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School segregation in the era of immigration, school choice and color-blind jurisprudence - the case of North Carolina

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SCHOOL SEGREGATION IN THE ERA OF IMMIGRATION, SCHOOL CHOICE, AND COLOR-BLIND JURISPRUDENCE – THE CASE OF NORTH CAROLINA*

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ABSTRACT

We document patterns and trends in school segregation by racial/ethnic group and by family income in North Carolina between 1998 and 2016, a period of rapid immigration, decline in federal oversight, and growth of charter schools. Accounting for students in both public and private schools, we find that segregation generally increased over the period, with the increase concentrated in urban areas. In addition, low-income students became more segregated from other students during the period. We measure and decompose segregation in metropolitan areas, finding that more than half can be attributed to racial disparities inside school districts, but in some counties private schools, charter schools, or multiple districts played a deciding role. We also find that segregation between white and Hispanic students increased sharply. We note several policy levers available at the local and state level.

Keywords:
School segregation
Race and education
Charter schools

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I. Introduction

More than six decades after *Brown v. Board of Education*, school segregation persists in school districts across the country. This segregation poses a persistent impediment to equal opportunity in education. Not only does it deny students the chance to learn in diverse surroundings, segregation has consistently been linked to inequality in educational resources and racial achievement gaps (e.g., Clotfelter, Ladd, Vigdor and Wheeler 2007; Johnson 2015; Reardon 2016). After bringing about impressive increases in interracial contact during the 1960s and 1970s, federal courts over time stopped pressing local districts to achieve racial balance and, guided by a color-blind approach to school desegregation, eventually barred even voluntary programs designed to balance schools.[1] As a result of these rulings, school districts previously under the watchful eye of federal courts were now left largely to their own devices to decide how segregated their schools would be.[2]

Meanwhile, the nation's schools have been buffeted by other forces: growing income inequality, a sizable influx of immigrants, and the emergence of charter schools. Considering the magnitude of these forces, tracking contemporary school segregation has never been a more important undertaking. Most recent research on national trends have documented persistence if not gradual increases in measures of school segregation based

[1] The Supreme Court later codified this prohibition in the 2007 decision *Parents Involved in Community Schools v. Seattle School District No. 1,* a decision in which Chief Justice John Roberts declared sardonically, "The way to stop discrimination on the basis of race is to stop discriminating on the basis of race." (551 U.S. 701, 748 (2007)).Schools in North Carolina fell under this new color-blind judicial approach earlier than 2007, owing to decisions made by the Fourth Circuit Court of Appeals. For discussion of this approach, see Boger (2000) or King and Smith (2011, p. 194).

[2] As we stress below, districts were by no means masters of their fates, however, given the existence of charter schools and private schools, among other things.

on racial imbalance (e.g., Reardon and Yun 2003; Clotfelter 2004; Reardon et al. 2012; Fiel 2013; Stroub and Richards 2013; Davis, Bhatt and Schwartz 2013; Reardon and Owens 2014; Owens, Reardon and Jencks 2016; Reardon 2016). Likewise, a study covering the 100 largest districts in the South showed no change in average segregation between 1994 and 2004 (Clotfelter, Ladd, and Vigdor 2006, p. 357). But research focused on North Carolina, covering urban and rural counties, showed a significant increase in public school segregation between 1995 and 2001, followed by a decade with nearly no change (Clotfelter, Ladd and Vigdor 2013). Studies focusing on measures of interracial contact in schools rather than imbalance, not surprisingly, do show a trend over time, owing to the rising nonwhite share of the nation's students.[3]

In this paper we build upon this existing literature in three ways. First, we examine patterns and trends in school segregation in a state whose recent experience offers a preview of what might be in store for the nation as a whole. Not only was it among the first states to come under the federal courts' application of color-blind jurisprudence to desegregation efforts, it has also witnessed significant immigration, earning it attention as a "New Destination" state. Between 1990 and 2010, while the foreign-born population in the U.S. doubled, it increased six-fold in North Carolina (Portes and Rumbaut 2014, Table 9). Using enrollment data for public and private schools, we measure changes in school segregation following the shift in judicial attitude. We also compare levels of segregation across counties whose demographic makeups and recent histories differ markedly from one another.

[3] As illustration, according to Frankenberg et al. (2019, p. 26), the share of black public school students who attended 90-100% nonwhite schools has risen from 32% in 1988 to 40% in 2016, with practically identical proportions for Hispanic students. Although they are a useful reflection of the experiences of students, measures such as these are affected by the overall racial mix of students. In the present study, we follow the practice of most social science studies and use an index that measures imbalance. As we will show, our measure makes a clear distinction between exposure and imbalance.

Our second objective is to explore how segregation in rural areas compares to that in urban areas and how any differences have changed over time. Although considerable attention has in recent years turned to the growing economic and social disparities between the nation's urban and rural communities, and substantial research has examined the residential segregation of Hispanic households (Crowley, Lichter and Turner 2015; Lichter, Parisi and Taquino 2016 and 2018; Garcia and Schmalzbauer 2017; and Lee, Iceland, Farrell and Sharp 2017), little attention been given to patterns of school segregation in rural areas. To be sure, some studies have focused on rural schools (Logan, Minca and Adar 2012 and Burdick-Will and Logan 2017), but to our knowledge only Logan and Burdick-Will (2018) have looked specifically at school segregation in rural communities.

Third, we use our analysis of segregation in counties and metropolitan areas to identify the separate contributions of several factors, including charter schools, to overall segregation. North Carolina has enthusiastically embraced charter schools, but some recent research suggests that charter schools may be aggravating racial segregation (Frankenberg, Siegel-Hawley and Wang 2011; Logan and Burdick-Will 2016; Ladd, Clotfelter and Holbein 2017). In addition to charter schools, we also identify the contributions of private schools, multiple school districts, and between-school differences to racial disparities.

By focusing on one large state with multiple and varied urban and regional areas, we are able to examine patterns of school segregation in some detail, citing specific examples to illustrate broader patterns. We employ administrative data that covers K-12 students in both public and private schools spanning the years 1997/98 and 2015/16 (hereafter simply 1998 and 2016). Over this period the Hispanic share of all students in the

state rose from 3% to 16%. We begin by describing broad patterns and trends in school segregation. We find that, for the state as a whole, racial and ethnic segregation in K-12 schools increased over this period. 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.

The next two sections of the paper briefly describe the policy and demographic contexts relevant to school enrollments in the state. Section IV describes our basic measure of segregation and presents some descriptive statistics for the state. In section V we decompose this basic measure to highlight the role played by charter schools, private schools, and racial disparities between and within established school districts. In section VI we apply this decomposition to metropolitan areas in the state. In section VII we compare separate indices measuring segregation between white and black students and between white and Hispanic students, respectively. Section VIII summarizes the findings and discusses the role of public policies at the local and state level.

II. The Policy Context

Public policies have the potential to affect school segregation directly in at least four ways, through their effects on school assignments, consolidation (or deconsolidation) of school districts, charter schools, and private schools. North Carolina offers examples of all four.

Student assignments to schools. One of the basic responsibilities of local school boards is to establish rules by which students are assigned to schools. Indeed, it was the racially discriminatory exercise of this responsibility that caused federal courts to oversee local school boards after the *Brown* decision in 1954. But after a remarkably brief period during the 1960s and 1970s during which federal courts ordered and enforced student

assignment plans that achieved remarkable degrees of interracial contact in public schools, the federal courts began to back-pedal away from active intervention in the student assignment decisions of school boards. 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 using magnet schools and racial quotas with one emphasizing neighborhood schools.[4] Confirming the fears that this new judicial stance would increase racial imbalance, measured racial segregation in Charlotte-Mecklenburg public schools jumped markedly, as we show below.[5]

Today local school boards, virtually freed from the interference of federal courts, are back on their own when it comes to student assignments. But theirs is not an easy job. Although these elected leaders typically have the legal power to do so, they cannot simply mandate that all the schools under their control be racially balanced overnight. If they were to do that, many parents who objected to the mandated transfers could move or enroll their children in a charter school or a private school. Indeed, parent groups held up that option as a not-so-subtle threat when they urged the Charlotte-Mecklenburg school board in 2017 not to let a push for diversity undermine parents' ability to send their children to neighborhood schools.[6] So school boards must weigh their instincts toward racial

[4] *Belk v. Charlotte-Mecklenburg Bd of Educ,* 211 F. 3d 853 (4th Cir. 2000). One opponent of the change stated, "We have guaranteed convenience for the most able and the most advantaged in our community." My Worst Fear was Realized," *Educate!,* November 13, 2003, p. 2.

[5] See Table 3.

[6] Mickelson et al (2018); One speaker at a school board meeting stated, "If diversity becomes the driving force and boundaries are changed dramatically, everybody with affluence will choose to go outside CMS." Ann D. Helms, CMS Boundary Study Moves Ahead, with Timing and Other Big Questions up in the Air, *Charlotte Observer,* January 24, 2017; https://www.charlotteobserver.com/news/local/education/your-schools-blog/article128565474.html 5/25/19.

integration, whatever those might be, against the fear, real or imagined, that actions aimed to integrate schools will drive some parents away.

One proposal in North Carolina aims to put pressure on local school boards in the other direction by publicizing public schools that do not reflect the overall county-wide racial mix. This proposal has taken shape in the form of a proposed law that would calculate for each school in a county a "disproportionality index," showing how far that school diverged from the county's overall racial composition, calculations that would be included in the accountability reports now issued each year by the state. The proposed legislation suggests arbitrary cutoffs for grouping schools on the basis of this index, ranging from Proportional (less than 10) to Highly Disproportional (50 or more) to make it easier to interpret the rating.[7] Whether such reporting – public shaming, perhaps – would influence the decisions of school board members or the choices of voters in school board elections remains uncertain, of course.

District consolidation (or deconsolidation). There is no clearer lesson to be learned from empirical studies of American school segregation than the fact that racial disparities between neighboring school districts can be a major source of school segregation. But, like other states in the South and West, North Carolina presents a counter-example to the jurisdictional balkanization that infects the urban areas of the North and Midwest, for it has been North Carolina's longstanding policy 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

[7] This disproportionality index is a modified dissimilarity index. Its value ranges from 0, for the case of a school whose racial mix exactly matched that of the county at large, to 100, for the case of a school that enrolled students from only one racial group. See North Carolina Justice Center (2019) for draft bill. See Orfield, Ee, and Coughlan (2017, p. 42) for a detailed description of the index. In section VIII, we present illustrative calculations using this proposal's measure for one county.

number had fallen to 115, most of which are county-wide. For a state with a population of 10 million, this is a remarkably small number. Compare, for example, New Jersey, with a smaller population, which had 602 districts in 2014 (Governing the States and Localities, n.d.). Because of this preponderance of county-wide districts, North Carolina features many fewer of the sharp racial disparities so prevalent in those balkanized urban areas.[8]

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.[9] Although a legislative study committee empaneled to examine the question issued no recommendation related to the desirability of smaller districts, its report did nothing to quell the push for deconsolidation (North Carolina Legislature 2018).[10]

Charter schools. A third set of policies with likely effects on segregation are those related to charter schools. As is the case in other states where they are a part of the public school landscape, the state government has virtual supreme authority over charter schools in North Carolina. It sets a maximum number of charter schools, if any, it approves the creation of new charter schools, and it establishes any constraints under which those schools can operate. Introduced in 1996, these schools increased in number, soon reaching the legislated maximum of 100. That cap was lifted in 2011, and the number quickly rose,

[8] In North Carolina, districts within the same county can consolidate by mutual agreement or they can be forced to consolidate by the board of county commissioners or by the state legislature (Burnette 2016, pp. 17-18).

[9] One of these proposals, for example, would split the Charlotte-Mecklenburg district into three new independent districts. Ann D. Helms, "Matthews Mayor: It's Time to Explore a Suburban Split from CMS," *Charlotte Observer,* February 24, 2016; https://www.charlotteobserver.com/news/local/education/article62279447.html 5/25/19

[10] 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. See also Keung Hui, "NC Lawmakers Will Consider Dividing School Districts, Including Wake County," *Raleigh News and Observer,* February 13, 2018.

topping 170 by 2018.[11] One fear harbored by skeptics of charter schools has been that they would become a vehicle for segregation, a fear that was surely excited by a bill debated and passed by the state legislature in 2018 that gave permission to four predominantly white towns within Mecklenburg County to open up charter schools catering to their own residents.[12]

The fear that charter schools might become vehicles for segregation spurred much of the opposition to charter schools when the state legislature debated and passed its originating charter school legislation. To guard against that possibility, 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 (Ladd, Clotfelter and Holbein 2017, p. 538).[13] This softening accompanied the state's removing the

[11] Stancill, J., Bonner, L., & Raynor, D. (2017, October 9). How are Charter Schools Different? Here are the Basics. *News and Observer*. http://www.newsobserver.com/news/local/education/article177834016.html, 5/31/18.

[12] This was HB 514, a bill that passed in June 2018. Morrill, J. (2016, June 6). Controversial NC Charter Bill Approved. Now, These Four Towns Could Open Schools. *Charlotte Observer;* Morrill, J., & Doss Helm, A. (2018, May 29). Controversial NC Town Charter Schools are Closer to Reality. And Impact is 'Monumental. *Charlotte Observer*. 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.

[13] One of the sponsors of the original charter school law in the state legislature, Wib Gulley, expressed his disappointment about the weakening of that requirement: "It was a key provision that was meant to ensure that the charter schools didn't segregate in some way and did not take only students from wealthy families and that kind of thing," "If that's the result even for one school, it is an undermining of the fundamental intent of the law. It perverts the premise of charter schools in a way that we never wanted and that both houses of the legislature voted to say would not happen." Jane Stancill and David Raynor, "Why NC Charter Schools are Richer and Whiter," *Raleigh News and Observer,* October 10, 2017.

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) (Ladd, Clotfelter and Holbein 2017, p. 543).

Private schools. A fourth state policy with the potential to influence school segregation is government support for private schools. As of 2015, 19 states, including North Carolina, had set up programs to give tax breaks or vouchers to students attending private schools using public funds (Southern Education Foundation 2016, p. 2). 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.[14] (In 2017 the maximum family income to be eligible was $45,510.)[15] There have also been proposals at the federal level to subsidize private school attendance (Southern Education Foundation 2016, p. 2). Considering the prominent role private schools have played in efforts of whites to avoid desegregated schools (Clotfelter 1976), it is not far-fetched to worry that such subsidies for private schooling could aggravate racial segregation. We are interested, therefore, in tracking recent trends in private school enrollment in North Carolina.

III. Demographic Context

North Carolina's K-12 enrollment is large, rapidly growing, and diverse. As shown in

[14] Doss, H. A., "Praying for options: Religious schools dominate NC voucher program," *Charlotte Observer*, April 8, 2018. In 2015/16 3,237 of the 3,460 students who received these scholarships went to religious schools.

[15] Keung, H., "Vouchers allow low-income families to attend private schools, but cost is still a challenge," *Raleigh News and Observer*, August 2, 2017. http://www.charlotteobserver.com/news/local/education/article70759617.html 2/8/18

the first two columns of Table1, 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. Among its 100 counties are highly urbanized counties as well as rural counties containing only a few dozen traffic lights. Unlike rural counties in most of the country, which are predominantly white (Logan and Burdick-Will 2017, p. 215), rural counties in North Carolina represent a wide range of racial compositions, as we demonstrate below. The state's two most populous counties, Mecklenburg and Wake (home to Charlotte and Raleigh, respectively) accounted for more 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.

The last six columns 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 4.9%. The share of students enrolled in a private school went the other way, declining over all from 5.8% to 5.0%.

[Table 1 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 2, which shows that 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. Over the 18-year period, the marked decline in the share of whites was mirrored by an almost identical increase in the share of Hispanic students. While the absolute number of whites declined by 3% over the period, the number of Hispanic students increased *seven-fold*. Black students gained share in most of the largest counties and in the mountains, but 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.[16]

[Table 2 about here]

To illustrate how the racial/ethnic diversity arrays itself geographically, the maps in Figures 1 and 2 show the concentration of black and Hispanic students by county in 1998 and 2016. Figures 1a and 1b 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.

[Figures 1a, 1b 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 rapid growth in their numbers, noted above, was the result of an influx of immigrants into the state, attracted by largely low-skill job openings in industries such as meat

[16] 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.

processing, construction, landscaping, and personal services.[17] This influx increased their shares in most counties, and their numbers in every single one. This growth was especially concentrated in a handful of destination counties, where the concentration of Hispanic students skyrocketed.[18] Figure 2, using different percentage categories from those used in the maps for black students, shows the marked demographic transformation of the state's schools between 1998 and 2016. In 1998 the Hispanic share of all K-12 students exceeded 5% in fewer than ten of the state's 100 counties; by 2016, that was true in more than 90% of the counties.

[Figures 2a, 2b about here]

IV. Measuring Segregation

The index of segregation we use in the present paper, originally devised by James Coleman (Coleman et al. 1975), measures the racial imbalance across schools in an area or district, such as a county. It is the proportional gap between actual and the maximum possible extent of interracial contact between two groups of students, where interracial contact is measured by the average exposure rate of white to nonwhite students. Where students are classified as white or nonwhite, denoted W and N, respectively, this average exposure rate (E_{wn}) is defined as the share of nonwhite students who are enrolled in the school of the average white student, or, equivalently, the probability that a nonwhite student will be in the school of a randomly selected white student.[19] This average exposure rate ranges from a minimum of zero, for the case in which no school contains both types of students, to a maximum of P_n, the overall proportion of nonwhite students in the area or

[17] For discussion of industries that have attracted Hispanic immigrants, see, for example, Griffith (1995), Wahl, Breckenridge and Gunkel (2007), Parado and Kandel (2008), and Crowley, Lichter and Turner (2015).
[18] By 2016 Hispanic students accounted for more than 30% of total enrollment in Duplin, Greene, Lee, Montgomery, and Sampson, all counties in the southern part of the piedmont or coastal plain.
[19] In the sociology literature, this exposure rate is commonly denoted ${}_wP^*_n$.. In Coleman et al.'s (1975, p. 35, n. 5) original rendition, it is denoted by s, as in ${}_wS_n$.

district. If all schools were precisely racially balanced, E_{wn} would exactly equal P_n, its maximum possible value.

The Coleman index of segregation is then the proportional gap between the maximum (P_n) and actual (E_{wn}) values of the exposure rate:

(1) $$S_{wn} = (P_n - E_{wn}) / P_n,$$

The smallest value that this index can take is zero, which signifies no segregation, or exact racial balance (since $E_{wn} = P_n$). The maximum value is one, which signifies complete segregation where interracial exposure is zero ($E_{wn} = 0$). To illustrate how S_{wn} is calculated, consider a county where 40% of students are nonwhite. If white students on average attend schools in which the proportion of nonwhite students is just 30%, the segregation index would equal 0.25 (= (0.40-0.30)/0.40). In other words, the gap between the actual and the maximum exposure rate is 25%. Because it uses each county's overall racial composition as the statistical reference point, this index is not dependent on a county's racial makeup, a characteristic it shares with the widely used dissimilarity index.

One of the virtues of the Coleman segregation index is that it makes explicit the ironclad dependence of interracial contact on two things: a county's racial mix and the segregation of its schools. Given the racial mix of its students, segregation is the only way a county can reduce interracial contact in the schools. To visualize this dependence, Figure 3 shows bars for every county. The light-colored portion of every bar corresponds to the actual average exposure rate of white to nonwhite students, and the entire bar corresponds to the nonwhite share in the county. The difference between these two proportions, shown by the black portion of each bar, shows the extent to which segregation has reduced exposure from its maximum (which would have occurred if schools had been racially balanced). The segregation index is equal to the proportional reduction – the black portion

as a share of the entire bar.

[Figure 3 about here.]

At the top of the figure are the counties with the highest nonwhite shares of students. More than a third of the counties had nonwhite majorities. These were the counties where segregation tended to reduce by the biggest proportions whites' exposure to nonwhite students. Three of the counties with the biggest reductions were Bertie, Halifax, and Mecklenburg. As we describe below, each of these counties featured a different institutional path to reducing interracial contact. By contrast, counties in the bottom third of the figure, where nonwhite students make up much smaller shares, the segregation gaps tend to be considerably smaller, in both absolute and relative terms.

Table 3 summarizes, in its first three columns, our basic calculations of school segregation in the state's K-12 schools. For the state as a whole, the enrollment-weighted-average white/nonwhite segregation increased, from 0.15 in 1998 to 0.19 in 2006 and then remained constant through 2016. This jump in segregation between 1998 and 2006 was driven entirely by urban counties, most notably by Mecklenburg, Forsyth, and Wake. Among them, the biggest increase, from 0.21 to 0.37, occurred in Mecklenburg County. Once the celebrated symbol of cross-town busing for racial balance, the district drastically altered its approach to student assignment after the Fourth Circuit Court of Appeals released it from previous desegregation orders. In addition, Wake County (home to Raleigh) saw its index increase by 0.09, from 0.09 to 0.18, reflecting that district's easing of a policy of balancing schools by SES, and in Forsyth (home to Winston-Salem) saw its index rise from 0.21 to 0.32. In contrast to the largest urban counties, rural counties on average experienced almost no change in white/nonwhite segregation.

[Table 3 about here]

For comparison, Table 3 also presents calculations based on three other imbalance measures of school segregation: the dissimilarity index, the entropy index, and a measure of economic segregation.[20] Like the Coleman index, the dissimilarity index indicates imbalance between white and nonwhite students; it closely mirrors the pattern of our segregation index, albeit with higher numeric values. For the state's 100 counties, the correlation between it and our segregation measure is 0.93. The multi-group entropy index is also highly correlated with the Coleman measure ($r = 0.94$), though it showed a slight decline in overall segregation for the state rather than the increase shown by the other two. Table 3's last group of columns traces changes in economic segregation. This index compares enrollment patterns for public school students eligible for free lunch to the enrollment patterns for all other students, including all private school students. This dichotomy, forced by the absence of subsidized lunch data for private schools, will be inaccurate to the extent that private schools enroll low-income students.[21] This measure of imbalance increased across the board in most of the counties and groups shown in the table. 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] These increases in economic segregation echo the findings of Owens, Reardon and Jencks (2016), who report that economic segregation in schools has increased nationwide. In sum, all of the measures suggest that the gaps in average school segregation between urban and rural counties grew larger over this 18-year period.

IV. Institutions for Segregating Schools

[20] For the formulas used, see Clotfelter, Ladd and Vigdor (2006, pp. 353-354).
[21] See Appendix A for a description of this index.
[22] Two of the largest increases were in rural counties: Hyde (0.05 to 0.40) and Vance (0.21 to 0.38).

The 100 counties in North Carolina provide illuminating examples of four different institutional mechanisms through which modern day school segregation can be achieved, each one advancing segregation by creating racial disparities across the schools in a given geographic unit, such as a county. These four institutional sources of racial disparities are private schools, charter schools, separate school districts, and differences across schools within public school districts and within the charter school or private school sectors.

As a way of quantifying the importance of each of these four institutional mechanisms, we take advantage of the easy divisibility of the Coleman segregation index to identify the racial disparities attributable to each of these mechanisms. We do this by dividing the gap between the maximum possible exposure rate of white to nonwhite students (P_n) and the actual interracial exposure (E_{wn}) into four additive components, those associated with private schools, charter schools, multiple districts, and differences across schools within districts or sectors.[23]

Table 4 presents this decomposition for several counties that illustrate contrasting institutional infrastructures for achieving school segregation. In the first group of counties – all of them in the state's northeast corner – private schools served as the principal mechanism for achieving what segregation existed in 2016. In Bertie County, a small rural county where 74% of all students were black, a single, nearly all-white private school enrolled nearly a quarter of all the county's white students. Although white and black students were quite evenly spread out in the county's nine public schools, this one private school caused enough racial disparity to produce a segregation index of 0.38. Our decomposition reveals that 0.36 of this total segregation index can be attributed to the

[23] This decomposition is explained in more detail in Appendix B. For previous studies that decompose school segregation, see, for example, Clotfelter (2004) or Field (2013).

difference in the racial composition of that one private school and the racial composition of the county's public schools. Similar situations occurred in nearby Northampton and Hertford Counties. In Northampton, two private schools enrolled 23% of all the county's white students; otherwise, the county's public schools were racially quite evenly balanced among themselves. In that county the racial gap between private and public schools accounted for 0.19 of the county's overall 0.21 segregation. In Hertford, where 77% of students were black, the county's one private school once again enrolled nearly a quarter of all white students. The public-private gap in Hertford accounted for 0.15 of the county's 0.17 overall segregation.

[Table 4 about here.]

As a methodological aside, our calculations make clear a shortcoming of the many studies of schools segregation that do not include private school enrollments. Consider Bertie County. Judging only on the basis of public school enrollments, its schools would appear to be nearly entirely integrated, with a segregation index of 0.04. But counting its two predominantly white private schools, renders a starkly different verdict, a segregation index of 0.38.[24]As a way of assessing how big a difference it makes to include data on private schools in the overall measure of segregation, we show, in the last column of Table 5, the comparable white/nonwhite segregation indices based only on data for public schools. With such data, the overall segregation rate for the state would have been 0.16 rather than 0.19. In a word, private schools remain a principal instrument for segregation, so it is clearly useful to have enrollment data on them.

The second important instrument for segregating white from nonwhite students

[24] Authors' calculations. Without private schools, the average exposure rate of white to nonwhite students was 0.82, close to the overall nonwhite proportion of 0.85.

was charter schools, and in several counties they played a major role. In Vance County, where 60% of students were black, 26% white, and 13% Hispanic, two charter schools enrolled a total of 23% of all white students, and its two private schools enrolled another 13%. Of the county's overall 0.26 segregation index, therefore, the racial distinctiveness of charter schools accounted for more than half (0.14), and private schools accounted for an additional 0.09. Another county where charter schools became the principal avenue for school segregation was in rural northeast Martin County, where 48% of students were black, 44% were whites, and 7% were Hispanic. More than a quarter of whites were in the county's two charter schools, leaving them 84% white. The county's remaining white students were spread rather evenly across the county's other 10 traditional public schools. As in Vance County, the racial disparity between the two predominantly white charter schools and the county's other public schools accounted for 0.11 of the county's total 0.21 segregation. A third county, featuring both charter schools and private schools as significant contributors to segregation, was urbanized Durham County, where charter schools accounted for 0.07 and private schools for another 0.11 of the county's total 0.27 index of segregation.

A third mechanism that played a part in producing segregation in a few counties was the one most commonly observed in the racially balkanized metropolitan areas of the Northeast and Midwest: disparities between school districts. Despite North Carolina's decades-long push to consolidate its school districts, the few counties where racially distinct city districts remain showed the power of this kind of legacy. Two North Carolina counties stand out as prime examples on this account.[25] One is Davidson, a county in the

[25] For a detailed accounting of independent city school districts in the state, see Appendix Table A1 in Clotfelter, Ladd and Vigdor (2003).

state's piedmont, which is home to Lexington City and Thomasville City districts, in addition to the Davidson County district. The larger county district is largely rural and white. Of the county's overall segregation index of 0.32, the racial disparities among these three separate districts accounted for the bulk (0.29). Another county whose high degree of segregation arises from independent and racially disparate districts is Halifax. Its Roanoke Rapids city district enrolled more than 90% of the county's white students, leaving the county district and diminutive Weldon city district as nearly all-black. A third example shown in Table 4 is Randolph, where a significant divergence in racial mix between its Asheboro city district and the county district accounted for 0.11 of the county's overall segregation index of 0.18.

By far the biggest contributor to segregation in North Carolina's counties was differences among individual schools within school districts (and within the charter and private school sectors). This component of segregation was largest in Mecklenburg, Union, and Alamance. The Charlotte-Mecklenburg Schools, with more than 100 traditional public schools serving students spread out over a land area of 524 square miles, had switched its method of student assignment in the fall of 2002, after the Fourth Circuit Court of Appeals had freed it in 1999 from its previous mandate to maintain a modicum of racial balance.[26] White/nonwhite segregation in the district increased from 0.20 in 2001 to 0.33 in 2006 (Clotfelter, Ladd and Vigdor, 2008, Table 2, p. 68), Close behind was Union County, home of many suburbs of nearby Charlotte, and Alamance, an urbanized piedmont county that has experienced a rapid increase in Hispanic enrollments.

To show patterns in the importance of these four components of school segregation,

[26] *Capacchione v. Charlotte-Mecklenburg Schools,* 57 F. Supp. 2d 228 (W.D.N.C. 1999); see Clotfelter, Ladd and Vigdor (2008, p. 50) for a description of the changes in Charlotte-Mecklenburg.

Table 5 presents weighted averages based on 2016 segregation in the same format as other summary tables. For the state as a whole, within-district differences in racial composition explain the bulk of total segregation, accounting for 0.16 of the total 0.19 overall index. Disparities associated with private schools, charter schools and separate districts accounted for 0.03, 0.02, and 0.01, respectively. The first two instruments were more important in urban than rural counties, but the third had its biggest impact in rural counties. Among the five largest counties, Mecklenburg led in the importance to its segregation of private schools and charter schools. (As noted elsewhere, Mecklenburg had 25 charter schools in 2016, leaving plenty of latitude for racial disparities to arise.) Finally, the table reveals that neither private schools nor charter schools played a large role in creating segregation in the mostly white mountain region of the state. These remedies were simply not required for parents aiming to limit the degree of white-nonwhite contact.
[Table 5 about here.]

Another way of seeing the role of charter schools and private schools in facilitating segregation is to examine their importance in providing predominately white school environments. Owing to the steady increase in the share nonwhite students in the state, predominantly white schools have become increasingly uncommon. As shown in Table 6, the percentage of white students in the state who attended a school with 80% or more whites declined over time, from 46% in 1998 to 27% in 2016. In 1998 charter schools accounted for virtually none of the students attending predominantly white schools, but by 2016 charter schools were home to 9% of such students. The share of white students in predominantly white schools who went to private schools also increased from 17% to 20%. Over this period, therefore, charter schools, and to a lesser extent private schools, assumed a bigger role in providing an avenue for white students to remain in largely white schools.

[Table 6 about here.]

VI. Segregation in Metropolitan Areas

Because most of the focus of American research and policy interest related to school desegregation has focused on metropolitan areas, we apply the same decomposition used above to school segregation for North Carolina's metropolitan areas. If these metro areas tracked the experience of most metro areas in the United States, we would expect to see that the bulk of segregation would arise as much or more from racial disparities *between* school districts as *within* them (Clotfelter 2004). Such between-district disparities are especially significant in Northeastern and Midwestern metropolitan areas. 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, such as North Carolina, there is less scope for this kind of between-district segregation.

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 metropolitan areas consisting of more than one county. We apply the same white/nonwhite measure of segregation as before, but to the schools in the entire metropolitan area contained in the state, not just those in a single county. To the extent that racial compositions of counties in the same metropolitan area differ, overall metropolitan area segregation will be higher. We employ the same method as above to decompose total white/nonwhite segregation into four additive parts.

Table 7 shows the resulting calculations for the 11 metropolitan areas. In 2016 the

most segregated metropolitan areas were Charlotte (with a white/nonwhite segregation index of 0.33), Winston-Salem (0.32), Greensboro (0.31), and Durham (0.28). These had also been the most segregated metro areas in 1998. In comparison to metropolitan areas in the rest of the country, the measured segregation indices for North Carolina areas are below average. As documented in Clotfelter (2004), calculations for the year 2000 using the same Coleman segregation index revealed that 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) (Clotfelter 2004, p. 62). In 2000 the average among smaller metropolitan areas, a better reference group for North Carolina's metro areas, was 0.265, a value well above the average of North Carolina areas in 1998 and also above, but by less, the 0.24 average in 2016 (Clotfelter 2004, p. 73).

[Table 7 about here]

Segregation increased in eight of the 11 metro areas, notably in Charlotte (0.25 to 0.33) and Winston-Salem (0.25 to 0.32). The increases in these two areas were primarily the result of higher within-district segregation – the component of segregation most closely linked to the federal courts' rejection of efforts to achieve racial balance after 2000. In contrast, Durham's increase from 0.23 to 0.28 was due entirely to charter schools. But Durham was exceptional. Along with Greensboro, it shared the distinction that within-district segregation was *not* the primary source of metropolitan school segregation. Across the 11 metropolitan areas in 2016, within-district disparities explain more than half of overall segregation (0.14), 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. Added 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),

Charlotte (0.06), and Rocky Mount (0.06). Regarding the increase in average metropolitan-level segregation between 1998 and 2016 for all 11 metro areas, 0.19 to 0.24, part was due to charter schools and part was due to increased segregation within districts.

VII. White/Black and White/Hispanic Segregation

To this point, our measures of racial/ethnic segregation have been based exclusively on the white/nonwhite patterns across schools, 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 could be employed, that between whites and nonwhites remains 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.

But, in keeping with many previous studies, we also calculated segregation indices based on less aggregated ethnoracial dichotomies, specifically, white/black and white/Hispanic classifications.[27] The very different histories of African Americans and Latinos in the United States and in North Carolina provide compelling reasons to examine separately segregation as it relates to these two groups, as we show in Table 8. 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 two columns), 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. Over the 18 years, white/black segregation 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

[27] See Appendix C for a detailed description of these indices.

closely tracked white/nonwhite segregation in both years.

[Table 8 about here]

For white/Hispanic segregation, both levels and changes differed markedly 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 the most in urban counties, but increased as well in rural counties. The increases easily exceeded those for white/black segregation: while white/black segregation increased by 25% over the period, white/Hispanic segregation more than tripled. In fact, white/Hispanic segregation was higher than white/black segregation in two large counties – Mecklenburg and Forsyth – as well as in the urban piedmont counties as a whole.

VIII. 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, 2006, and 2016. As a state to study, North Carolina offers several advantages. It is large. Its population is diverse, with this diversity manifesting itself with geographical starkness across counties that range from entirely rural to highly urbanized. We use as a measure of segregation an index originally devised by James Coleman 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 also measure segregation by economic status. We do not examine segregation that may occur within schools.

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, boosting the Hispanic share 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, federal courts removed any pressure remaining from the days of aggressive desegregation orders on local districts to advance racial balance in schools. This opened the door for local school boards, most famously the one in Charlotte, to revise their school assignments to make it easier for parents to send their children to neighborhood schools. Third, the state legislature embraced and expanded the state's vast array of charter schools. Over the period we studied, the share of students attending charter schools rose from less than 1% to nearly 5%. Unlike charter schools in most of the country (Logan and Burdick-Will, 2017, p. 214), those in North Carolina were not just a big city phenomenon; they also cropped up in small towns and rural counties. Over time the state relaxed the original strictures on its charter 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 become.

Using our index of racial imbalance, we find that segregation went up in North Carolina by about 25% between 1998 and 2006, reflecting the new color-blind attitude of federal courts, after which it remained level for the following decade. The increase was

mainly confined to urban areas, where segregation increased on average by more than a third. Similar patterns and trends show up if indices other than the Coleman index are used, including the dissimilarity and entropy indices. An index of economic imbalance, however, reveals one interesting distinction: it increased after rather than before 2006, suggesting the impact of the Great Recession. Viewing the degree of racial segregation across the state's counties highlights one unmistakable pattern: segregation tends to be higher in counties with higher shares of nonwhite students. This tendency has the effect of attenuating the differences across the state in white/nonwhite exposure in schools. We decompose segregation into four additive components. In most counties, the most consequential of these was intra-district/intra-sector racial disparities across schools. However, in a few counties the primary instrument for achieving the observed segregation was one of the other three available: private schools, charter schools, or multiple school districts.

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) (Clotfelter 2004, p. 73). 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.

Although our aim in this paper is to describe rather than explain patterns and trends in school segregation, it is fitting to recall that policy, along with demographic forces and household decisions, will continue to influence school segregation. Among the policies we discuss above is one that might profitably be illuminated by way of illustration. The proposal to publicize the extent of racial imbalance in counties comes with it a specific

"disproportionality index" that would be used to measure the degree of imbalance across schools.[28] To illustrate how this might work in practice, we have calculated the index for an illustrative county, Chatham, a racially diverse county that has seen a rapid increase in Hispanic enrollment. Table 9 shows the enrollments by race of all the public schools (including charter schools) in that county. Across the county's 20 public schools, this index ranged from a low of 3, for SAGE Academy, whose racial and ethnic mix almost exactly matched the county's, to a high of 50, for the overwhelmingly Hispanic Virginia Cross Elementary School. Applying the proposed legislation's suggested cutoffs, we have noted the rating that each school would receive, ranging from Proportional (less than 10) to Highly Disproportional (50 or more). As we note above, there is no research to date to suggest how a policy such as this might affect the decisions of school boards, state legislators, or voters, but it seems a worthy topic of future research.

[Table 9 about here.]

Public policy retains the potential to influence school segregation, even in the new era of federal benign neglect. In its state-enforced form, racial segregation was banished in 1954, but in its modern-day *de facto* form, it continues to exert many of its past baleful influences. One hopeful point on which to conclude is to keep in mind the potential for integrated schools that is the unintended consequence of having so many county-wide school districts, as North Carolina and many other states in the South and West have. Although school segregation might be locked in for much of the balkanized metropolitan areas of the North and Midwest, it need not everywhere be so. Instead of balkanized districts, the chief threats to integrated schools in states like North Carolina will be charter schools, private schools, and efforts to reverse the long trend toward district consolidation.

[28] North Carolina Justice Center (2019).

Appendix A. Segregation by Income

We used the Coleman 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 (eligibility for free lunch is set at 130% of the poverty rate (Federal Register, 2017)). We were able to estimate for every public school in both 1998 and 2014 the percentage of students eligible to receive free lunch.[29] 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.[30] 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.

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

[30] Data on receipt of free lunch were 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.

Appendix B: Decomposition of Segregation

We decompose total white/nonwhite segregation into four additive parts. The first of these uses the racial disparity between the population of students attending private schools and the population of students attending public schools to measures the contribution of that private/public racial disparity to overall segregation in a county's schools. Thus it measures the contribution of private schools, by comparing a hypothetical situation in which all schools in the county 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, whites' average exposure to nonwhites would fall, creating imbalance. The difference in segregation between those two hypothetical situations is the portion of segregation in the county that can be attributed to private schools.

In a similar fashion, we identify portions of the gap between actual and maximum exposure to the racial gap between charter schools and traditional public schools. If, like private schools, charter schools as a whole differ from the racial mix of traditional public schools (TPS), this disparity is used to calculate the portion of overall segregation attributable to this charter/TPS racial gap. Note that our method of calculation captures the effect on overall segregation of any racial disparity between charter schools *as a whole* and traditional public schools. To the extent that there are predominantly white or nonwhite charter schools, that contribution is reflected in the fourth component, the between-school component, described below.

The third component is that which results from racial disparities among different school districts in a county, if more than one district exists, and the remaining component of overall segregation is that which arises because of racial disparities between schools

within school districts, between charter schools, and between private schools.[31]

Formally, we divide the gap between the maximum and the actual exposure of white to nonwhite students as follows:

$$P_n - E_{wn} = (P_n - E_{wn}^*) + (E_{wn}^* - E_{wn}^{**}) + (E_{wn}^{**} - E_{wn}^{***}) + (E_{wn}^{***} - E_{wn}),$$

where each of the terms with asterisks are the interracial exposure rates calculated for a series of three hypothetical scenarios, each one adding another source of racial disparities. These hypothetical exposure rates are defined as: 1) the exposure rate that would obtain if every public school reflected the overall racial composition of public schools and every private school reflected the overall racial composition of all private schools (E_{wn}^*); 2)the exposure rate that would obtain if all traditional public schools and all charter schools were similarly balanced within those two sectors (E_{wn}^{**}); and 3) the exposure rate that would obtain if every traditional public school within each district in the county were balanced with that district's racial composition (E_{wn}^{***}). Dividing both sides of the above equation by P_n yields:

$$(P_n - E_{wn}) / P_n = S_{wn}$$

$$= (P_n - E_{wn}^*)/ P_n + (E_{wn}^* - E_{wn}^{**})/ P_n + (E_{wn}^{**} - E_{wn}^{***})/ P_n + (E_{wn}^{***} - E_{wn}) / P_n .$$

Thus total school segregation is decomposed into four parts, those attributable to racial disparities between private and public schools, between charter and traditional public schools, between separate school districts when they exist, and between schools within districts or sectors:

$$S_{wn} = S_{wn}\,(\text{pub/priv}) + S_{wn}\,(\text{charter/TPS}) + S_{wn}\,(\text{bet. districts}) + S_{wn}\,(\text{w/in districts, sectors})$$

[31] For previous studies that decompose school segregation, see, for example, Clotfelter (2004) or Field (2013).

Appendix C. White/black and White/Hispanic Segregation Indices

We calculate separate Coleman segregation indices with respect to both groups. In keeping with the usual approach taken in social science research, we ignore all groups other than the two being compared. White/black segregation then is:

(2) $S_{wb} = (P_b - E_{wb}) / P_b$,

where E_{wb} is the calculated proportion of students who are black in the average white student's school, when only white and black students are counted, and P_b is the proportion black among those students. Similarly, white/Hispanic segregation is defined as:

(3) $S_{wh} = (P_h - E_{w/h}) / P_h$,

where E_{wh} is the calculated proportion of students who are Hispanic in the average white student's school and P_h is the proportion Hispanic, when only white and Hispanic students are counted.

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Table 1. Distribution of North Carolina K-12 Students by School Type and County or County Group, 1997/98, 2005/06 and 2015/16

	Percentage of students in NC schools											
	Total enrollment			Traditional public school			Charter			Private		
	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16
State of NC	1,310,089	1,493,354	1,622,407	93.8	92.9	90.1	0.4	1.8	4.9	5.8	5.2	5.0
Five largest counties												
Mecklenburg	110,115	141,556	174,614	87.2	87.6	83.7	0.1	2.1	7.4	12.8	10.3	8.8
Wake	97,830	137,226	183,289	91.7	88.2	86.0	0.6	3.7	5.8	7.7	8.1	8.3
Guilford	65,168	76,236	84,613	91.9	90.4	86.5	0.0	1.9	6.3	8.1	7.7	7.2
Cumberland	54,143	56,520	54,955	94.2	94.1	93.1	0.0	0.1	2.0	5.8	5.7	4.9
Forsyth	49,376	57,658	60,554	87.1	88.3	89.4	1.6	3.3	4.7	11.3	8.5	5.9
Urban counties												
Coastal	144,969	152,233	156,973	93.0	93.3	91.4	0.4	1.0	3.2	6.5	5.6	5.4
Piedmont	109,982	128,287	149,437	91.5	90.8	85.7	1.1	3.5	7.9	7.5	5.7	6.4
Mountain	88,748	93,940	96,290	91.8	92.1	88.5	0.4	1.7	4.8	7.8	6.1	6.7
Rural counties												
Coastal	82,868	86,140	85,856	96.8	95.4	94.6	0.3	1.8	3.6	2.9	2.8	1.8
Piedmont	316,416	354,120	367,931	96.7	96.0	94.3	0.1	1.1	3.3	3.2	3.0	2.4
Mountain	190,474	209,438	207,895	97.8	96.7	93.3	0.2	1.5	5.0	2.0	1.8	1.7

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

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

(source: sa07-V01)

Table 2. Racial/Ethnic Distribution of North Carolina K-12 Students by County or County Groups, 1997/98, 2005/06 and 2015/16

	Percentage of students																	
	White			Black			Hispanic			Asian			American Indian			Low income		
	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2013/14
State of NC	64.7	58.1	51.1	29.6	30.3	28.7	2.6	8.1	15.7	1.6	2.1	3.2	1.5	1.4	1.3	28.9	34.5	43.4
Five largest counties																		
Mecklenburg	55.5	42.6	34.8	37.5	42.2	39.7	2.7	10.8	19.3	3.8	3.9	5.8	0.4	0.6	0.4	26.2	35.1	42.6
Wake	68.3	58.0	50.2	25.6	28.7	25.7	2.5	8.5	16.1	3.3	4.4	7.8	0.2	0.3	0.3	14.9	21.1	25.6
Guilford	57.2	47.2	38.2	37.4	41.7	42.2	1.7	6.4	13.2	3.1	4.2	6.0	0.6	0.5	0.4	27.1	35.6	48.0
Cumberland	47.1	40.5	32.0	44.9	49.4	51.7	4.7	6.3	12.2	1.7	1.9	2.5	1.5	1.9	1.7	34.4	38.5	46.5
Forsyth	60.8	51.0	41.9	34.5	34.6	31.8	3.5	12.6	23.4	1.0	1.5	2.6	0.2	0.3	0.2	30.4	34.8	45.4
Urban counties																		
Coastal	56.3	52.1	47.7	39.9	40.7	37.6	2.5	5.7	12.7	1.0	1.1	1.7	0.3	0.3	0.3	34.6	38.5	47.5
Piedmont	59.4	51.4	43.1	35.5	35.1	33.4	3.0	10.6	19.4	1.7	2.5	3.6	0.3	0.3	0.4	24.9	30.9	42.4
Mountain	81.8	74.1	65.9	14.1	16.2	17.7	1.6	6.6	13.4	2.2	2.8	2.8	0.2	0.3	0.2	21.1	32.3	44.6
Rural counties																		
Coastal	59.0	59.1	56.4	38.2	33.3	28.4	2.3	6.8	14.1	0.2	0.4	0.7	0.3	0.3	0.5	40.2	41.5	50.1
Piedmont	61.2	57.4	52.6	30.6	28.7	25.5	2.9	8.6	16.5	0.7	0.9	1.4	4.6	4.4	4.0	33.3	37.3	46.4
Mountain	86.4	81.5	75.3	9.6	10.1	10.6	2.0	6.2	11.8	1.3	1.5	1.5	0.6	0.7	0.7	25.2	33.4	44.9

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 inludes multiracial students, and the Asian category inludes Pacific Islander students.

(source: sa07-V01)

Figure 1a. North Carolina Counties by Percentage of Black Students, 1997/98

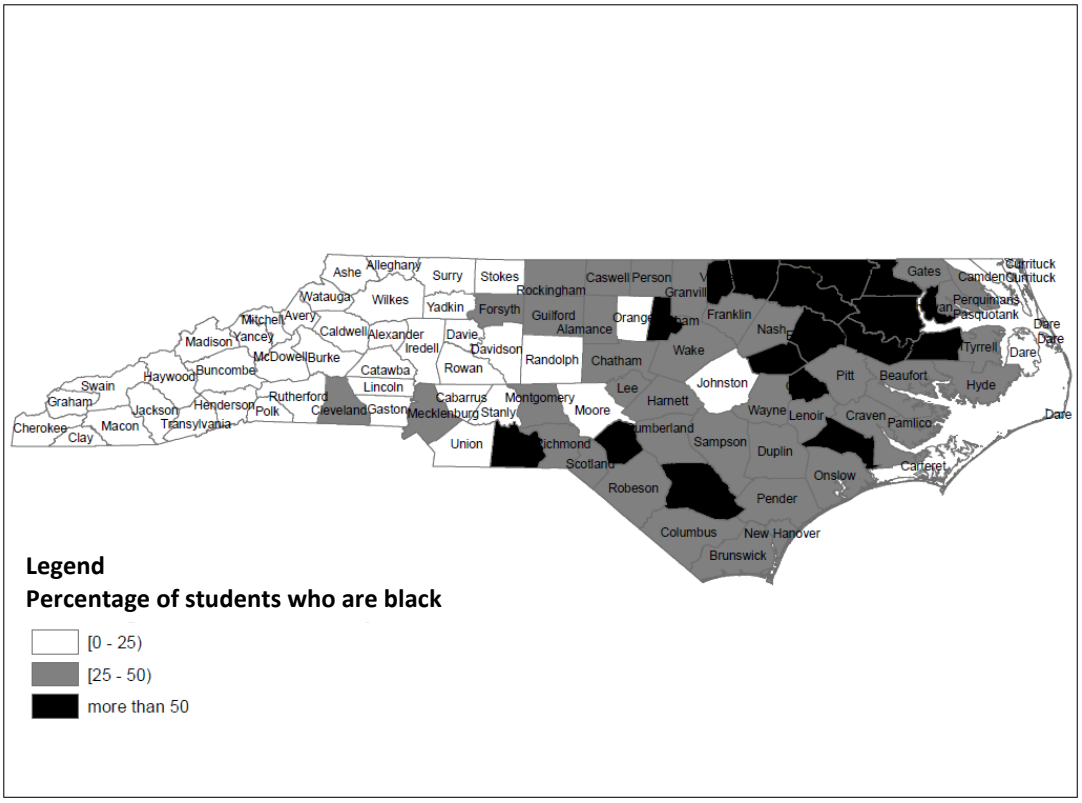

Figure 1b. North Carolina Counties by Percentage of Black Students, 2015/16

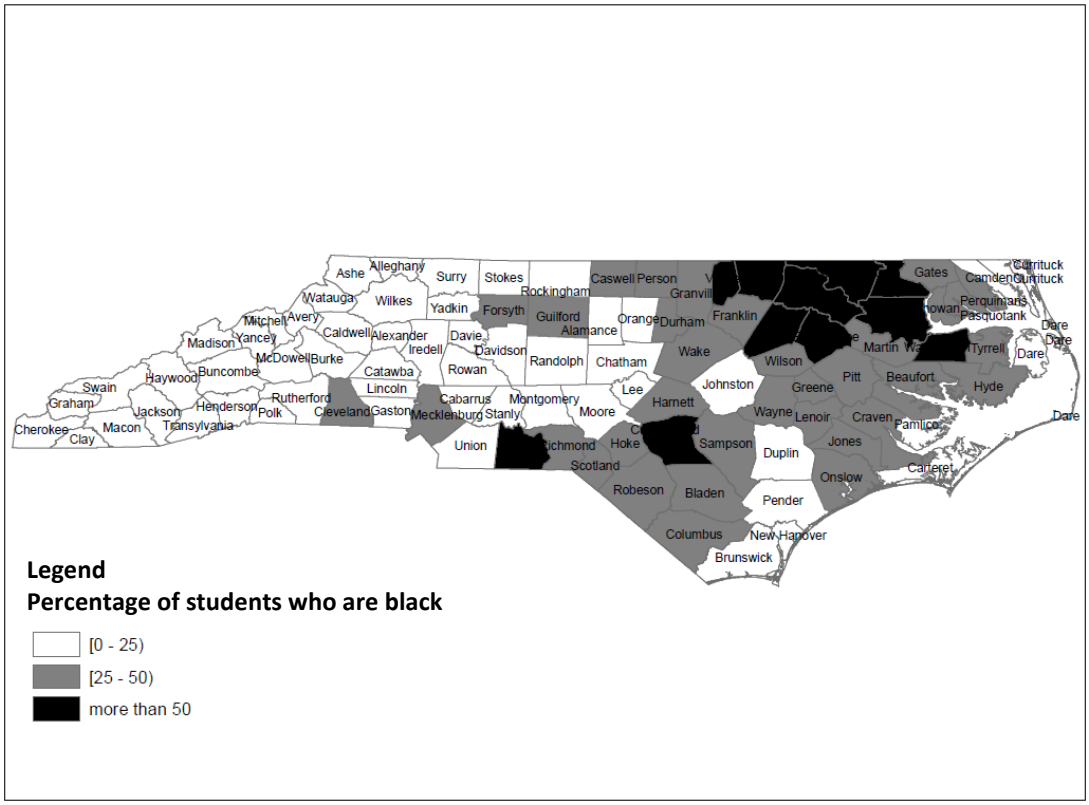

Figure 2a. Map of NC Counties by Percent of Hispanic Students, 1997/98

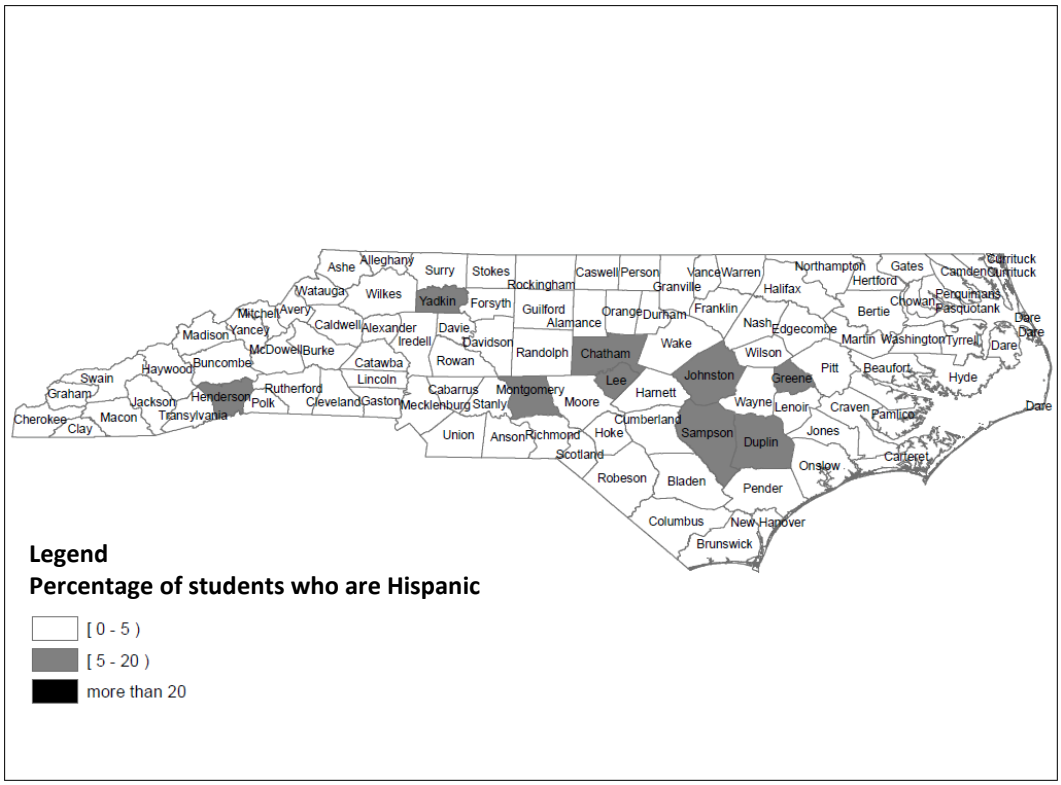

Figure 2b. Map of NC Counties by Percent of Hispanic Students, 2015/16

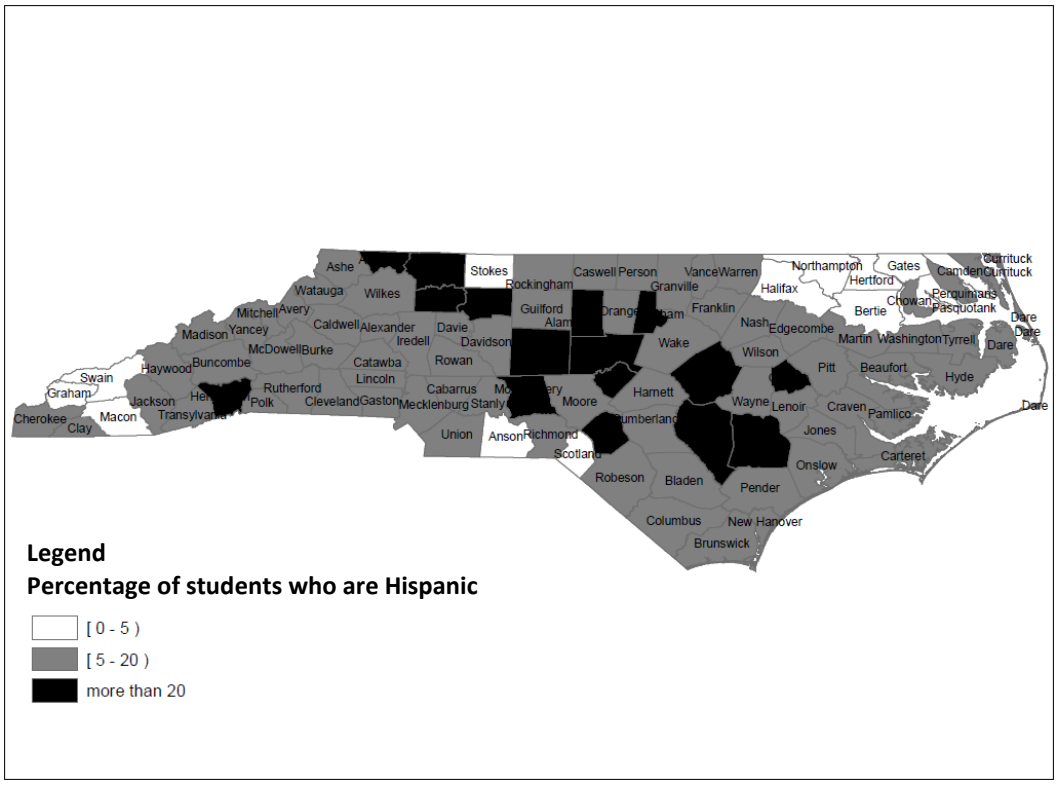

Figure 3. Percent Nonwhite and Exposure of White to Nonwhite Students, NC Counties, 2016

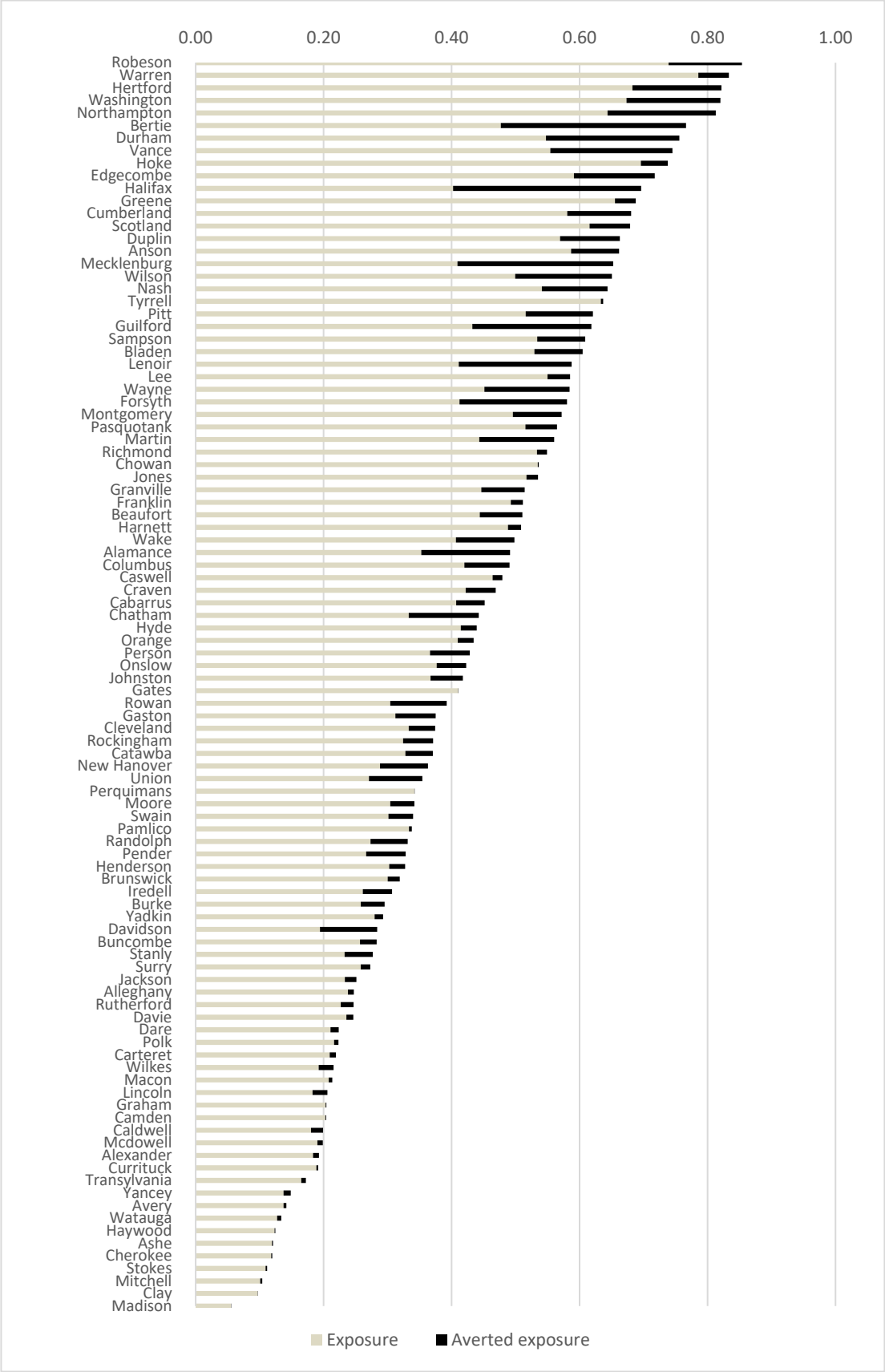

Table 3. Segregation in North Carolina Schools by Division and Region: Alternative Measures

	White/Nonwhite Segregation (a)			White/Nonwhite Dissimilarity (b)			4-group Entropy (c)			Economic Segregation (d)		
	1997/98	2005/2006	2015/16	1997/98	2005/2006	2015/16	1997/98	2005/2006	2015/16	1997/98	2005/2006	2013/14*
State of NC	0.15	0.19	0.19	0.34	0.37	0.36	0.14	0.14	0.13	0.14	0.14	0.19
Urban counties	0.17	0.23	0.23	0.35	0.40	0.40	0.14	0.16	0.16	0.17	0.18	0.23
Rural counties	0.13	0.14	0.13	0.34	0.32	0.29	0.13	0.12	0.10	0.10	0.10	0.14
Five largest counties												
Mecklenburg	0.21	0.38	0.37	0.38	0.56	0.58	0.16	0.24	0.23	0.20	0.30	0.36
Wake	0.09	0.15	0.18	0.26	0.31	0.34	0.09	0.12	0.15	0.09	0.11	0.16
Guilford	0.30	0.33	0.30	0.47	0.47	0.48	0.22	0.22	0.18	0.23	0.25	0.30
Cumberland	0.15	0.17	0.15	0.33	0.36	0.35	0.10	0.11	0.09	0.15	0.13	0.18
Forsyth	0.21	0.32	0.29	0.37	0.49	0.47	0.18	0.22	0.18	0.21	0.29	0.34
Other urban												
Coastal	0.16	0.18	0.18	0.31	0.34	0.34	0.13	0.14	0.13	0.16	0.14	0.17
Piedmont	0.15	0.17	0.18	0.32	0.35	0.36	0.13	0.13	0.13	0.16	0.13	0.20
Mountain	0.15	0.15	0.13	0.39	0.35	0.31	0.15	0.13	0.10	0.17	0.13	0.16
Rural												
Coastal	0.10	0.11	0.10	0.25	0.26	0.25	0.09	0.10	0.08	0.09	0.09	0.11
Piedmont	0.18	0.18	0.16	0.38	0.36	0.33	0.16	0.15	0.12	0.12	0.12	0.17
Mountain	0.08	0.09	0.08	0.31	0.28	0.25	0.11	0.09	0.07	0.08	0.07	0.11

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. County designation for region and rural/urban are shown in Appendix Table AI.

a) White-nowhite gap-based segregation. See text eq(1).

b) See text for definition.

c) See text for definition.

d) Gap-based segregtion based on public school students eligible for free lunch and all other students. See text for discussion.

(source: sa01-V02)

Table 4. Noteworthy Examples of Four Segregation-Serving Instruments

		Portion of segregation due to racial disparities			
County and prominent instrument	**Total segregation**	**Between public & private schools**	**Between charter and traditional public schools**	**Between school districts**	**Between schools within districts or sectors**
Private schools prominent					
Bertie	0.38	**0.36**	0.00	0.00	0.02
Northampton	0.21	**0.19**	0.00	0.00	0.02
Hertford	0.17	**0.15**	0.00	0.00	0.02
Charter schools prominent					
Vance	0.26	0.09	**0.14**	0.00	0.03
Martin	0.21	0.00	**0.12**	0.00	0.09
Durham	0.28	0.11	**0.07**	0.00	0.09
Multiple districts prominent					
Davidson	0.32	0.01	0.00	**0.29**	0.02
Halifax	0.42	0.04	0.01	**0.37**	0.01
Randolph	0.18	0.01	0.01	**0.11**	0.05
Within-districts and sectors prominent					
Mecklenburg	0.37	0.08	0.05	0.00	**0.24**
Union	0.24	0.00	0.00	0.00	**0.23**
Alamance	0.28	0.03	0.03	0.00	**0.22**

Counties with the largest component in each category are shown.
Source: authors' calculations. See Appendix Table A3 and text.

Table 5. White-Nonwhite Segregation Index Decomposition in NC Schools by Region, 2015/16

Region	Actual	Public/Private	TPS/Charter	Between TPS districts	Within Districts and Sectors	W/NW Segregation (excluding Private Schools)
State of NC	0.19	0.03	0.02	0.01	0.13	0.16
Rural	0.13	0.01	0.01	0.02	0.09	0.12
Urban	0.23	0.05	0.02	0.00	0.15	0.20
Five largest counties						
Mecklenburg	0.37	0.08	0.05	0.00	0.24	0.34
Wake	0.18	0.04	0.02	0.00	0.12	0.16
Guilford	0.30	0.06	0.03	0.00	0.21	0.27
Cumberland	0.15	0.03	0.00	0.00	0.12	0.13
Forsyth	0.29	0.04	0.03	0.00	0.22	0.27
Urban counties						
Coastal	0.18	0.04	0.01	0.00	0.12	0.15
Piedmont	0.18	0.05	0.03	0.01	0.10	0.15
Mountain	0.13	0.01	0.00	0.01	0.10	0.12
Rural counties						
Coastal	0.10	0.02	0.01	0.00	0.07	0.08
Piedmont	0.16	0.01	0.01	0.04	0.10	0.15
Mountain	0.08	0.00	0.00	0.00	0.08	0.08

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

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

(source: sa06-V01, sa07-V01)

Table 6. White Students Enrolled in Schools 80% or More White

	1998	2006	2016
White students in 80% + schools (1,000s)	326	274	159
As a percentage of all white students (%)	46	41	27
Percentage of these students attending (%)			
Traditional public schools	83	79	71
Charter schools	0	3	9
Private schools	17	18	20
Total	100	100	100

Source: NCES Common Core of Data; authors' calculations.

(source: sa08-V01)

Table 7. White/nonwhite Segregation in 11 Metropolitan Areas, 1997/98 and 2015/16

	Segregation index									
	1997/98					2015/16				
Metro Area	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-Gastonia-Rock Hill	0.25	0.04	0.00	0.08	0.12	0.33	0.04	0.02	0.08	0.19
Durham-Chapel Hill	0.23	0.04	0.01	0.10	0.08	0.28	0.04	0.06	0.11	0.08
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
Greenville	0.11	0.06	0.00	0.00	0.05	0.16	0.05	0.00	0.00	0.10
Hickory-Lenoir-Morganton	0.12	0.01	0.01	0.05	0.05	0.13	0.01	0.00	0.05	0.08
Raleigh-Cary	0.10	0.02	0.00	0.00	0.06	0.17	0.03	0.02	0.01	0.12
Rocky Mount	0.20	0.06	0.00	0.00	0.13	0.17	0.05	0.01	0.00	0.11
Wilmington	0.09	0.02	0.00	0.00	0.07	0.12	0.02	0.00	0.00	0.10
Winston-Salem	0.25	0.03	0.01	0.09	0.12	0.32	0.02	0.02	0.11	0.17
Weighted Average	0.19	0.03	0.00	0.06	0.11	0.24	0.03	0.02	0.06	0.14
as % of total	100	15.9	1.3	28.8	54.1	100	12.8	8.1	23.2	56.0

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

Note: Included in the table are the 11 metropolitan areas in 2012 containing two or more North Carolina counties. 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
Fayetteville	Cumberland; Hoke
Greensboro-High Point	Guilford; Randolph; Rockingham
Greenville	Greene; Pitt
Hickory-Lenoir-Morganton	Alexander; Burke; Caldwell; Catawba (Newton Conover City Schools, Newton Conover City Schools)
Raleigh-Cary	Franklin; Johnston; Wake
Rocky Mount	Edgecombe (Nash-Rocky Mount Schools); Nash
Wilmington	Brunswick; New Hanover; Pender
Winston-Salem	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

(source: ss-sa10-V01); 6-19-19

Table 8. Ethnoracial Segregation in N.C.,1997/98, 2005/06 and 2015/16: Three Dichotomies

	Segregation index								
	White/Black			White/Hispanic			White/Nonwhite		
	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2015/16
State of NC	0.16	0.20	0.20	0.06	0.16	0.20	0.15	0.19	0.19
Urban counties	0.18	0.25	0.26	0.07	0.19	0.25	0.17	0.23	0.23
Rural counties	0.14	0.14	0.12	0.06	0.11	0.12	0.13	0.14	0.13
Five largest counties									
Mecklenburg	0.22	0.42	0.44	0.12	0.36	0.46	0.21	0.38	0.37
Wake	0.11	0.18	0.21	0.04	0.10	0.21	0.09	0.15	0.18
Guilford	0.31	0.36	0.34	0.08	0.24	0.33	0.30	0.33	0.30
Cumberland	0.17	0.21	0.19	0.06	0.07	0.10	0.15	0.17	0.15
Forsyth	0.22	0.34	0.30	0.15	0.35	0.38	0.21	0.32	0.29
Other urban									
Coastal	0.17	0.20	0.22	0.04	0.12	0.14	0.16	0.18	0.18
Piedmont	0.16	0.17	0.19	0.08	0.19	0.23	0.15	0.17	0.18
Mountain	0.17	0.17	0.13	0.02	0.09	0.11	0.15	0.15	0.13
Rural									
Coastal	0.11	0.12	0.11	0.03	0.06	0.08	0.10	0.11	0.10
Piedmont	0.18	0.17	0.16	0.08	0.16	0.16	0.18	0.18	0.16
Mountain	0.08	0.08	0.07	0.03	0.06	0.07	0.08	0.09	0.08

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

Note: Segregation indices for the state and county groups are weighted averages of county statistics where weights are county enrollments. County designation for region and rural/urban are shown in Appendix Table AI. 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.

(source: sa01-V02)

Table 9. Applying a "Disproportionality Score" to Public Schools in Chatham County, NC, 2016

School name	Type	Enrollment by race/ethnicity, 2015/2016						Disproportionality score and rating	
		American Indian	Asian	Hispanic	Black	White	Total	Score	Rating
SAGE Academy	TPS	0	0	13	9	28	50	3	Highly Proportional
North Chatham Elementary	TPS	3	6	195	52	314	570	7	Highly Proportional
Margaret B. Pollard Middle	TPS	3	11	124	79	403	620	11	Proportional
Moncure School	TPS	2	1	53	58	195	309	11	Proportional
Northwood High	TPS	4	17	196	239	870	1,326	13	Proportional
Horton Middle	TPS	0	10	55	93	225	383	13	Proportional
Pittsboro Elementary	TPS	0	9	71	130	292	502	14	Proportional
Bonlee School	TPS	0	0	55	34	238	327	17	Proportional
Perry W Harrison Elementary	TPS	5	14	79	91	494	683	18	Proportional
Chatham Central High	TPS	0	2	38	57	289	386	20	Proportional
Silk Hope School	TPS	0	4	56	38	299	397	20	Proportional
J S Waters School	TPS	1	1	15	56	197	270	23	Proportional
Chatham Charter	Charter	0	0	23	90	419	532	25	Somewhat Disproportional
Willow Oak Montessori	Charter	0	3	7	18	121	149	27	Somewhat Disproportional
Jordan Matthews High	TPS	0	8	398	135	218	759	27	Somewhat Disproportional
Woods Charter	Charter	4	18	23	43	415	503	30	Somewhat Disproportional
Bennett School	TPS	0	1	19	3	203	226	35	Somewhat Disproportional
Siler City Elementary	TPS	0	5	466	130	133	734	38	Somewhat Disproportional
Chatham Middle	TPS	1	4	385	95	70	555	43	Somewhat Disproportional
Virginia Cross Elementary	TPS	3	3	439	110	38	593	50	Highly Disproportional
Group's share county-wide		0.3%	1.2%	27.4%	15.8%	55.3%	100.0%		

Source: National Center for Education Statistics; authors' calculations.

Note: Disproportionality score is the dissimilarity index between each school's racial composition and the county-wide composition, based on Orfield, Ee and Coughlan (2017, p. 42). Designations are taken from proposed legislation, "An Act to Incorporate Measures of Segregation into State Accountability Models," 2019. They correspond to disproportionality scores as follows: Less than 10: Highly Proportional; 10 less than 25: Proportional; 25 less than 50: Somewhat Disproportional; 50 or more: Highly Disproportional.

Appendix Table A1. Enrollment and Racial Composition by County, 1997/98, 2005/06 and 2015/16 (source: sa07-V01)

		Enrollment			Pecentage white			Pecentage black			Pecentage Hispanic		
County	**Region***	**1997/98**	**2005/06**	**2015/16**	**1997/98**	**2005/06**	**2015/16**	**1997/98**	**2005/06**	**2015/16**	**1997/98**	**2005/06**	**2015/16**
North Carolina		**1,310,089**	**1,493,354**	**1,622,407**	**64.7**	**58.1**	**51.1**	**29.6**	**30.3**	**28.7**	**2.6**	**13.8**	**15.7**
Alamance	UP	20,691	24,340	26,197	68.8	59.8	50.9	25.6	24.7	24.5	4.3	13.8	22.7
Alexander	RM	5,277	5,753	5,084	89.3	85.1	80.7	6.6	6.5	8.0	1.4	5.4	9.3
Alleghany	RM	1,483	1,611	1,528	96.3	87.9	75.3	1.5	2.4	2.6	2.1	9.6	21.5
Anson	RP	4,538	4,261	3,434	34.9	33.0	33.8	63.5	62.8	60.2	0.4	1.6	4.0
Ashe	RM	3,381	3,349	3,175	98.3	93.6	87.9	0.7	1.9	1.6	0.8	3.9	9.9
Avery	RM	2,611	2,510	2,498	98.2	93.6	85.8	1.2	1.3	2.2	0.5	4.4	11.1
Beaufort	RC	8,165	7,931	7,488	56.7	55.8	48.9	41.4	36.9	35.5	1.6	7.0	15.1
Bertie	RC	4,372	3,835	3,051	27.2	24.1	23.4	72.2	74.3	73.5	0.3	0.9	2.2
Bladen	RP	5,877	5,772	5,141	46.9	42.7	39.5	50.9	49.0	41.2	1.3	6.9	17.2
Brunswick	RC	9,961	12,390	13,982	72.5	71.6	68.1	25.1	22.0	18.6	1.5	5.3	11.7
Buncombe	UM	31,855	32,663	34,197	86.2	79.6	71.7	11.0	13.0	13.2	1.6	5.7	13.0
Burke	RM	14,122	14,998	13,175	81.8	77.1	70.5	7.6	9.2	9.6	2.0	5.2	13.4
Cabarrus	UP	22,412	30,576	40,792	80.1	68.9	54.8	16.0	19.5	24.8	2.6	9.7	16.1
Caldwell	RM	12,564	13,332	12,320	90.3	85.1	80.1	8.1	9.2	9.4	0.9	4.5	9.7
Camden	RC	1,225	1,798	1,860	77.5	82.3	79.6	21.9	16.1	15.8	0.0	0.8	2.8
Carteret	RC	9,046	9,136	9,003	86.1	84.7	78.1	12.0	11.0	11.9	1.0	2.9	8.3
Caswell	RP	3,640	3,335	2,767	53.4	53.2	52.1	45.4	42.4	40.4	1.1	3.9	7.0
Catawba	UM	23,221	25,861	25,343	79.6	70.2	62.9	12.4	13.9	13.8	2.7	9.0	17.3
Chatham	RP	6,945	8,116	9,993	66.1	59.7	55.8	26.4	20.5	15.6	6.6	19.1	27.1
Cherokee	RM	3,688	3,953	3,716	94.1	92.7	88.0	2.6	3.4	4.6	1.0	1.6	5.1
Chowan	RC	2,631	2,554	2,142	47.0	50.2	46.4	52.2	47.3	46.6	0.6	2.2	6.3
Clay	RM	1,287	1,323	1,419	98.2	97.9	90.3	0.9	1.1	2.5	0.2	0.4	6.2
Cleveland	RM	16,933	17,404	16,095	68.2	66.5	62.6	30.1	30.0	31.1	0.8	2.5	5.5
Columbus	RP	10,911	10,219	9,576	52.9	51.3	51.0	42.0	40.0	35.3	1.1	4.1	9.3
Craven	UC	15,723	15,966	15,165	62.0	60.2	53.1	34.7	33.8	32.8	2.2	4.5	9.5
Cumberland	Cumberland	54,143	56,520	54,955	47.1	40.5	32.0	44.9	49.4	51.7	4.7	6.3	12.2
Currituck	RC	3,017	4,070	4,071	86.4	86.6	80.8	12.3	10.5	13.3	0.9	2.2	5.1
Dare	RC	4,528	5,065	5,167	93.3	87.9	77.6	5.0	5.3	6.5	1.3	5.8	14.7
Davidson	RP	24,191	26,229	26,229	83.8	77.9	71.6	12.8	13.2	13.0	1.8	7.2	13.2
Davie	RM	5,296	6,542	6,396	87.4	81.9	75.3	10.3	9.5	10.7	1.6	7.9	12.8
Duplin	RC	8,583	9,098	10,190	51.8	42.2	33.7	37.5	32.4	25.0	10.5	25.0	40.0
Durham	UP	33,309	36,083	44,353	40.5	28.1	24.4	54.1	56.6	47.6	2.9	12.7	24.8
Edgecombe	UC	10,056	9,834	8,613	39.0	29.7	28.2	58.3	65.1	63.0	2.4	4.8	8.4
Forsyth	Forsyth	49,376	57,658	60,554	60.8	51.0	41.9	34.5	34.6	31.8	3.5	12.6	23.4
Franklin	RP	7,187	8,401	8,857	55.2	53.5	48.9	41.9	37.0	33.5	2.3	8.7	16.5
Gaston	UM	33,672	35,416	36,750	79.3	71.9	62.5	18.2	20.9	24.6	1.0	5.6	11.1
Gates	RC	2,021	2,050	1,655	53.3	57.6	58.9	46.2	40.6	38.7	0.3	1.4	1.8
Graham	RM	1,228	1,266	1,238	87.1	87.4	79.6	0.2	1.3	0.9	0.1	0.6	3.3
Granville	RP	7,940	8,846	8,851	54.6	53.0	48.6	42.7	39.5	35.4	2.1	6.6	14.9
Greene	RC	3,198	3,392	3,247	42.9	36.1	31.2	50.6	47.6	38.3	6.3	16.2	30.2
Guilford	Guilford	65,168	76,236	84,613	57.2	47.2	38.2	37.4	41.7	42.2	1.7	6.4	13.2
Halifax	RP	11,754	10,069	7,087	31.7	32.8	30.4	63.6	62.6	61.9	0.6	1.2	4.1
Harnett	RP	15,494	18,588	21,218	64.0	56.9	49.1	30.6	31.7	29.9	3.9	9.8	18.9
Haywood	RM	7,823	8,133	8,596	96.2	93.5	87.5	2.0	2.4	3.0	1.2	3.0	8.0
Henderson	RM	12,089	13,583	14,233	88.1	78.4	67.3	5.7	7.6	8.1	5.2	12.5	22.8

Hertford	RC	4,821	4,160	3,251	27.0	23.6	17.8	71.7	74.1	77.2	0.2	1.2	3.4
Hoke	RP	5,956	7,217	8,161	32.5	29.3	26.2	50.1	45.5	42.1	2.5	10.2	21.3
Hyde	RC	798	649	658	53.3	48.2	56.1	46.4	42.1	25.1	0.4	9.7	18.8
Iredell	RM	19,808	26,832	31,652	76.2	74.3	69.3	20.1	16.8	16.7	1.7	6.3	10.9
Jackson	RM	3,919	3,968	4,058	88.7	83.1	74.9	1.4	2.4	4.0	1.1	3.6	12.1
Johnston	RP	18,585	27,831	35,993	71.3	64.5	58.2	22.5	21.8	19.0	5.5	12.9	21.6
Jones	RC	1,618	1,436	1,170	44.1	41.2	46.5	53.8	54.5	43.1	1.7	3.9	10.0
Lee	RP	9,235	10,097	10,868	61.6	51.0	41.5	27.3	26.5	24.8	9.8	21.3	32.1
Lenoir	UC	11,640	11,409	10,315	49.4	45.1	41.2	47.6	48.2	46.2	2.4	5.7	11.5
Lincoln	RM	10,155	12,804	13,590	85.6	81.4	79.4	10.0	9.4	9.2	3.8	8.5	10.4
Macon	RM	4,082	4,385	4,502	97.4	90.9	78.6	1.1	2.2	3.0	0.7	5.6	17.0
Madison	RM	2,559	2,621	2,453	98.7	96.6	94.5	0.3	1.0	1.4	0.5	1.9	3.6
Martin	RC	5,069	4,393	3,938	41.4	42.6	44.0	57.0	54.2	48.3	1.1	2.7	7.0
Mcdowell	RM	6,576	6,622	6,365	92.4	86.7	80.1	4.5	4.7	6.1	0.9	6.6	12.3
Charlotte-Mecklenburg	CM	110,115	141,556	174,614	55.5	42.6	34.8	37.5	42.2	39.7	2.7	10.8	19.3
Mitchell	RM	2,414	2,266	1,873	97.9	93.9	89.6	0.3	0.7	1.2	1.7	5.0	8.1
Montgomery	RP	4,476	4,663	4,227	57.2	48.8	42.8	30.2	26.7	22.1	9.6	21.8	33.0
Moore	RP	11,513	13,268	14,363	70.3	68.9	65.8	25.0	22.6	19.6	3.2	6.7	12.0
Nash	UP	17,950	18,150	17,254	45.8	42.8	35.6	50.2	49.0	50.5	2.8	6.4	12.0
New	UC	23,903	26,805	29,380	70.4	67.1	63.7	27.2	27.2	23.1	1.0	4.0	11.2
Northampton	RP	4,142	3,904	3,401	22.7	22.6	18.7	76.7	76.2	76.7	0.4	1.0	3.5
Onslow	UC	22,194	23,518	26,857	66.6	62.2	57.7	26.5	29.7	26.9	3.9	5.7	13.2
Orange	UP	15,620	19,138	20,841	73.5	65.3	56.5	20.1	19.5	17.4	2.3	7.6	16.6
Pamlico	RC	2,119	2,008	1,830	65.3	68.7	66.2	32.5	27.5	24.3	1.3	2.7	8.5
Pasquotank	UC	6,661	6,619	6,267	51.4	50.2	43.5	46.5	47.2	48.4	0.9	1.8	6.8
Pender	RC	6,119	7,408	9,191	62.8	66.8	67.2	34.4	25.5	18.6	2.6	7.3	13.2
Perquimans	RC	2,033	1,817	1,744	56.5	61.8	65.8	42.6	35.6	30.4	0.6	1.6	3.3
Person	RP	5,846	6,375	5,831	61.6	58.3	57.2	36.0	36.9	34.2	1.7	3.8	7.8
Pitt	UC	21,351	23,538	25,446	49.8	43.7	37.9	47.5	49.7	49.5	1.7	5.2	10.8
Polk	RM	2,293	2,674	2,289	87.1	81.9	77.7	9.1	10.5	9.7	3.2	7.1	12.2
Randolph	RP	21,030	24,033	23,704	86.8	77.2	66.9	7.7	8.7	9.4	4.3	12.6	21.8
Richmond	RP	8,518	8,661	7,762	55.4	49.6	45.1	41.1	40.9	39.8	1.4	4.9	10.7
Robeson	RP	24,658	24,984	24,912	24.0	19.7	14.6	30.4	30.1	28.2	1.5	6.6	14.7
Rockingham	RP	15,250	15,187	13,397	71.8	67.3	62.9	25.5	26.7	23.5	2.1	5.3	12.6
Rowan	RP	21,107	22,283	21,942	74.4	68.3	60.8	21.8	22.8	21.5	2.2	7.3	16.0
Rutherford	RM	10,570	10,815	10,490	82.0	78.9	75.3	16.6	17.0	17.0	1.1	3.6	6.6
Sampson	RP	10,461	11,307	12,388	52.8	45.6	39.1	37.5	33.8	26.9	7.4	18.4	32.2
Scotland	RP	7,354	7,512	6,257	43.4	37.2	32.1	46.4	47.8	48.1	0.3	1.2	2.8
Stanly	RP	9,860	9,941	9,356	78.1	75.5	72.3	16.6	15.9	16.1	1.3	4.2	8.0
Stokes	RP	7,188	7,670	6,456	91.7	91.0	88.8	6.2	6.6	5.9	1.8	1.9	4.5
Surry	RM	11,280	12,170	11,906	88.8	80.3	72.7	5.9	6.3	5.9	4.7	12.3	20.8
Swain	RM	1,678	2,080	2,304	77.5	73.2	66.0	0.5	1.5	5.1	1.4	2.5	4.6
Transylvania	RM	4,071	4,065	3,872	92.2	87.3	82.8	6.7	9.4	9.6	0.6	2.2	6.3
Tyrrell	RC	795	644	595	49.7	46.1	36.3	48.9	41.8	42.2	0.8	11.6	18.0
Union	RP	20,638	33,462	45,041	76.9	72.8	64.6	19.2	16.5	15.5	3.0	9.4	16.4
Vance	RP	8,524	8,815	8,181	37.4	27.8	25.5	60.2	64.5	60.0	1.9	7.2	13.3
Wake	Wake	97,830	137,226	183,289	68.3	58.0	50.2	25.6	28.7	25.7	2.5	8.5	16.1
Warren	RP	3,598	3,074	2,538	28.0	17.6	16.7	66.3	70.8	64.9	1.0	3.0	6.9
Washington	RC	2,749	2,306	1,623	30.6	21.9	18.0	68.2	74.6	73.6	1.0	3.2	7.8
Watauga	RM	5,120	4,743	4,759	97.2	93.7	86.6	1.5	2.9	3.9	0.7	2.3	7.9
Wayne	UC	20,894	20,915	21,001	53.8	48.9	41.6	41.8	41.3	37.3	3.2	8.6	19.3
Wilkes	RM	10,077	10,703	10,396	91.4	86.1	78.4	5.7	6.5	7.4	2.4	6.7	13.4
Wilson	UC	12,547	13,629	13,929	42.3	38.1	34.9	53.1	51.2	45.4	4.0	9.6	18.2
Yadkin	RM	5,587	6,232	5,637	88.6	80.3	70.7	4.6	5.2	5.1	6.5	14.0	23.3
Yancey	RM	2,503	2,701	2,276	96.8	91.5	85.1	1.2	1.7	2.0	1.7	6.0	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.

*** Regions:**
UC - Urban Coastal; UP - Urban Piedmont; UM - Urban Mountain; RC - Rural Coastal; RP - Rural Piedmont; RM - Rural Mountain; CM - Charlotte - Mecklenburg

Appendix Table A2. Segregation by County, Three Measures, 1997/98, 2005/06 and 2015/16 (source: sa07-V01)

County	Region*	W/NW Segregation			Entropy			L/NL Segregation		
		1997/98	2005/06	2015/16	1997/98	2005/06	2015/16	1997/98	2005/06	2013/14
Alamance	UP	0.16	0.27	0.28	0.12	0.17	0.16	0.12	0.17	0.23
Alexander	RM	0.07	0.06	0.05	0.10	0.07	0.05	0.09	0.04	0.04
Alleghany	RM	0.00	0.01	0.04	0.03	0.02	0.04	0.03	0.02	0.08
Anson	RP	0.09	0.12	0.11	0.08	0.10	0.08	0.06	0.06	0.06
Ashe	RM	0.00	0.01	0.01	0.05	0.03	0.02	0.02	0.02	0.02
Avery	RM	0.04	0.05	0.03	0.15	0.12	0.05	0.03	0.06	0.08
Beaufort	RC	0.13	0.15	0.13	0.11	0.12	0.08	0.10	0.13	0.14
Bertie	RC	0.36	0.48	0.38	0.29	0.36	0.27	0.19	0.29	0.33
Bladen	RP	0.14	0.13	0.12	0.11	0.10	0.09	0.10	0.03	0.09
Brunswick	RC	0.03	0.06	0.06	0.03	0.06	0.05	0.07	0.06	0.10
Buncombe	UM	0.19	0.15	0.09	0.20	0.14	0.09	0.14	0.12	0.14
Burke	RM	0.07	0.07	0.13	0.10	0.10	0.12	0.08	0.04	0.07
Cabarrus	UP	0.07	0.09	0.10	0.07	0.07	0.08	0.10	0.12	0.20
Caldwell	RM	0.18	0.14	0.10	0.24	0.15	0.09	0.10	0.10	0.09
Camden	RC	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01
Carteret	RC	0.05	0.05	0.04	0.08	0.07	0.05	0.07	0.05	0.09
Caswell	RP	0.05	0.02	0.03	0.04	0.02	0.03	0.05	0.02	0.03
Catawba	UM	0.11	0.12	0.12	0.10	0.10	0.08	0.11	0.11	0.11
Chatham	RP	0.11	0.23	0.25	0.10	0.19	0.17	0.12	0.22	0.26
Cherokee	RM	0.02	0.02	0.01	0.08	0.05	0.04	0.07	0.03	0.04
Chowan	RC	0.08	0.01	0.00	0.06	0.01	0.00	0.06	0.03	0.02
Clay	RM	0.00	0.00	0.00	0.02	0.03	0.01	0.04	0.01	0.04
Cleveland	RM	0.10	0.11	0.11	0.08	0.08	0.08	0.09	0.06	0.08
Columbus	RP	0.14	0.15	0.14	0.15	0.15	0.12	0.13	0.09	0.13
Craven	UC	0.06	0.09	0.10	0.06	0.08	0.07	0.09	0.12	0.14
Cumberland	C	0.15	0.17	0.15	0.10	0.11	0.09	0.15	0.13	0.18
Currituck	RC	0.02	0.00	0.01	0.03	0.01	0.02	0.02	0.03	0.06
Dare	RC	0.04	0.07	0.06	0.09	0.09	0.05	0.03	0.06	0.06
Davidson	RP	0.39	0.42	0.32	0.34	0.28	0.19	0.21	0.22	0.19
Davie	RM	0.04	0.06	0.04	0.07	0.06	0.04	0.07	0.08	0.10
Duplin	RC	0.14	0.17	0.14	0.12	0.13	0.10	0.10	0.10	0.08
Durham	UP	0.22	0.25	0.28	0.17	0.18	0.17	0.27	0.18	0.29
Edgecombe	UC	0.16	0.18	0.18	0.14	0.16	0.15	0.12	0.09	0.14
Forsyth	Forsyth	0.21	0.32	0.29	0.18	0.22	0.18	0.21	0.29	0.34
Franklin	RP	0.07	0.06	0.04	0.05	0.04	0.03	0.10	0.05	0.07
Gaston	UM	0.14	0.18	0.17	0.13	0.14	0.11	0.24	0.15	0.22
Gates	RC	0.01	0.00	0.00	0.01	0.01	0.00	0.03	0.02	0.01
Graham	RM	0.01	0.00	0.01	0.01	0.00	0.01	0.04	0.01	0.01
Granville	RP	0.13	0.10	0.13	0.09	0.06	0.09	0.10	0.08	0.11
Greene	RC	0.10	0.07	0.05	0.08	0.05	0.03	0.12	0.14	0.06
Guilford	Guilford	0.30	0.33	0.30	0.22	0.22	0.18	0.23	0.25	0.30
Halifax	RP	0.60	0.62	0.42	0.48	0.49	0.33	0.29	0.26	0.23
Harnett	RP	0.05	0.04	0.04	0.05	0.05	0.04	0.06	0.06	0.07
Haywood	RM	0.02	0.01	0.01	0.08	0.04	0.02	0.06	0.04	0.05
Henderson	RM	0.10	0.08	0.08	0.13	0.08	0.07	0.12	0.11	0.15

Hertford	RC	0.25	0.30	0.17	0.19	0.21	0.10	0.20	0.17	0.26
Hoke	RP	0.11	0.07	0.06	0.09	0.10	0.06	0.06	0.05	0.06
Hyde	RC	0.11	0.07	0.06	0.10	0.10	0.14	0.15	0.15	0.39
Iredell	RM	0.13	0.16	0.15	0.11	0.12	0.11	0.08	0.14	0.21
Jackson	RM	0.19	0.15	0.07	0.21	0.16	0.09	0.06	0.03	0.06
Johnston	RP	0.09	0.11	0.12	0.07	0.07	0.08	0.11	0.15	0.17
Jones	RC	0.04	0.07	0.03	0.04	0.06	0.03	0.06	0.02	0.01
Lee	RP	0.09	0.08	0.06	0.07	0.05	0.05	0.09	0.11	0.12
Lenoir	UC	0.35	0.35	0.30	0.29	0.30	0.25	0.27	0.17	0.15
Lincoln	RM	0.08	0.14	0.11	0.09	0.12	0.08	0.06	0.10	0.18
Mcdowell	RM	0.04	0.04	0.04	0.08	0.07	0.04	0.11	0.06	0.05
Macon	RM	0.01	0.02	0.03	0.08	0.03	0.03	0.06	0.05	0.07
Madison	RM	0.01	0.01	0.00	0.12	0.04	0.03	0.06	0.02	0.04
Martin	RC	0.16	0.22	0.21	0.12	0.15	0.14	0.09	0.07	0.17
Charlotte-Mecklenburg	CM	0.21	0.38	0.37	0.16	0.24	0.23	0.20	0.30	0.36
Mitchell	RM	0.01	0.03	0.03	0.09	0.07	0.05	0.11	0.03	0.05
Montgomery	RP	0.09	0.10	0.13	0.11	0.15	0.14	0.08	0.15	0.01
Moore	RP	0.09	0.11	0.11	0.11	0.12	0.10	0.14	0.13	0.16
Nash	UP	0.22	0.13	0.16	0.20	0.14	0.15	0.19	0.10	0.09
New	UC	0.11	0.16	0.21	0.09	0.12	0.15	0.19	0.16	0.24
Northampton	RP	0.29	0.35	0.21	0.26	0.30	0.14	0.13	0.15	0.47
Onslow	UC	0.12	0.11	0.11	0.08	0.07	0.07	0.09	0.05	0.05
Orange	UP	0.03	0.05	0.06	0.06	0.07	0.09	0.06	0.06	0.09
Pamlico	RC	0.02	0.03	0.01	0.02	0.05	0.02	0.04	0.03	0.01
Pasquotank	UC	0.09	0.10	0.09	0.07	0.07	0.06	0.28	0.09	0.07
Pender	RC	0.10	0.13	0.19	0.07	0.10	0.14	0.05	0.12	0.17
Perquimans	RC	0.01	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.01
Person	RP	0.09	0.12	0.14	0.07	0.09	0.09	0.15	0.10	0.17
Pitt	UC	0.11	0.15	0.17	0.10	0.12	0.13	0.12	0.16	0.20
Polk	RM	0.02	0.04	0.03	0.04	0.04	0.03	0.07	0.04	0.04
Randolph	RP	0.10	0.16	0.18	0.13	0.13	0.12	0.09	0.09	0.10
Richmond	RP	0.04	0.05	0.03	0.04	0.05	0.03	0.10	0.01	0.09
Robeson	RP	0.26	0.19	0.13	0.24	0.22	0.19	0.09	0.05	0.09
Rockingham	RP	0.10	0.13	0.13	0.09	0.10	0.09	0.09	0.08	0.16
Rowan	RP	0.23	0.24	0.22	0.20	0.18	0.15	0.13	0.10	0.12
Rutherford	RM	0.14	0.09	0.08	0.14	0.09	0.07	0.10	0.07	0.20
Sampson	RP	0.09	0.12	0.12	0.09	0.09	0.08	0.09	0.09	0.40
Scotland	RP	0.07	0.11	0.09	0.06	0.08	0.06	0.10	0.09	0.11
Stanly	RP	0.16	0.15	0.16	0.16	0.15	0.14	0.09	0.12	0.13
Stokes	RP	0.05	0.04	0.02	0.12	0.08	0.04	0.10	0.04	0.05
Surry	RM	0.04	0.05	0.05	0.10	0.07	0.07	0.06	0.04	0.10
Swain	RM	0.08	0.08	0.11	0.08	0.06	0.10	0.03	0.02	0.05
Transylvania	RM	0.04	0.04	0.04	0.11	0.08	0.07	0.12	0.06	0.07
Tyrrell	RC	0.00	0.01	0.01	0.00	0.01	0.01	0.08	0.03	0.04
Union	RP	0.27	0.28	0.24	0.21	0.19	0.16	0.19	0.26	0.32
Vance	RP	0.19	0.15	0.26	0.16	0.12	0.16	0.21	0.04	0.38
Wake	Wake	0.09	0.15	0.18	0.09	0.12	0.15	0.09	0.11	0.16
Warren	RP	0.29	0.02	0.06	0.21	0.15	0.15	0.18	0.06	0.12
Washington	RC	0.04	0.04	0.18	0.03	0.05	0.14	0.09	0.02	0.08
Watauga	RM	0.02	0.04	0.05	0.09	0.07	0.06	0.07	0.07	0.03
Wayne	UC	0.32	0.26	0.23	0.25	0.22	0.19	0.25	0.21	0.19
Wilkes	RM	0.12	0.13	0.11	0.19	0.13	0.09	0.07	0.06	0.07
Wilson	UC	0.13	0.21	0.23	0.10	0.17	0.15	0.12	0.18	0.22
Yadkin	RM	0.03	0.05	0.05	0.08	0.07	0.04	0.06	0.04	0.06
Yancey	RM	0.01	0.05	0.08	0.07	0.07	0.09	0.06	0.04	0.05

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

*** Regions:**
UC - Urban Coastal; UP - Urban Piedmont; UM - Urban Mountain; RC - Rural Coastal; RP - Rural Piedmont; RM - Rural Mountain; CM - Charlotte - Mecklenburg

Appendix Table A3. White-Nonwhite Segregation Index Decomposition in NC School by County, 1997/98 and 2015/16 (source: sa06-V01, sa07-V01)

		1997/98					2015/16					
County Name	Region*	Actual	Public/Private	TPS/Charter	Between TPS districts	Within Districts and Sectors	Actual	Public/Private	TPS/Charter	Between TPS districts	Within Districts and Sectors	Actual (excluding private schools)
Alamance	UP	0.16	0.02	0.00	0.00	0.14	0.28	0.03	0.03	0.00	0.22	0.27
Alexander	RM	0.07	0.00	0.00	0.00	0.07	0.05	0.00	0.00	0.00	0.05	0.05
Alleghany	RM	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.03	0.03
Anson	RP	0.09	0.00	0.00	0.00	0.09	0.11	0.00	0.00	0.00	0.11	0.11
Ashe	RM	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01
Avery	RM	0.04	0.00	0.03	0.00	0.01	0.03	0.00	0.00	0.00	0.03	0.03
Beaufort	RC	0.13	0.04	0.00	0.00	0.09	0.13	0.01	0.03	0.00	0.10	0.12
Bertie	RC	0.36	0.31	0.00	0.00	0.06	0.38	0.36	0.00	0.00	0.02	0.04
Bladen	RP	0.14	0.01	0.00	0.00	0.14	0.12	0.04	0.01	0.00	0.08	0.08
Brunswick	RC	0.03	0.00	0.00	0.00	0.03	0.06	0.01	0.00	0.00	0.05	0.05
Buncombe	UM	0.19	0.01	0.00	0.14	0.04	0.09	0.02	0.01	0.01	0.06	0.08
Burke	RM	0.07	0.00	0.00	0.00	0.07	0.13	0.00	0.00	0.00	0.12	0.13
Cabarrus	UP	0.07	0.01	0.00	0.03	0.03	0.10	0.02	0.01	0.02	0.06	0.08
Caldwell	RM	0.18	0.02	0.05	0.00	0.11	0.10	0.00	0.00	0.00	0.09	0.09
Camden	RC	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Carteret	RC	0.05	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.04	0.04
Caswell	RP	0.05	0.01	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.03	0.03
Catawba	UM	0.11	0.01	0.00	0.07	0.03	0.12	0.02	0.00	0.04	0.06	0.10
Chatham	RP	0.11	0.00	0.00	0.00	0.11	0.25	0.01	0.04	0.00	0.21	0.24
Cherokee	RM	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.01
Chowan	RC	0.08	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Clay	RM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cleveland	RM	0.10	0.00	0.00	0.07	0.03	0.11	0.00	0.00	0.00	0.10	0.11
Columbus	RP	0.14	0.04	0.00	0.00	0.10	0.14	0.01	0.02	0.01	0.11	0.14
Craven	UC	0.06	0.02	0.00	0.00	0.05	0.10	0.03	0.00	0.00	0.07	0.07
Cumberland	Cumberland	0.15	0.03	0.00	0.00	0.12	0.15	0.03	0.00	0.00	0.12	0.13
Currituck	RC	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.01
Dare	RC	0.04	0.00	0.00	0.00	0.04	0.06	0.00	0.00	0.00	0.06	0.06
Davidson	RP	0.39	0.00	0.00	0.38	0.01	0.32	0.01	0.00	0.29	0.02	0.32
Davie	RM	0.04	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.04	0.04
Duplin	RC	0.14	0.01	0.00	0.00	0.13	0.14	0.01	0.00	0.00	0.13	0.13
Durham	UP	0.22	0.10	0.00	0.00	0.11	0.28	0.11	0.07	0.00	0.09	0.21
Edgecombe	UC	0.16	0.08	0.00	0.00	0.08	0.18	0.00	0.03	0.06	0.09	0.18
Forsyth	Forsyth	0.21	0.06	0.01	0.00	0.14	0.29	0.04	0.03	0.00	0.22	0.27
Franklin	RP	0.07	0.00	0.00	0.00	0.07	0.04	0.00	0.01	0.00	0.02	0.04
Gaston	UM	0.14	0.02	0.00	0.00	0.12	0.17	0.01	0.00	0.00	0.15	0.16
Gates	RC	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Graham	RM	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01
Granville	RP	0.13	0.03	0.00	0.00	0.09	0.13	0.00	0.03	0.00	0.10	0.13
Greene	RC	0.10	0.09	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.00
Guilford	Guilford	0.30	0.05	0.00	0.00	0.25	0.30	0.06	0.03	0.00	0.21	0.27
Halifax	RP	0.60	0.15	0.00	0.44	0.01	0.42	0.04	0.01	0.37	0.01	0.41
Harnett	RP	0.05	0.01	0.00	0.00	0.04	0.04	0.01	0.00	0.00	0.03	0.03
Haywood	RM	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.01
Henderson	RM	0.10	0.00	0.00	0.00	0.10	0.08	0.00	0.00	0.00	0.07	0.08

Hertford	RC	0.25	0.23	0.00	0.00	0.01	0.17	0.15	0.00	0.00	0.02	0.02
Hoke	RP	0.11	0.00	0.00	0.00	0.11	0.06	0.00	0.00	0.00	0.06	0.06
Hyde	RC	0.11	0.00	0.00	0.00	0.11	0.06	0.04	0.00	0.00	0.02	0.02
Iredell	RM	0.13	0.01	0.00	0.00	0.12	0.15	0.01	0.02	0.00	0.12	0.14
Jackson	RM	0.19	0.00	0.00	0.00	0.18	0.07	0.00	0.00	0.00	0.06	0.07
Johnston	RP	0.09	0.00	0.00	0.00	0.09	0.12	0.00	0.00	0.00	0.11	0.12
Jones	RC	0.04	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.03	0.03
Lee	RP	0.09	0.04	0.00	0.00	0.06	0.06	0.03	0.00	0.00	0.03	0.03
Lenoir	UC	0.35	0.09	0.01	0.00	0.25	0.30	0.11	0.01	0.00	0.18	0.23
Lincoln	RM	0.08	0.00	0.00	0.00	0.08	0.11	0.00	0.00	0.00	0.11	0.11
Macon	RM	0.01	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.02	0.02
Madison	RM	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Martin	RC	0.16	0.00	0.00	0.00	0.16	0.21	0.00	0.12	0.00	0.09	0.21
Mcdowell	RM	0.04	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.04	0.04
Charlotte-Mecklenburg	CM	0.21	0.08	0.00	0.00	0.13	0.37	0.08	0.05	0.00	0.24	0.34
Mitchell	RM	0.01	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.03	0.03
Montgomery	RP	0.09	0.01	0.00	0.00	0.07	0.13	0.03	0.00	0.00	0.11	0.11
Moore	RP	0.09	0.02	0.00	0.00	0.08	0.11	0.01	0.00	0.00	0.10	0.11
Nash	UP	0.22	0.06	0.00	0.00	0.16	0.16	0.07	0.01	0.00	0.08	0.10
New	UC	0.00	0.00	0.00	0.00	0.00	0.21	0.02	0.01	0.00	0.17	0.19
New	UC	0.11	0.03	0.00	0.00	0.08	0.21	0.02	0.01	0.00	0.17	0.02
Northampton	RP	0.29	0.17	0.00	0.00	0.12	0.21	0.19	0.00	0.00	0.02	0.10
Onslow	UC	0.12	0.01	0.00	0.00	0.11	0.11	0.01	0.00	0.00	0.10	0.04
Orange	UP	0.03	0.02	0.00	0.00	0.01	0.06	0.01	0.01	0.01	0.03	0.01
Pamlico	RC	0.02	0.00	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.06
Pasquotank	UC	0.09	0.04	0.00	0.00	0.05	0.09	0.03	0.00	0.00	0.05	0.19
Pender	RC	0.10	0.00	0.00	0.00	0.10	0.19	0.00	0.00	0.00	0.19	0.00
Perquimans	RC	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Person	RP	0.09	0.01	0.00	0.00	0.09	0.14	0.01	0.06	0.00	0.08	0.13
Pitt	UC	0.11	0.06	0.00	0.00	0.05	0.17	0.05	0.00	0.00	0.12	0.03
Polk	RM	0.02	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.03	0.17
Randolph	RP	0.10	0.00	0.00	0.05	0.04	0.18	0.01	0.01	0.11	0.05	0.02
Richmond	RP	0.04	0.01	0.00	0.00	0.03	0.03	0.01	0.00	0.00	0.02	0.13
Robeson	RP	0.26	0.04	0.00	0.00	0.22	0.13	0.00	0.02	0.01	0.10	0.12
Rockingham	RP	0.10	0.01	0.00	0.00	0.10	0.13	0.01	0.00	0.00	0.11	0.22
Rowan	RP	0.23	0.01	0.00	0.00	0.22	0.22	0.01	0.00	0.01	0.21	0.08
Rutherford	RM	0.14	0.00	0.00	0.00	0.14	0.08	0.00	0.01	0.00	0.07	0.08
Sampson	RP	0.09	0.03	0.00	0.01	0.06	0.12	0.05	0.00	0.01	0.06	0.06
Scotland	RP	0.07	0.01	0.00	0.00	0.06	0.09	0.04	0.00	0.00	0.06	0.15
Stanly	RP	0.16	0.00	0.00	0.00	0.16	0.16	0.01	0.01	0.00	0.14	0.02
Stokes	RP	0.05	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.02	0.05
Surry	RM	0.04	0.00	0.00	0.01	0.03	0.05	0.00	0.01	0.00	0.04	0.07
Swain	RM	0.08	0.00	0.00	0.00	0.08	0.11	0.05	0.01	0.00	0.06	0.04
Transylvania	RM	0.04	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.04	0.01
Tyrrell	RC	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.24
Union	RP	0.27	0.01	0.00	0.00	0.27	0.24	0.00	0.00	0.00	0.23	0.19
Vance	RP	0.19	0.10	0.00	0.00	0.09	0.26	0.09	0.14	0.00	0.03	0.16
Wake	Wake	0.09	0.03	0.00	0.00	0.06	0.18	0.04	0.02	0.00	0.12	0.06
Warren	RP	0.29	0.28	0.00	0.00	0.01	0.06	0.00	0.01	0.00	0.05	0.18
Washington	RC	0.04	0.00	0.00	0.00	0.04	0.18	0.00	0.00	0.00	0.18	0.05
Watauga	RM	0.02	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.04	0.20
Wayne	UC	0.32	0.04	0.00	0.00	0.28	0.23	0.04	0.02	0.00	0.16	0.11
Wilkes	RM	0.12	0.00	0.00	0.00	0.12	0.11	0.00	0.00	0.00	0.10	0.15
Wilson	UC	0.13	0.04	0.01	0.00	0.08	0.23	0.10	0.03	0.00	0.10	0.04
Yadkin	RM	0.03	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.04	0.08

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

*** Regions:**
UC - Urban Coastal; UP - Urban Piedmont; UM - Urban Mountain; RC - Rural Coastal; RP - Rural Piedmont; RM - Rural Mountain; CM - Charlotte - Mecklenburg

Appendix Figure A1. Reference NC map