\ rate\ in\ charter\ schools)*W_2 + (exposure\ rate\ in\ private\ schools)*W_3] / W$.
4. $E_4 = [(\sum (pct\ nw\ in\ district\ k)(\#whites\ in\ district\ k)) + (exposure\ rate\ in\ charter\ schools)*W_2 + (exposure\ rate\ in\ private\ schools)*W_3] / W$.
5. $E =$ actual exposure rate, defined above, $E_c = (\sum nw_i W_i) / W$.

Because these scenarios assume successively greater opportunities for racial disparities between schools, each one implies an exposure rate that is less than or equal to the previous scenario.

That is,

$$E_1 \geq E_2 \geq E_3 \geq E_4 \geq E$$

It is straightforward to decompose a county's segregation rate into four components, defined in terms of differences between these scenarios:

$$S_c = (nw_c - E) / nw_c$$

$$= (nw_c - E_2) / nw_c + (E_2 - E_3) / nw_c + (E_3 - E_4) / nw_c + (E_4 - E) / nw_c$$

The components are, in order: first, the portion of segregation attributable to private schools (calculated as the difference between scenarios 1 and 2); second, the portion attributable to charter schools (the difference between scenarios 2 and 3); third, the portion attributable to racial disparities between school districts in the county or metropolitan area (the difference between scenarios 3 and 4); and, fourth, the portion due to racial disparities between schools within districts.

Note that the third component – showing the portion of segregation due to racial disparities in traditional public schools across districts – will necessarily be zero if there is just one school district in a county. Similarly, the first component would be zero if the county contained no private schools, and the second would be zero if there were no charter schools.

Note also that this method can equally well be applied to metropolitan areas, consisting as they do of multiple counties. Instead of individual counties, we do this.

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Tables & Figures

Table I. Distribution of North Carolina K-12 Students by School Type and County or County Group, 1997/98 and 2015/16

	Percentage of students in NC schools							
	Total enrollment		Traditional public school		Charter		Private	
	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16
State of NC	1,308,326	1,619,190	93.8	90.2	0.4	4.9	5.8	4.9
Five largest counties								
Mecklenburg	110,115	174,614	87.2	83.7	0.1	7.4	12.8	8.8
Wake	97,780	183,002	91.7	86.1	0.6	5.8	7.7	8.1
Guilford	65,168	83,916	91.9	86.9	0.0	6.4	8.1	6.8
Cumberland	54,143	54,955	94.2	93.1	0.0	2.0	5.8	4.9
Forsyth	49,376	62,179	87.1	89.7	1.6	4.5	11.3	5.8
Other urban								
Coastal	145,791	157,102	93.1	91.7	0.4	3.2	6.5	5.1
Piedmont	110,191	148,653	91.5	85.7	1.1	8.0	7.5	6.3
Mountain	88,203	96,189	91.7	88.6	0.4	4.8	7.8	6.6
Rural								
Coastal	82,868	85,194	96.8	94.8	0.3	3.3	2.9	1.8
Piedmont	314,303	365,593	96.7	94.3	0.1	3.3	3.2	2.4
Mountain	190,388	207,793	97.8	93.4	0.2	5.0	2.0	1.7

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

Note 1: Percentages for the state and county groups are weighted averages of county statistics where weights are county enrollments.

Note 2: If a school has missing/unreliable information in 1997/98, the same school is dropped from consideration in 2015/16, and vice versa.

Table II. Racial/Ethnic Distribution of North Carolina Schools Students by County or County Group, 1997/98 and 2015/16

	Percentage of students											
	White		Black		Hispanic		Asian		American Indian		Low income	
	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16	1997/98	2013/14
State of NC	64.7	51.1	29.6	28.7	2.6	15.7	1.6	3.2	1.4	1.3	29.3	44.4
Five largest counties												
Mecklenburg	55.5	34.8	37.5	39.7	2.7	19.3	3.8	5.8	0.4	0.4	26.7	42.4
Wake	68.4	50.2	25.6	25.7	2.5	16.1	3.3	7.8	0.2	0.3	15.1	25.6
Guilford	57.2	37.9	37.4	42.4	1.7	13.3	3.1	6.0	0.6	0.4	27.3	48.7
Cumberland	47.1	32.0	44.9	51.7	4.7	12.2	1.7	2.5	1.5	1.7	34.6	47.1
Forsyth	60.8	42.7	34.5	31.3	3.5	23.2	1.0	2.7	0.2	0.2	30.1	45.2
Other urban												
Coastal	56.0	47.5	40.2	37.8	2.4	12.7	1.0	1.7	0.3	0.3	35.4	48.1
Piedmont	59.9	43.2	35.0	33.4	3.0	19.5	1.8	3.6	0.3	0.4	23.8	42.6
Mountain	82.1	65.9	13.8	17.7	1.7	13.4	2.2	2.8	0.2	0.2	21.1	44.7
Rural												
Coastal	59.0	56.1	38.2	28.6	2.3	14.2	0.2	0.7	0.3	0.5	40.5	50.8
Piedmont	61.3	52.5	30.5	25.5	2.9	16.5	0.7	1.3	4.6	4.0	34.9	49.7
Mountain	86.4	75.3	9.6	10.6	2.0	11.8	1.3	1.5	0.6	0.7	25.4	45.3

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

Note: Percentages for the county groups are weighted averages of county statistics where weights are county enrollments. For consistency with NC enrollment data prior to 2010, for 2015/16 the black category includes multiracial students, and the Asian category includes Pacific Islander students.

Figure Ia. North Carolina Counties by Percentage of Black Students, 1997/98

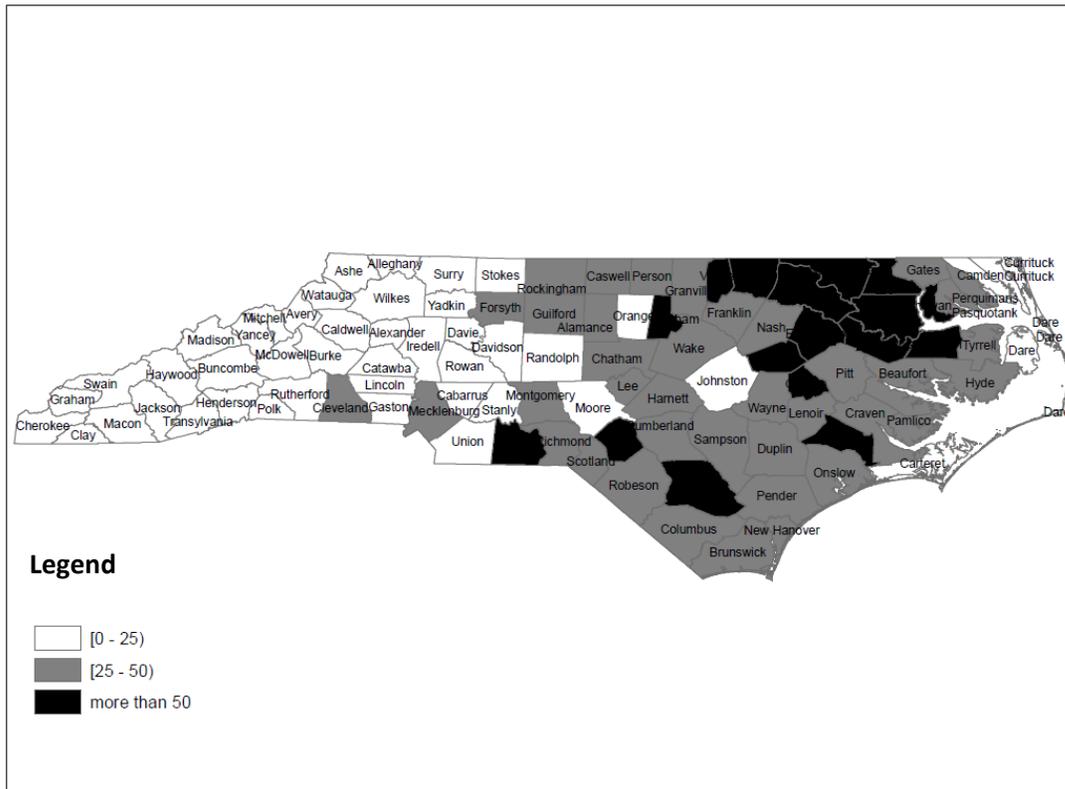


Figure Ib. North Carolina Counties by Percentage of Black Students, 2015/16

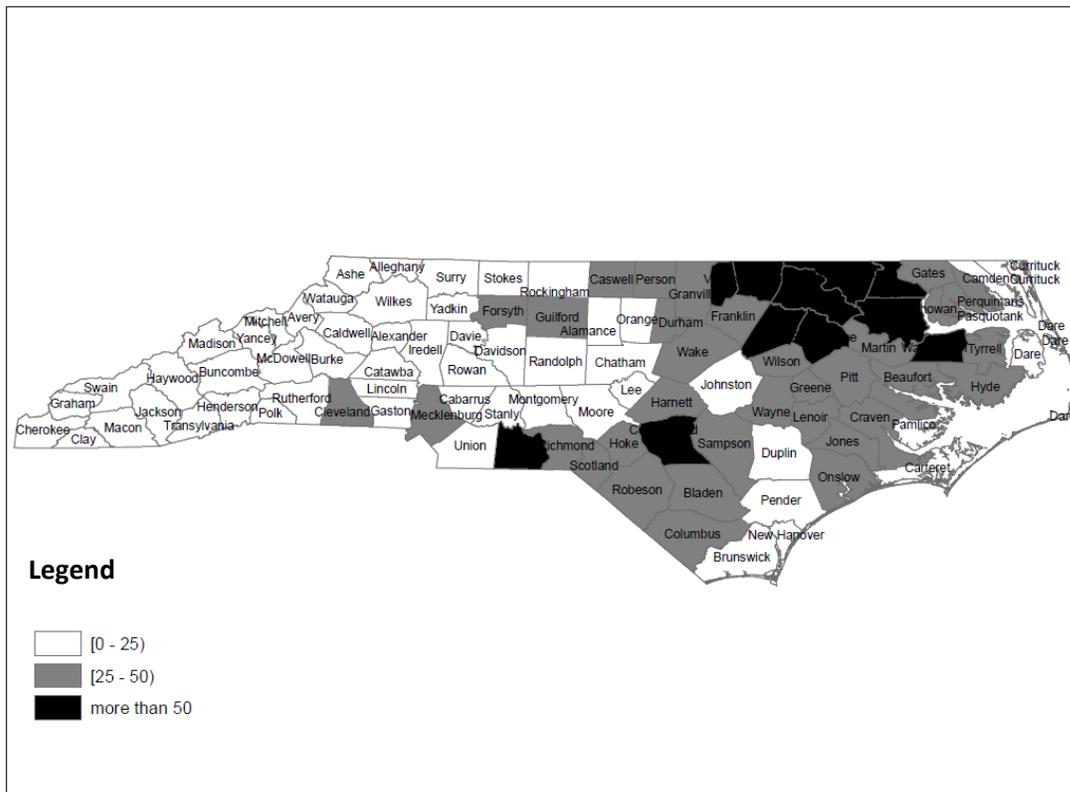


Figure IIa. Map of NC Counties by Percent of Hispanic Students, 1997/98

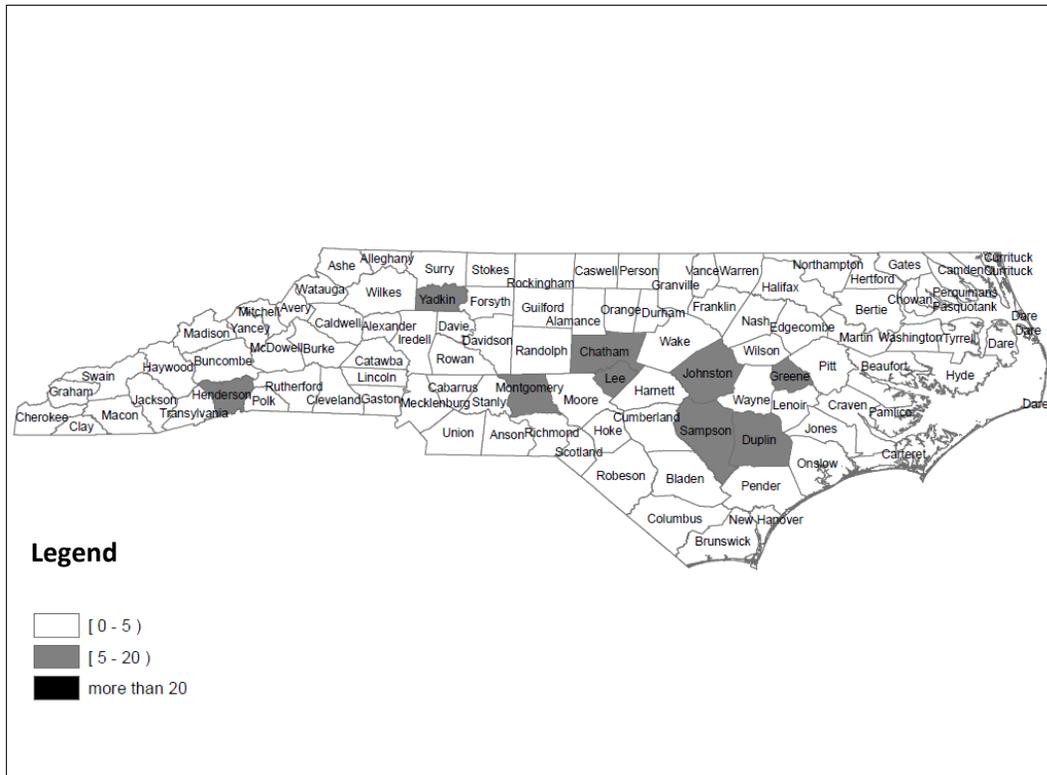


Figure IIb. Map of NC Counties by Percent of Hispanic Students, 2015/16

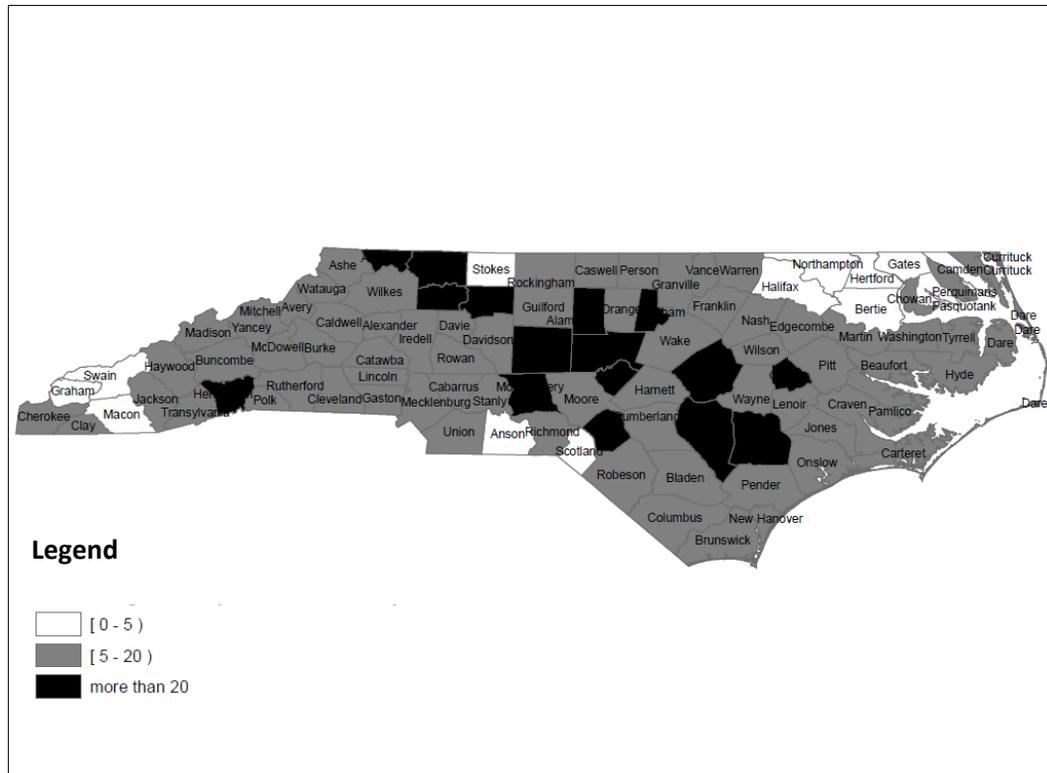


Table III. White/nonwhite Segregation Index in North Carolina Schools by County or County Group, 1997/98 and 2015/16

	Segregation index	
	White/nonwhite 1997/98	2015/16
State of NC	0.15	0.19
Urban counties	0.17	0.23
Rural counties	0.13	0.13
Five largest counties		
Mecklenburg	0.21	0.37
Wake	0.09	0.18
Guilford	0.30	0.30
Cumberland	0.15	0.15
Forsyth	0.21	0.29
Other urban		
Coastal	0.16	0.17
Piedmont	0.14	0.18
Mountain	0.14	0.13
Rural		
Coastal	0.10	0.10
Piedmont	0.18	0.16
Mountain	0.08	0.08

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

Note: Segregation indices for the state and groups are weighted averages of county statistics where weights are county enrollments.

Table IV. White/nonwhite Segregation Index: Decomposition, NC Metropolitan Areas, 1997/98 & 2015/16

Metro Area	Segregation index									
	1997/98					2015/16				
	Total	Private/public	TPS/charter	Between TPS districts	Within districts and sectors	Total	Private/public	TPS/charter	Between TPS districts	Within districts and sectors
Asheville	0.17	0.00	0.00	0.11	0.05	0.11	0.01	0.00	0.04	0.06
Charlotte-Concord-Gastonia	0.25	0.04	0.00	0.08	0.12	0.33	0.04	0.02	0.08	0.19
Durham-Chapel Hill	0.22	0.04	0.01	0.09	0.08	0.28	0.04	0.06	0.11	0.08
Elizabeth City	0.09	0.02	0.00	0.03	0.04	0.14	0.02	0.00	0.09	0.03
Fayetteville	0.15	0.03	0.00	0.01	0.12	0.14	0.02	0.00	0.00	0.11
Greensboro-High Point	0.30	0.03	0.00	0.08	0.19	0.31	0.03	0.02	0.09	0.16
Hickory-Lenoir-Morganton	0.12	0.01	0.01	0.05	0.05	0.13	0.01	0.00	0.05	0.08
New Bern	0.07	0.01	0.00	0.01	0.04	0.09	0.03	0.01	0.00	0.06
Raleigh-Cary	0.10	0.02	0.00	0.00	0.06	0.17	0.03	0.02	0.01	0.12
Roanoke Rapids	0.54	0.15	0.00	0.35	0.03	0.39	0.08	0.01	0.29	0.01
Rocky Mount	0.20	0.06	0.00	0.01	0.13	0.17	0.05	0.01	0.01	0.10
Wilmington	0.09	0.02	0.00	0.00	0.07	0.17	0.01	0.01	0.00	0.14
Winston-Salem	0.29	0.02	0.01	0.16	0.10	0.34	0.02	0.02	0.17	0.14
Weighted Average	0.20	0.03	0.00	0.07	0.10	0.25	0.03	0.02	0.07	0.13
as % of total	100	15.0	1.2	34.8	49.0	100	11.9	7.9	26.5	53.8

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

Note: Metro areas, their component NC counties, and districts other than county districts are listed below:

Metro Area Name	Component NC counties (and districts other than county)
Asheville	Buncombe (Asheville City Schools); Haywood; Henderson; Madison
Charlotte-Concord-Gastonia	Anson; Cabarrus (Kannapolis City Schools); Gaston; Mecklenburg*; Union
Durham-Chapel Hill	Chatham; Durham; Orange (Chapel Hill-Carrboro City Schools); Person
Elizabeth City	Camden; Pasquotank** ; Perquimans
Fayetteville	Cumberland; Hoke
Greensboro-High Point	Guilford; Randolph; Rockingham
Hickory-Lenoir-Morganton	Alexander; Burke; Caldwell; Catawba (Newton Conover City Schools, Newton Conover City Schools)
New Bern	Craven; Jones; Pamlico
Raleigh-Cary	Franklin; Johnston; Wake
Roanoke Rapids	Halifax (Roanoke Rapids City Schools, Weldon City Schools); Northampton
Rocky Mount	Edgecombe (Nash-Rocky Mount Schools); Nash
Wilmington	Brunswick; New Hanover; Pender
Winston-Salem	Davidson (Lexington City Schools, Thomasville City Schools) ; Davie; Forsyth*** ; Stokes; Yadkin

* Name of the county-wide district is Charlotte-Mecklenburg Schools

** Name of the county-wide district is Elizabeth City-Pasquotank Public Schools

*** Name of the county-wide district is Winston Salem/Forsyth County Schools

Table V. Alternative Measures Racial/Ethnic Segregation in North Carolina Schools by Division and Region, 1997/98 and 2015/16

	Segregation index											
	White/black		White/Hispanic		Black/non-black		Hispanic/non-Hispanic		Low/non-low		White/Nonwhite	
	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16	1997/98	2015/16	1997/98	2013/14*	1997/98	2015/16
State of NC	0.16	0.20	0.06	0.20	0.15	0.12	0.03	0.09	0.14	0.19	0.15	0.19
Urban counties	0.18	0.26	0.07	0.25	0.17	0.15	0.03	0.10	0.17	0.23	0.17	0.23
Rural counties	0.14	0.12	0.06	0.12	0.12	0.08	0.03	0.07	0.11	0.14	0.13	0.13
Five largest counties												
Mecklenburg	0.22	0.44	0.12	0.46	0.19	0.23	0.03	0.15	0.20	0.36	0.21	0.37
Wake	0.10	0.21	0.04	0.21	0.10	0.12	0.02	0.09	0.09	0.16	0.09	0.18
Guilford	0.31	0.34	0.08	0.33	0.27	0.19	0.02	0.07	0.24	0.30	0.30	0.30
Cumberland	0.17	0.19	0.06	0.10	0.14	0.13	0.01	0.01	0.15	0.19	0.15	0.15
Forsyth	0.22	0.31	0.15	0.38	0.20	0.14	0.07	0.16	0.21	0.34	0.21	0.29
Other urban												
Coastal	0.18	0.21	0.04	0.14	0.17	0.17	0.02	0.07	0.17	0.16	0.16	0.17
Piedmont	0.15	0.19	0.08	0.23	0.14	0.10	0.03	0.10	0.16	0.20	0.14	0.18
Mountain	0.16	0.13	0.02	0.11	0.15	0.09	0.01	0.06	0.17	0.16	0.14	0.13
Rural												
Coastal	0.11	0.11	0.03	0.08	0.10	0.08	0.01	0.04	0.09	0.11	0.10	0.10
Piedmont	0.18	0.16	0.08	0.17	0.16	0.10	0.03	0.09	0.13	0.16	0.18	0.16
Mountain	0.08	0.07	0.03	0.07	0.07	0.05	0.02	0.05	0.08	0.11	0.08	0.08

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

* Comparable data on free lunch eligibility in 2015/16 not available. See text.

Note: Segregation indices for the state and county groups are weighted averages of county statistics where weights are county enrollments. For consistency with NC enrollment data prior to 2010, for 2015/16 black and multiracial students are grouped together in black category, and Asian and Pacific Islander students are grouped together in Asian category.

Table VI. Regression Explaining Segregation Index, by County

VARIABLES	1997/98		2015/16	
	W/NW Seg	L/NL Seg	W/NW Seg	L/NL Seg
	(1)	(2)	(3)	(4)
% black	0.218*** (0.001)	0.156*** (0.000)	0.186*** (0.001)	0.178*** (0.000)
% Hispanic	-0.930*** (0.004)	-0.532*** (0.002)	0.204*** (0.001)	0.217*** (0.001)
More than 1 district	0.032*** (0.000)	0.022*** (0.000)	0.008*** (0.000)	0.002*** (0.000)
Enrollment (log)	0.057*** (0.000)	0.014*** (0.000)	0.018*** (0.000)	0.011*** (0.000)
Density	0.002*** (0.000)	0.066*** (0.000)	0.062*** (0.000)	0.051*** (0.000)
% HH in top 20*	-0.527*** (0.002)	-0.378*** (0.001)	-0.329*** (0.001)	-0.093*** (0.002)
Constant	-0.371*** (0.001)	-0.009*** (0.001)	-0.087*** (0.001)	-0.045*** (0.001)
Observations	100	100	100	100
R-squared	0.359	0.494	0.619	0.561

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: W/NW seg is the white/nonwhite segregation index; see text for definition. L/NL seg is the analogous index measuring the imbalance in enrollments between low-income students in public school and all others; see text.

* Percent of county households in top quintile of national income.

Appendix

Table A.1 Alamance County Illustration, 1997/98 & 2015/16

Contrasting Groups	1997/98	2015/16
White/Nonwhite		
Percent nonwhite	0.31	0.49
Exposure rate (W/NW)	0.26	0.35
Segregation Index (W/NW)	0.16	0.28
Black/non - black		
Percent non-black	0.74	0.76
Exposure rate (B/NB)	0.66	0.68
Segregation Index (B/NB)	0.12	0.10
Hispanic/non - Hispanic		
Percent non-Hispanic	0.96	0.77
Exposure rate (H/NH)	0.92	0.67
Segregation Index (H/NH)	0.04	0.14
Low income/ not low income*		
	1997/98	2013/14
Percent not low income	0.76	0.54
Exposure rate (L/NL)	0.67	0.41
Segregation Index (L/NL)	0.12	0.24

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

Note: Segregation index is proportional gap between the actual and maximum exposure rates calculated for all public and private K-12 schools in the county.

* Low income is defined as attending a public school & receiving free lunch.

Comparable data on free lunch eligibility in 2015/16 not available. See text.

Table A.2 Racial Distribution by School

Table A.2-1 Chatham County

School Name	Type	1997/98						2015/16					
		Native American	Asian	Hispanic	Black	White	Total	Native American	Asian	Hispanic	Black	White	Total
North Chatham Elementary	TPS	7	3	28	125	442	605	3	6	195	52	314	570
Virginia Cross Elementary	TPS							3	3	439	110	38	593
Willow Oak Montessori	Charter							0	3	7	18	121	149
Bennett School	TPS	0	0	9	10	197	216	0	1	19	3	203	226
Community Independent School	Private	0	0	0	0	25	25						
Haw River Christian Academy	Private							0	0	0	0	64	64
Moncure School	TPS	2	0	8	96	133	239	2	1	53	58	195	309
Auldem Academy	Private							1	2	2	2	40	47
Bonlee School	TPS	0	0	19	60	386	465	0	0	55	34	238	327
Chatham Middle	TPS	2	1	96	173	185	457	1	4	385	95	70	555
Three Springs Middle & High School	Private	2	1	0	7	54	64						
Northwood High	TPS	1	4	13	238	526	782	4	17	196	239	870	1326
J S Waters School	TPS	0	0	11	125	171	307	1	1	15	56	197	270
Chatham Charter	Charter	1	3	0	16	106	126	0	0	23	90	419	532
Perry W Harrison Elementary	TPS	4	5	6	100	441	556	5	14	79	91	494	683
Siler City Elementary	TPS	1	2	179	268	228	678	0	5	466	130	133	734
Silk Hope School	TPS	3	1	35	62	411	512	0	4	56	38	299	397
Margaret B. Pollard Middle	TPS							3	11	124	79	403	620
Horton Middle	TPS	1	4	7	138	291	441	0	10	55	93	225	383
Pittsboro Montessori School	Private							0	0	0	1	7	8
Pittsboro Elementary	TPS	5	2	8	182	331	528	0	9	71	130	292	502
Woods Charter	Charter							4	18	23	43	415	503
Jordan Matthews High	TPS	0	2	40	167	337	546	0	8	398	135	218	759
Chatham Central High	TPS	0	0	2	69	327	398	0	2	38	57	289	386

Table A.2-2. Washington County

School Name	Type	1997/98						2015/16					
		Native American	Asian	Hispanic	Black	White	Total	Native American	Asian	Hispanic	Black	White	Total
Creswell Elementary	TPS	0	0	6	120	136	262	0	0	39	73	81	193
Creswell High	TPS	0	0	2	108	107	217	0	1	22	70	99	192
Plymouth High	TPS	0	1	3	472	173	649	0	1	14	290	25	330
Pines Elementary	TPS	3	0	11	731	246	991	2	4	32	538	65	641
Washington County Union	TPS	0	1	6	443	180	630	0	1	20	224	22	267

Table A.2-3 Alamance County

School Name	Type	1997/98						2015/16					
		Native American	Asian	Hispanic	Black	White	Total	Native American	Asian	Hispanic	Black	White	Total
Bradford Academy	Private							0	1	6	4	72	83
Graham High	TPS	1	4	43	162	450	660	1	15	339	290	169	814
The Hawbridge School	Charter							0	5	6	36	270	317
Elon Elementary	TPS	1	6	8	107	688	810	2	8	146	120	428	704
Western Alamance High	TPS	6	0	4	105	706	821	4	21	120	186	907	1238
Haw River Christian School	Private	0	0	0	1	6	7						
Southern Middle	TPS	1	0	16	81	755	853	3	6	87	54	622	772
Pleasant Grove Elementary	TPS	0	0	39	139	175	353	1	2	75	81	112	271
Turrentine Middle	TPS	0	25	18	235	580	858	1	26	219	332	233	811
River Mill Academy	Charter							5	11	20	130	539	705
Clover Garden	Charter							0	1	33	41	555	630
Edwin M Holt Elementary	TPS	1	0	1	50	489	541	4	3	34	33	514	588
Lakeside School	Charter	0	0	1	25	19	45						
Alamance Christian School	Private	0	0	0	1	337	338	0	8	10	20	304	342
Marvin B Smith Elementary	TPS	0	18	24	210	453	705	3	11	125	183	263	585
Grove Park Elementary	TPS	2	13	29	232	268	544	1	11	181	335	135	663
Southern High	TPS	7	2	5	84	868	966	6	14	193	159	1174	1546
Highland Elementary	TPS							2	43	85	128	401	659
Harvey R Newlin Elementary	TPS	5	10	37	323	281	656	4	9	249	271	90	623
Burlington Christian Academy	Private	0	0	0	13	348	361	0	20	13	31	492	556
Hillcrest Elementary	TPS	3	7	28	257	455	750	2	7	193	283	149	634
Hawfields Middle	TPS							3	4	144	113	384	648
Hugh M Cummings High	TPS	1	25	51	360	270	707	6	7	445	423	76	957
Altamahaw Ossipee Elem	TPS	0	1	4	88	487	580	1	3	76	50	430	560
Bible Wesleyan Christian School	Private	0	0	5	2	35	42	0	0	11	1	26	38
Woodlawn Middle	TPS	5	0	15	178	502	700	3	8	79	142	318	550
Sylvan Elementary	TPS	0	0	9	13	256	278	0	4	33	25	252	314
South Mebane Elementary	TPS	1	1	32	166	555	755	2	16	59	218	309	604
Broadview Middle	TPS	1	13	50	395	292	751	1	10	395	314	66	786
Eastlawn Elementary	TPS	3	20	71	302	202	598	1	3	284	212	59	559
Graham Middle	TPS	3	4	67	192	380	646	5	11	272	195	140	623
B Everett Jordan Elem	TPS	0	2	25	54	312	393	1	1	84	56	255	397
Alexander Wilson Elementary	TPS	1	5	13	114	448	581	0	5	145	70	355	575
Garrett Elementary	TPS							6	10	155	112	392	675
Walter M Williams High	TPS	0	24	21	220	793	1058	5	37	248	455	440	1185
Blessed Sacrament School	Private	0	2	5	13	294	314	0	6	25	18	104	153
Haw River Elementary	TPS	1	3	67	219	258	548	8	4	284	163	117	576
R Homer Andrews Elementary	TPS	0	3	63	302	182	550	4	6	343	192	45	590
South Graham Elementary	TPS	3	7	97	125	326	558	5	13	274	173	161	626
Western Middle	TPS	0	2	6	106	585	699	4	9	92	112	658	875
Burlington Day School	Private	0	11	0	6	151	168	0	7	14	38	199	258
Ray Street Academy	TPS	0	0	0	2	6	8	1	0	11	27	33	72
North Graham Elementary	TPS	0	2	17	145	171	335	4	0	136	163	60	363
E M Yoder Elementary	TPS	2	1	4	87	292	386	1	5	42	64	202	314
Alamance-Burlington Middle College	TPS							0	1	15	27	60	103
Eastern Alamance High	TPS	3	3	12	192	558	768	7	13	148	333	754	1255

Table A.3. Select County and State Data, 1997/98 & 2015/16

County	Region	W-NW Segregation		enrollment 2015/16	Percentage white		Percentage black		Percentage Hispanic	
		1997/98	2015/16		1997/98	2015/16	1997/98	2015/16	1997/98	2015/16
North Carolina		0.15	0.19	1,619,190	64.7	51.1	29.6	28.7	2.6	15.7
ALAMANCE COUNTY	Urban Piedmont	0.16	0.28	26,197	68.8	50.9	25.6	24.5	4.3	22.7
ALEXANDER COUNTY	Rural Mountain	0.07	0.05	5,084	89.3	80.7	6.6	8.0	1.4	9.3
ALLEGHANY COUNTY	Rural Mountain	0.00	0.04	1,528	96.3	75.3	1.5	2.6	2.1	21.5
ANSON COUNTY	Rural Piedmont	0.09	0.11	3,434	34.9	33.8	63.5	60.2	0.4	4.0
ASHE COUNTY	Rural Mountain	0.00	0.01	3,175	98.3	87.9	0.7	1.6	0.8	9.9
AVERY COUNTY	Rural Mountain	0.01	0.03	2,498	98.5	85.8	0.9	2.2	0.5	11.1
BEAUFORT COUNTY	Rural Coastal	0.13	0.13	7,488	56.6	48.9	41.5	35.5	1.5	15.1
BERTIE COUNTY	Rural Coastal	0.36	0.38	3,051	27.2	23.4	72.2	73.5	0.3	2.2
BLADEN COUNTY	Rural Piedmont	0.14	0.12	5,141	46.9	39.5	50.9	41.2	1.3	17.2
BRUNSWICK COUNTY	Rural Coastal	0.03	0.06	13,982	72.5	68.1	25.1	18.6	1.5	11.7
BUNCOMBE COUNTY	Urban Mountain	0.19	0.09	34,197	86.2	71.7	11.0	13.2	1.6	13.0
BURKE COUNTY	Rural Mountain	0.07	0.13	13,175	81.8	70.5	7.6	9.6	2.0	13.4
CABARRUS COUNTY	Urban Piedmont	0.07	0.10	40,733	80.5	54.9	15.6	24.8	2.6	16.1
CALDWELL COUNTY	Rural Mountain	0.18	0.10	12,320	90.3	80.1	8.1	9.4	0.9	9.7
CAMDEN COUNTY	Rural Coastal	0.01	0.00	1,860	77.5	79.6	21.9	15.8	0.0	2.8
CARTERET COUNTY	Rural Coastal	0.05	0.04	9,003	86.1	78.1	12.0	11.9	1.0	8.3
CASWELL COUNTY	Rural Piedmont	0.05	0.03	2,767	53.4	52.1	45.4	40.4	1.1	7.0
CATAWBA COUNTY	Urban Mountain	0.11	0.12	25,242	79.6	62.9	12.4	13.8	2.7	17.3
CHATHAM COUNTY	Rural Piedmont	0.11	0.25	9,943	66.1	55.8	26.4	15.6	6.6	27.1
CHEROKEE COUNTY	Rural Mountain	0.02	0.01	3,716	94.1	88.0	2.6	4.6	1.0	5.1
CHOWAN COUNTY	Rural Coastal	0.08	0.00	2,142	47.0	46.4	52.2	46.6	0.6	6.3
CLAY COUNTY	Rural Mountain	0.00	0.00	1,419	98.2	90.3	0.9	2.5	0.2	6.2
CLEVELAND COUNTY	Rural Mountain	0.10	0.11	16,095	68.2	62.6	30.1	31.1	0.8	5.5
COLUMBUS COUNTY	Rural Piedmont	0.14	0.14	9,576	52.9	51.0	42.0	35.3	1.1	9.3
CRAVEN COUNTY	Urban Coastal	0.06	0.10	15,165	62.0	53.1	34.7	32.8	2.2	9.5
CUMBERLAND COUNTY	Cumberland	0.15	0.15	54,955	47.1	32.0	44.9	51.7	4.7	12.2
CURRITUCK COUNTY	Rural Coastal	0.02	0.01	4,071	86.4	80.8	12.3	13.3	0.9	5.1
DARE COUNTY	Rural Coastal	0.04	0.06	5,167	93.3	77.6	5.0	6.5	1.3	14.7
DAVIDSON COUNTY	Rural Piedmont	0.39	0.32	25,405	83.8	71.3	12.8	13.2	1.8	13.4
DAVIE COUNTY	Rural Mountain	0.04	0.04	6,396	87.4	75.3	10.3	10.7	1.6	12.8
DUPLIN COUNTY	Rural Coastal	0.14	0.14	10,190	51.8	33.7	37.5	25.0	10.5	40.0
DURHAM COUNTY	Urban Piedmont	0.21	0.27	44,214	41.3	24.2	53.2	47.7	2.9	24.9
EDGECOMBE COUNTY	Urban Coastal	0.19	0.18	8,613	36.2	28.2	61.3	63.0	2.3	8.4
FORSYTH COUNTY	Forsyth	0.21	0.29	62,179	60.8	42.7	34.5	31.3	3.5	23.2
FRANKLIN COUNTY	Rural Piedmont	0.07	0.04	8,857	55.2	48.9	41.9	33.5	2.3	16.5
GASTON COUNTY	Urban Mountain	0.13	0.17	36,750	80.0	62.5	17.4	24.6	1.0	11.1
GATES COUNTY	Rural Coastal	0.01	0.00	1,655	53.3	58.9	46.2	38.7	0.3	1.8
GRAHAM COUNTY	Rural Mountain	0.01	0.01	1,238	87.1	79.6	0.2	0.9	0.1	3.3
GRANVILLE COUNTY	Rural Piedmont	0.12	0.13	8,851	52.6	48.6	44.5	35.4	2.3	14.9
GREENE COUNTY	Rural Coastal	0.10	0.05	3,247	42.9	31.2	50.6	38.3	6.3	30.2
GUILFORD COUNTY	Guilford	0.30	0.30	83,916	57.2	37.9	37.4	42.4	1.7	13.3
HALIFAX COUNTY	Rural Piedmont	0.59	0.46	6,424	32.3	27.8	62.9	64.8	0.6	3.5
HARNETT COUNTY	Rural Piedmont	0.05	0.04	21,218	64.0	49.1	30.6	29.9	3.9	18.9
HAYWOOD COUNTY	Rural Mountain	0.02	0.01	8,596	96.2	87.5	2.0	3.0	1.2	8.0
HENDERSON COUNTY	Rural Mountain	0.10	0.08	14,233	88.1	67.3	5.7	8.1	5.2	22.8
HERTFORD COUNTY	Rural Coastal	0.25	0.17	3,251	27.0	17.8	71.7	77.2	0.2	3.4
HOKE COUNTY	Rural Piedmont	0.11	0.06	8,161	32.5	26.2	50.1	42.1	2.5	21.3
HYDE COUNTY	Rural Coastal	0.11	0.06	658	53.9	56.1	44.9	25.1	1.2	18.8
IREDELL COUNTY	Rural Mountain	0.13	0.15	31,550	76.2	69.3	20.1	16.7	1.7	10.9
JACKSON COUNTY	Rural Mountain	0.19	0.07	4,058	88.7	74.9	1.4	4.0	1.1	12.1
JOHNSTON COUNTY	Rural Piedmont	0.09	0.12	35,993	71.3	58.2	22.5	19.0	5.5	21.6
JONES COUNTY	Rural Coastal	0.04	0.03	1,170	44.1	46.5	53.8	43.1	1.7	10.0
LEE COUNTY	Rural Piedmont	0.09	0.06	10,868	61.6	41.5	27.3	24.8	9.8	32.1

LENOIR COUNTY	Urban Coastal	0.35	0.30	10,315	49.4	41.2	47.6	46.2	2.4	11.5
LINCOLN COUNTY	Rural Mountain	0.08	0.11	13,590	85.6	79.4	10.0	9.2	3.8	10.4
MACON COUNTY	Rural Mountain	0.04	0.04	6,365	92.4	80.1	4.5	6.1	0.9	12.3
MADISON COUNTY	Rural Mountain	0.01	0.03	4,502	97.4	78.6	1.1	3.0	0.7	17.0
MARTIN COUNTY	Rural Coastal	0.01	0.00	2,453	98.9	94.5	0.3	1.4	0.3	3.6
MCDOWELL COUNTY	Rural Mountain	0.16	0.21	3,938	41.4	44.0	57.0	48.3	1.1	7.0
MECKLENBURG COUNTY	Charlotte-Mecklenburg	0.21	0.37	174,614	55.5	34.8	37.5	39.7	2.7	19.3
MITCHELL COUNTY	Rural Mountain	0.01	0.03	1,873	97.9	89.6	0.3	1.2	1.7	8.1
MONTGOMERY COUNTY	Rural Piedmont	0.09	0.13	4,227	57.2	42.8	30.2	22.1	9.6	33.0
MOORE COUNTY	Rural Piedmont	0.09	0.11	14,363	70.3	65.8	25.0	19.6	3.2	12.0
NASH COUNTY	Urban Piedmont	0.19	0.16	16,668	47.9	36.2	47.9	50.1	2.9	11.9
NEW HANOVER COUNTY	Urban Coastal	0.11	0.21	29,380	70.4	63.7	27.2	23.1	1.0	11.2
NORTHAMPTON COUNTY	Rural Piedmont	0.31	0.21	3,401	24.1	18.7	75.4	76.7	0.3	3.5
ONSLOW COUNTY	Urban Coastal	0.12	0.11	26,857	66.6	57.7	26.5	26.9	3.9	13.2
ORANGE COUNTY	Urban Piedmont	0.03	0.06	20,841	73.5	56.5	20.1	17.4	2.3	16.6
PAMLICO COUNTY	Rural Coastal	0.02	0.01	1,830	65.3	66.2	32.5	24.3	1.3	8.5
PASQUOTANK COUNTY	Urban Coastal	0.09	0.09	6,267	51.4	43.5	46.5	48.4	0.9	6.8
PENDER COUNTY	Rural Coastal	0.10	0.18	8,529	62.8	65.5	34.4	19.6	2.6	13.8
PERQUIMANS COUNTY	Rural Coastal	0.01	0.00	1,744	56.5	65.8	42.6	30.4	0.6	3.3
PERSON COUNTY	Rural Piedmont	0.09	0.14	5,831	61.6	57.2	36.0	34.2	1.7	7.8
PITT COUNTY	Urban Coastal	0.11	0.17	25,446	49.8	37.9	47.5	49.5	1.7	10.8
POLK COUNTY	Rural Mountain	0.02	0.03	2,289	87.1	77.7	9.1	9.7	3.2	12.2
RANDOLPH COUNTY	Rural Piedmont	0.10	0.18	23,704	86.8	66.9	7.7	9.4	4.3	21.8
RICHMOND COUNTY	Rural Piedmont	0.04	0.03	7,762	55.4	45.1	41.1	39.8	1.4	10.7
ROBESON COUNTY	Rural Piedmont	0.26	0.13	24,912	24.1	14.6	30.4	28.2	1.5	14.7
ROCKINGHAM COUNTY	Rural Piedmont	0.10	0.13	13,397	71.8	62.9	25.5	23.5	2.1	12.6
ROWAN COUNTY	Rural Piedmont	0.23	0.23	21,141	74.0	60.9	22.1	21.8	2.2	15.7
RUTHERFORD COUNTY	Rural Mountain	0.14	0.08	10,490	82.0	75.3	16.6	17.0	1.1	6.6
SAMPSON COUNTY	Rural Piedmont	0.09	0.12	12,388	52.8	39.1	37.5	26.9	7.4	32.2
SCOTLAND COUNTY	Rural Piedmont	0.08	0.09	6,257	43.5	32.1	46.3	48.1	0.3	2.8
STANLY COUNTY	Rural Piedmont	0.16	0.16	9,356	78.1	72.3	16.6	16.1	1.3	8.0
STOKES COUNTY	Rural Piedmont	0.05	0.02	6,456	91.9	88.8	6.1	5.9	1.8	4.5
SURRY COUNTY	Rural Mountain	0.04	0.05	11,906	88.8	72.7	5.9	5.9	4.7	20.8
SWAIN COUNTY	Rural Mountain	0.08	0.11	2,304	77.5	66.0	0.5	5.1	1.4	4.6
TRANSYLVANIA COUNTY	Rural Mountain	0.04	0.04	3,872	92.2	82.8	6.7	9.6	0.6	6.3
TYRRELL COUNTY	Rural Coastal	0.00	0.01	595	49.7	36.3	48.9	42.2	0.8	18.0
UNION COUNTY	Rural Piedmont	0.27	0.24	45,041	76.8	64.6	19.3	15.5	3.0	16.4
VANCE COUNTY	Rural Piedmont	0.19	0.26	8,181	37.4	25.5	60.2	60.0	1.9	13.3
WAKE COUNTY	Wake	0.09	0.18	183,002	68.4	50.2	25.6	25.7	2.5	16.1
WARREN COUNTY	Rural Piedmont	0.29	0.06	2,538	28.0	16.7	66.3	64.9	1.0	6.9
WASHINGTON COUNTY	Rural Coastal	0.04	0.18	1,623	30.6	18.0	68.2	73.6	1.0	7.8
WATAUGA COUNTY	Rural Mountain	0.03	0.05	4,759	97.1	86.6	1.7	3.9	0.7	7.9
WAYNE COUNTY	Urban Coastal	0.32	0.23	21,001	53.8	41.6	41.8	37.3	3.2	19.3
WILKES COUNTY	Rural Mountain	0.12	0.11	10,396	91.4	78.4	5.7	7.4	2.4	13.4
WILSON COUNTY	Urban Coastal	0.13	0.19	14,058	42.3	32.4	53.1	47.5	4.0	18.6
YADKIN COUNTY	Rural Mountain	0.03	0.05	5,637	88.6	70.7	4.6	5.1	6.5	23.3
YANCEY COUNTY	Rural Mountain	0.01	0.08	2,276	96.8	85.1	1.2	2.0	1.7	12.4

Source: National Center for Education Statistics, Common Core Data; authors' calculations.

Note: For consistency with NC enrollment data prior to 2010, for 2015/16 black and multiracial students are grouped together in black category, and Asian and Pacific Islander students are grouped together in Asian category.

Figure A.1 Reference NC map

