



# School Segregation in the Era of Color-blind Jurisprudence and School Choice

Charles T. Clotfelter

Duke University

Steven W. Hemelt

University of North

Carolina at Chapel Hill

Helen F. Ladd

Duke University

Mavzuna Turaeva

Duke University

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# SCHOOL SEGREGATION IN THE ERA OF COLOR-BLIND JURISPRUDENCE AND SCHOOL CHOICE \*

Charles T. Clotfelter\*\*

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## ABSTRACT

The decades-long resistance to federally imposed school desegregation entered a new phase at the turn of the new century, when federal courts stopped pushing racial balance as a remedy for past segregation, adopting in its place a color-blind approach in judging local school districts' assignment plans. Using data that span 1998 to 2016 from North Carolina, one of the first states to come under this color-blind dictum, we examine the ways in which households and policymakers took actions that had the effect of reducing the amount of interracial contact in K-12 schools within counties. We divide these reductions in interracial contact into portions due to the private school and charter school sectors, the existence of multiple school districts, and racial disparities between schools within districts and sectors. For most counties, the last of these proves to be the biggest, though in some counties private schools, charter schools, or multiple districts played a deciding role. In addition, we decompose segregation in the state's 13 metropolitan areas, finding that more than half can be attributed to racial disparities inside school districts. We also measure segregation by economic status, finding that it, like racial segregation, increased in the largest urban counties, but elsewhere changed little over the period.

Keywords: School segregation, race and education, charter schools

\*\*Duke University

\*\*\*University of North Carolina at Chapel Hill

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## I. Introduction

For several decades after the Supreme Court's decision in the 1954 *Brown* case, federal courts closely monitored local districts, especially those in the South, to force them to racially balance their schools. The courts eventually stopped doing so in the late 1990s, first, by declaring most Southern districts previously under court order to be "unitary" and therefore no longer in need of close oversight. Then the federal courts, led by Fourth Circuit Court of Appeals (the circuit covering North Carolina) and eventually the Supreme Court, enunciated what amounted to a color-blind attitude to school desegregation. This attitude found ultimate expression in the 2007 decision in *Parents Involved*, which disallowed voluntary desegregation plans built around assigning individual students according to their race.<sup>1</sup> As a result of these rulings, school districts previously under orders to eliminate vestiges of the old, segregated order were now free to stand by even as existing patterns of residential segregation, the expansion of charter schools, and the use of private schools might lead to the re-segregation of their schools.

Although residential segregation – one of the most important correlates of school segregation – has been declining broadly in urban areas (Cutler, Glaser, & Vigdor, 1999; Frankenberg, 2013), few school districts across the U.S. have experienced reductions in school segregation, as measured by racial imbalance within districts. Indeed, most recent research on national trends in school segregation has documented persistence, if not increases in segregation. (e.g., Reardon & Yun, 2003; Clotfelter, 2004; Clotfelter, Ladd, & Vigdor, 2006; Reardon et al.,

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<sup>1</sup> In *Parents Involved in Community Schools v. Seattle School District No. 1*, 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)). While forbidding the assignment of students on the basis of race in general, the Court left open the possibility of "narrowly tailored" remedies under the legal principle of strict scrutiny when other options had been considered and found infeasible. A subsequent clarification of that decision prepared under the Obama administration made clear what types of permissible means districts could use to pursue diversity in schools, such as assignments using race-neutral criteria like SES or assignment plans based on the generalized use of race, such as building schools or adjusting attendance zones so as to have catchment areas in racially diverse residential areas. This clarification was, however, rescinded by the Trump administration. (See <https://www2.ed.gov/about/offices/list/ocr/docs/guidance-ese-201111.pdf>). 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).

2012; Fiel, 2013; Stroub & Richards, 2013; Davis, Bhatt, & Schwartz, 2013; Clotfelter, Ladd, & Vigdor, 2013; Reardon & Owens, 2014; Owens, Reardon, & Jencks, 2016; Reardon, 2016).<sup>2</sup>

For many reasons, only two of which we highlight here, school segregation is cause for serious concern. The first reason relates to one of the fundamental public purposes of education, mainly to prepare students to function as adults in a pluralistic democratic society (Blum and Buckholder, 2021). To the extent that students are educated in schools with students similar to themselves they lose the opportunity to broaden their understanding of and ability to interact in constructive and kind ways with other groups within the same community. A second reason relates to fairness. When schools are racially or racially and economically segregated, some schools – in most cases those serving greater shares of white students who have historically been more socioeconomically advantaged than most nonwhite students – are likely to attract more resources and to provide higher-quality education than other schools. The additional resources may come in the form of more experienced teachers, higher-quality school principals, lower turnover of teachers, or a more involved parent community (see, for example, Goldhaber et al. 2018; and Clotfelter et al., 2021). In addition, to the extent that nonwhite students come from more economically disadvantaged families than white students, even equal school resources across schools will not translate into equal educational opportunity for students in schools with disproportionately high proportions of nonwhite students. Such schools may need more resources than other schools to address the needs that some students bring to the school house door. In sum, racial segregation enables differential quality of schooling for students of different races

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<sup>2</sup> Research 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. 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. 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.

within the same community. For these and other reasons, research on the extent of, and contributors to, the segregation of schools is both timely and policy relevant.

We have two major aims in this paper. The first is to document changes in school segregation during the period 1998-2016 in a single Southern state, North Carolina. This period covers the initial years of the shift to color-blind jurisprudence as well as the growth of charter schools and school voucher programs. North Carolina is of interest because it is a large and diverse state and one of its largest districts was among the first to be relieved of court pressure to integrate its schools. In addition, it has witnessed a significant influx of immigrants, 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 & 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 with markedly different demographic makeups and recent histories. 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. As part of our analysis, we examine the experience of rural as well as urban communities. While most studies of school segregation focus on districts in metropolitan areas, to our knowledge only Logan and Burdick-Will (2017) have looked specifically at school segregation in rural communities.<sup>3</sup>

Our second aim is to quantify the relative contributions to segregation of various mechanisms such as charter schools, private schools, and multiple districts, all of which could

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<sup>3</sup> 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, & Turner, 2015; Lichter, Parisi, & Taquino, 2016 and 2018; Garcia & Schmalzbauer, 2017; and Lee, Iceland, Farrell, & Sharp, 2017), little attention has been given to patterns of school segregation in rural areas. Not only are rural schools important in the aggregate, educating nearly one in seven students, their isolation and high rates of poverty make them too important to ignore (Showalter, 2019).

well contribute to segregation, but are likely to do so to different degrees in different communities across the state. We are able to describe the separate contributions of these various mechanisms using a straightforward algebraic decomposition of one of the standard measures of racial imbalance – the Coleman index – within each relevant school community. For North Carolina, the relevant community is the county because most counties are coterminous with school districts. Because of the large size of many of the state’s 100 counties, North Carolina is less subject to the school segregation within metropolitan areas that emerges as a result of the multiplicity of small school districts in many other parts of the country, but is not completely immune. In addition, the state has experienced a rapidly growing charter school sector, especially after the initial cap of 100 charter schools was removed in 2011. Recent research suggests that charter schools may be aggravating racial segregation (Frankenberg, Siegel-Hawley, & Wang 2011; Logan & Burdick-Will, 2016; Ladd, Clotfelter, & Holbein, 2017; Mickelson et al. 2018; Monarrez et al., 2019) as well as segregation by economic background (Marcotte & Dalane, 2019). As one component of our decomposition, we also measure, albeit imperfectly, the role of private school enrollment, a role that has not been explored in studies that rely entirely on data for public schools.<sup>4</sup> Given the fact that many private schools served as a way for white students to avoid racial integration in earlier periods of court enforced segregation, it seems useful to understand their contribution to racial segregation in the period of color-blind jurisprudence and, in recent years, after the introduction of NC Opportunity Scholarship for low-income students in the 2013 (Egalite et al., 2020).

The next two sections of the paper set the stage by briefly explaining the relevant policy levers that may affect segregation and by summarizing the state’s enrollment patterns. Section IV

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<sup>4</sup> A notable exception is the work of Saporito and Sohoni (2006, 2009), who use GIS techniques to compare the racial mix of public schools and their corresponding attendance zones. Using for 2000 the same NCES national data on public and private schools we use in the present paper, they show that private schools and other schools of choice cause actual school segregation to be higher than it would be if all children attended the public school to which they were assigned.

describes our basic measure of interracial contact and 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 Black and Hispanic students and between White, Black, and Hispanic students and each group's corresponding set of all other students. Section VIII summarizes the findings and discusses some of the policy implications.

## II. Policy Instruments

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

Student assignments to schools. One of the basic responsibilities of local school boards is to establish rules by which students may choose or be 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. Although federal courts ordered and enforced student assignment plans that achieved astonishing degrees of interracial contact in public schools during the 1970s and 1980s, the federal courts began to back-pedal from active intervention in the student assignment decisions of school boards starting in the late 1990s. Beginning in the new millennium, federal courts in the Fourth Circuit handed down several decisions that prohibited any student assignment based on race, even if part of a plan designed to foster racially balanced schools. One of the key decisions struck down the proactive racial balancing policies of busing and magnet schools practiced by the Charlotte-Mecklenburg, one of the two largest school districts in North Carolina.

That decision along with others freed up local school boards once again to make their own

decisions about school assignment policies, as long as they did not consider students' race in making assignments. Such policies differed significantly across districts, the effects of which we document below. Most striking was the decision by Charlotte-Mecklenburg to return to a student assignment plan that embraced neighborhood schools, in a context in which the neighborhoods themselves were highly segregated.<sup>5</sup> In contrast, Wake County, which is now the largest county in the state, and home to the state's capital of Raleigh, sought to avoid the return to racially segregated schools. Its school board skirted the new legal environment that prohibited school boards from using race in student assignments by assigning students so as to balance schools according to economic disadvantage and student achievement (Grant, 2009; Kahlenberg, 2012). Ten years into that program, however, rapid population growth and the need for frequent revisions of school assignments led voters to elect a new school board that scaled back the policy in 2010 (Carlson et al., 2019).

In addition to residential segregation and local population growth, a number of other factors are likely to account for the degree of racial segregation across traditional public schools that we document below. These include local decisions to allow various degrees of public school choice in the form of transfer policies, magnet schools or year round schools and the influence of other forms of parental choice such as charter schools and private schools on the mix of students within the traditional public schools. In their decisions both about the design of school attendance zones and about how much flexibility to offer parents to select out of their assigned zones, school boards must weigh their instincts to foster racial integration, whatever those might be, against the fear that efforts to promote racially integrated traditional public schools may

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<sup>5</sup> *Belk v. Charlotte-Mecklenburg Bd of Educ*, 211 F. 3d 853 (4<sup>th</sup> 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). A similar choice plan was implemented in Forsyth County (Winston-Salem) in the late 1990s, producing a similar move to neighborhood schools. See Arika Herron, "Student-Assignment Plan Leaves Some Schools Overcrowded, Others Underutilized," *Winston-Salem Journal*, January 11, 2014.



induce some parents to opt out of traditional public schools in favor of more segregated schools. Indeed, parents' preferences for a variety of non-academic factors may readily lead to segregation of students by race (and family income) in public schools (e.g., Macartney & Singleton, 2018; Bifulco et al., 2009).

In general, we would expect rural districts to be more constrained than dense urban areas by the need to have school assignment policies that minimize the costs of transporting students across long distances. In those areas, concentrations of employment opportunities, including those for newly arriving Hispanic immigrants, are likely to be significant contributors to the racial and ethnic segregation of their schools.

District consolidation (or deconsolidation). Empirical studies of American school segregation clearly document 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 characterizes the urban areas of the North and Midwest, largely because of 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 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 balkanized urban areas in other states.<sup>6</sup>

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<sup>6</sup> 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 (Barnette, 2016, pp. 17-18).

There has recently been a push, however, to reverse this pro-consolidation policy in several Southern states, including North Carolina, a trend that political scientists Johnson and King (2018) attribute to “efforts to re-segregate public education” by newly emerged Republican majorities in state legislatures.<sup>7</sup> In North Carolina, 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.<sup>8</sup> Although the legislative study committee established by the legislature to examine the question of deconsolidation issued no recommendation, its report did nothing to quell the push for deconsolidation.<sup>9</sup>

Charter schools. A third set of policies with likely effects on segregation are those related to charter schools. In North Carolina, the State Board of Education is the sole authorizer of charter schools with local districts having no say in the approval, location, or operation of charter schools. First authorized by the state legislature in 1996, these schools increased in number, soon reaching the initial legislated maximum of 100. That cap was lifted in 2011, and the number quickly rose, topping 170 by 2018.<sup>10</sup>

Skeptics of charter schools have long feared that, as schools of choice, charter schools would become a vehicle for segregation. That fear spurred much of the opposition to charter schools when the state legislature debated and passed its originating charter school legislation, although many legislators believed charter schools would be less detrimental to the traditional

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<sup>7</sup> Other Southern states where deconsolidation has followed shifts from Democratic to Republican majorities in state legislatures are Alabama and Tennessee (Johnson & King, 2018). In the latter state, a consolidation of schools in Shelby County in 2013 was quickly followed by serial deconsolidation, with predictable results. See Frankenberg et al. (2017).

<sup>8</sup> 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>

<sup>9</sup> The committee had an 8-2 Republican majority (Johnson & King 2018, Table 4). In support of its apparent preference for deconsolidation, 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.

<sup>10</sup> 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.

education system than the alternative of vouchers. To guard against their potential segregating effects, 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 watered down 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, & Holbein, 2017, p. 538).<sup>11</sup> This watering down accompanied the state’s removal of the cap on the total number of charter schools allowed to operate. Coincident with these changes and the growth of charter schools was an increase in the number of charter schools with 80% or more white or nonwhite enrollments (Ladd, Clotfelter, & Holbein, 2017, p. 543). Although some researchers in other states have argued that charter schools might decrease segregation by providing opportunities for disadvantaged students to move from their heavily segregated neighborhood schools to less segregated charter schools (Cohodes & Parham, 2021) two empirical studies of charter schools in North Carolina have documented that they increase segregation in this state, largely because of the segregating enhancing decisions of white parents (Bifulco & Ladd, 2007; Ladd & Mavzuna, 2020).

Most recently, worries that charter schools might aggravate segregation were surely aroused 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.<sup>12</sup>

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<sup>11</sup> 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.

<sup>12</sup> 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,

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.<sup>13</sup> (In 2017 the maximum family income to be eligible was \$45,510.)<sup>14</sup> 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 historically played in efforts of white families to avoid desegregated schools (Clotfelter, 1976; 2004), one might reasonably be concerned that such subsidies for private schooling could aggravate racial segregation. Thus, we are interested in tracking recent enrollment trends in North Carolina private schools, whether or not that enrollment is currently funded by vouchers.

### III. Demographic Context

We use publicly available data for all K-12 students. Enrollment in public schools comes from the Common Core of Data (CCD). For private schools we use the Private School Universe and the state of North Carolina's own survey of private schools.<sup>15</sup> Our data span the years 1997/98 and 2015/16 (hereafter simply 1998 and 2016).

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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.

<sup>13</sup> 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.

<sup>14</sup> 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

<sup>15</sup> North Carolina Department of Administration, Division of Non-Public Education, *Directory of Non-Public Schools*. <https://ncadmin.nc.gov/public/private-school-information/nc-directory-private-schools>

North Carolina's K-12 enrollment is large, rapidly growing, and diverse. As shown in the first three columns of Table 1, enrollment in public and private schools increased over this period from 1.3 million in 1998 to 1.6 million in 2016, a rate of little more than 1% a year. The number of Hispanic students increased at a much faster rate, however, with their share rising over the period from 3% to 16%. Among its 100 counties are highly urbanized counties as well as rural counties containing only a few traffic lights. Unlike rural counties in most of the country, which are predominantly white (Logan & Burdick-Will 2017, p. 215), rural counties in North Carolina represent a wide range of racial compositions, with Black students disproportionately represented in the northeastern part of the state and underrepresented in the mountains to the west. 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 between urban and rural, based on each county's share of residents living in urban areas in 2000.<sup>16</sup> We report statistics for all of these remaining counties, and then again counting only those with at least 4% nonwhite enrollment in 1998.<sup>17</sup> As a group, rural counties showed the slowest growth in enrollments over this period.

The remainder of the table documents enrollment changes in charter schools and private schools. Enrollment in charter schools increased markedly, their share increasing across the board and rising as a share of all students in the state from 0.4 % to 4.9%. Meanwhile, the share of students enrolled in a private school barely changed, falling from 6.2% to 6.0% over the period. In calculating these percentages, we use data on private school enrollment published by the state rather than the NCES Private School Universe because the latter has a history of

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<sup>16</sup> U.S. Census Bureau, *Census of Population and Housing, 2000*.

<sup>17</sup> Taken as a group, the 10 counties dropped from the analysis because their nonwhite shares of students were less than 4% accounted for only 33,000 students, or about 2% of total state enrollment, in 2016.

missing schools, resulting in undercounts. For the three years we investigate, the NCES data underestimate the share of students enrolled in private schools by 0.4, 0.9, and 1.0 percentage point(s), respectively. Despite this tendency, the NCES Private School Universe remains the only source of data that includes the racial composition of private schools.<sup>18</sup> Thus, we use the NCES data in the present paper, reasoning that using imperfect data on private schools in a study of racial segregation is far better than ignoring private schools altogether.

[Table 1 about here]

Three 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. 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.<sup>19</sup> Over the 18-year period between 1998 and 2016, the marked decline in the share of white students was mirrored by an almost identical increase in the share of Hispanic students. While the absolute number of white students declined by 3% over the period, the number of Hispanic students increased seven-fold. 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 of the state's counties.<sup>20</sup>

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<sup>18</sup> Specifically, our state-based source of data on private school enrollments disaggregates counts by gender, but not by race or ethnicity.

<sup>19</sup> See Appendix Table B4 for details on the racial and ethnic composition of students over time across the state.

<sup>20</sup> 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. For county designations and detailed racial and ethnic breakdowns by county, see Appendix Table B1.

To illustrate how the racial/ethnic diversity arrays itself geographically, the maps in Figure 1 show the concentration of Black and Hispanic students by county in 1998 and 2016. The figure’s first two maps show for 1998 and 2016 the concentration of Black students, with counties divided into three groups. These two maps show that Black students were concentrated in the middle and eastern sections of the state. In contrast to the stability of these racial patterns, the story was altogether different for Hispanic students. The rapid growth in their numbers was the result of an influx of immigrants into the state, attracted by job openings in industries such as meat processing, construction, landscaping, and personal services.<sup>21</sup> This influx increased Hispanic shares in most counties, and their numbers in every county. This growth was especially concentrated in a handful of destination counties, where the concentration of Hispanic students skyrocketed.<sup>22</sup> The two maps for Hispanic students in Figure 1, using different percentage categories from those used for Black students, show the astonishing 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.

[Figure 1 about here.]

#### IV. Measuring Segregation

Basic to our analysis is the concept of segregation – the uneven distribution of students by racial/ethnic group across schools in an area (in our case, a county). The most commonly used index used by social scientists is the dissimilarity index, defined as:

$$D = 0.5 * \sum_j \left| \frac{N_j}{N} - \frac{W_j}{W} \right| \tag{1}$$

where  $N_j$  and  $W_j$  are the number of nonwhite and white students, respectively, in school  $j$  and  $N$

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<sup>21</sup> 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).

<sup>22</sup> 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.

and  $W$  are the total number of each group in the county.<sup>23</sup> This index ranges from zero, where every school has the same racial composition, to one, where every school's enrollment is either entirely white or entirely nonwhite. The numerical value of the dissimilarity index corresponds to the proportion of students of one racial group who would have to change schools in order for all schools to be racially balanced.

Although we include measures based on this index in this paper, we devote more attention to a lesser known index, which is better suited for documenting how various aspects of the contemporary educational scene create segregation by reducing interracial exposure. This index, devised in the 1950's and later employed by James Coleman (Coleman et al., 1975), measures 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.<sup>24</sup> Where students are classified as white or nonwhite, 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.<sup>25</sup> 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 county. 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

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<sup>23</sup> Both of the principal measures of segregation we use are designed to be applied to situations with just two groups. In the social science literature, the two most commonly used dichotomies are white/nonwhite and white/Black. In the present paper, we use mainly the former, on the basis that Hispanic and most nonwhite groups have been sufficiently "racialized" that the generalized dichotomy captures the most important single division relevant to contemporary American life. See Gans (1999) for a supporting argument.

<sup>24</sup> This index, originally referred to as a corrected exposure rate and later as the  $V$  index, is discussed in Bell (1954), Becker (1978), and James and Taeuber (1985).

<sup>25</sup> In the sociology literature, this exposure rate is commonly denoted  ${}_wP^*_n$ . In Coleman et al. (1975, p. 35, n. 5), it is denoted by  $s$ , as in  ${}_wS_n$ .



( $P_n$ ) and actual ( $E_{wn}$ ) values of the exposure rate:

$$S_{wn} = (P_n - E_{wn})/P_n \quad (2)$$

Like the dissimilarity index, its smallest value is zero (which signifies no segregation, or exact racial balance, since  $E_{wn} = P_n$ ), and its maximum value is one, which signifies complete segregation where interracial exposure is zero ( $E_{wn} = 0$ ).<sup>26</sup> Because it uses each county's overall racial composition as the statistical reference point, this index, like the dissimilarity index, is independent of a county's racial makeup.

We also calculate a multi-group measure of imbalance, the Theil entropy index (Theil & Finezza, 1971). To calculate it, students in each county are classified according to four racial/ethnic groups ( $g$ ). The index is:

$$H = \sum_j \frac{t_j(F-F_j)}{F} \quad (3)$$

where  $t_j$  is school  $j$ 's proportion of county enrollment.  $F_j$  and  $F$  are defined as:

$$F_j = \sum_g p_{gj} \ln\left(\frac{1}{p_{gj}}\right), \text{ and} \quad (4)$$

$$F = \sum_g p_g \ln\left(\frac{1}{p_g}\right) \quad (5)$$

where  $p_{gj}$  is the proportion of school  $j$ 's enrollment belonging to group  $g$ , and  $p_g$  is the proportion of the county's enrollment belonging to group  $g$ . We divide students into four groups: white, Black, Hispanic, and others. Like the dissimilarity index, the entropy index  $H$  has a maximum value of 1, indicating schools that are completely separated by race, and a minimum value of 0, indicating racially balanced schools. Note that the index  $F$  represents a measure of racial/ethnic diversity in a county, with higher values constituting higher diversity.<sup>27</sup>

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<sup>26</sup> 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%.

<sup>27</sup> The maximum value of  $F$  with four groups would be 1.39, in which each group would have 0.25 of a county's enrollment, thus  $p_g = 0.25$ . Please see Appendix Table B2 for county-specific calculations of these four measures.

As a measure of segregation, the Coleman index has two attractive features. First, as we explain below, it allows researchers to identify and separately measure the contributions to overall segregation of different segregative instruments, such as private schools. We discuss this decomposition below. The second attractive feature of the Coleman index is that it makes explicit the ironclad dependence of interracial contact on two things: a county's racial mix of students and the segregation of its schools. Given the racial mix of its students, segregating students is the only way a county can reduce the average interracial contact of students across schools. To visualize this dependence, Figure 2 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 2 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 white students' 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. Indeed, it is an established feature of indices of segregation, including the dissimilarity index, to be unreliable or biased when the minority

group's share is very small.<sup>28</sup> We therefore omit from our analysis counties that had nonwhite shares less than 4% in 1998.

Table 2 summarizes, in its first three columns, our calculations of school segregation in the state's K-12 schools using Coleman's index. For the state as a whole, the enrollment-weighted-average white/nonwhite segregation increased, from 0.16 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 0.38, 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 from 0.09 to 0.15, reflecting that district's easing of a policy of balancing schools by socioeconomic status, 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. Rural counties also registered slightly smaller levels of segregation than did urban counties, though this difference could arise due to a mechanical bias in measuring segregation.<sup>29</sup>

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<sup>28</sup> Previous research has established that the dissimilarity index is subject to upward bias when the proportion of minority individuals is very low or when the units of grouping are small, and this bias applies as well to other widely-used measures of imbalance. As explained in studies such as Allen et al. (2015) and Mazza (2017), the problem arises because small enumeration units will simply by chance tend to differ in composition, a tendency that will be more pronounced with a very small minority group. Among the methods proposed to correct the bias are Monte Carlo simulations that allow actual distributions to be compared to those generated randomly. According to Mazza (2017, p. 31), "Most of the methods proposed use computation-intensive techniques that have the drawback of introducing complexity and substantial computational burdens." As an alternative, many studies have resorted to various rule-of-thumb remedies, such as excluding cities or districts with tiny proportions of the minority group of interest, an approach we adopt here.

<sup>29</sup> This form of mechanical bias (sometimes called the "spatial scale effect") is the tendency wherein measured segregation tends to be lower when enumeration units are larger. If schools of a given level tend to have more or less the same size everywhere, a school in a county with a small population will tend to enroll a larger share of all the county's students than would a school in a populous county. Due to the spatial scale effect, this tendency would reduce measured segregation indices in less populous counties. Since rural counties do tend to have fewer students, the effect would be to produce lower indices for rural counties. See Wong(2003), who describes the spatial scale effect as a manifestation of the more general "modified areal unit problem."

[Table 2 about here]

For comparison, Table 2 also presents calculations based on three other imbalance measures of school segregation: the dissimilarity index, the entropy index, and a measure of economic segregation. Like the Coleman index, the dissimilarity index indicates imbalance between white and nonwhite students; it closely mirrors the patterns traced by the Coleman index, albeit with higher numeric values. For the 90 counties included in the analysis, the correlation between it and the Coleman index is 0.93. The multi-group entropy index is also highly correlated with the Coleman measure ( $r = 0.93$ ).

Table 2's next trio of columns traces changes in economic segregation. We use the dissimilarity index to compare enrollment patterns for public school students eligible for free lunch (available only through 2014) to the enrollment patterns for all other students.<sup>30</sup> Because virtually no free lunch data were available for charter schools before 2014, we calculated indices for the three years just for traditional public schools (TPS). These indices display a pattern of changes that largely mirrors the changes in white/nonwhite dissimilarity. Both measures showed sharp increases from 1998 to 2014 in Mecklenburg and Forsyth, the two counties that got rid of their racial balance desegregation plans. In addition, both measures indicate declines in segregation in the smaller urban counties and the rural counties. The only noticeable difference was in Wake; whereas its white/nonwhite segregation increased, economic segregation was level over the period, a likely result of that county's effort to balance schools by socioeconomic status. Taken together, these patterns of economic segregation echo the findings of Owens, Reardon, and Jencks (2016), who report increases in economic segregation between 1998 and 2012 in the nation's largest school districts. In the remainder of the state, however, our measure of economic

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<sup>30</sup> Eligibility for free lunch is set at 130% of the poverty rate (Federal Register 2017). Due to a change in the program, comparable data were not available for 2015/16. For schools with missing free lunch data, we used data from an adjacent year (1999, 2005, or 2013) to estimate the proportion of students eligible for free lunch. If such a replacement could not be found, the school was omitted from all years of the analysis.

segregation remained steady or declined.

For 2014 we calculated a separate set of dissimilarity indices including charter schools, for which free lunch data were available for that year. This addition of charter schools increased the calculated degree of economic segregation across the board, suggesting that charter schools are associated not only with greater racial segregation, but also higher levels of economic segregation. To round out our comparisons, we also calculated one more set of dissimilarity indices for 2014, this one including private schools as well as public schools of both types. Lacking any data on free lunch eligibility for private schools, we made the simplifying assumption that private schools enrolled no free lunch students at all, an assumption that is inaccurate, of course, to the extent that private schools enroll low-income students. As might be expected, adding private schools in this manner led to yet higher calculated economic segregation.

With the exception of two large urban counties that threw off the constraints of past desegregation suits, the trend in segregation across the state was rather flat, if not declining – but certainly not sharply increasing. In the nearly 60 rural counties, the average degree of school segregation was lower at the end of our period than it had been at the beginning, no matter which measure is used. And across most of the urban counties in the state, segregation stayed more or less the same over the period. Stasis, not dramatic change, best describes this period.

#### V. Instruments for Undoing Desegregation

The counties in North Carolina provide illuminating examples of four different institutional mechanisms through which the increases in interracial contact achieved through federal desegregation orders are being silently undone, albeit incompletely, with each mechanism reducing interracial contact by creating racial disparities across the schools in a given geographic unit, such as a county. As we described in section II, these four institutional drivers of segregation are private schools, charter schools, balkanized school districts, and differences

between schools within public school districts and within the charter school or private school sectors.<sup>31</sup>

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 the private school sector, the charter school sector, multiple districts, and differences across schools within districts or sectors.<sup>32</sup> To illustrate how this decomposition works, consider the contribution of private schools. We ask, how much would interracial exposure decline compared to complete racial balance if every private school had the same racial mix of students as the average across all private schools and every public school similarly reflected the racial mix of the public school population? Thus, we are measuring the reduction in average exposure between our core counterfactual scenario (racial balance across all schools) and an alternative scenario (private schools all having one uniform racial composition and all public schools having another one). Next we allow charter schools and traditional public schools to differ in racial composition and re-calculate the resulting (typically smaller) exposure rate. And so on.

Table 3 presents this decomposition for several counties that illustrate contrasting institutional infrastructures that increase segregation by creating racial disparities between schools. In the first group of counties – all of them in the state’s northeast corner – private schools served as the principal mechanism for achieving its 2016 level of segregation. In Bertie

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<sup>31</sup> A fifth mechanism for reducing interracial contact in schools is segregation that occurs inside of schools, across classrooms. We are not able to measure the effects of this mechanism in the present paper because we do not have classroom-level data. See Clotfelter, Ladd, Clifton and Turaeva (forthcoming) for an analysis of classroom-level segregation in public schools.

<sup>32</sup> This decomposition is explained in more detail in Appendix A, and calculations based on it are presented by county in Appendix Table B3. For previous studies that decompose school segregation, see, for example, Clotfelter (2004) or Fiel (2013).

County, a small rural county where 74% of all students were Black, its two, nearly all-white private schools enrolled more than 40% of all the county's white students. Judging only on the basis of public school enrollments, its schools would appear to be nearly entirely integrated, with a Coleman segregation index of 0.04. But counting its two predominantly white private schools renders a starkly different verdict, a Coleman index of 0.38.<sup>33</sup> As illustrated in Figure 2, white students in Bertie would have had the sixth highest share of nonwhite students in their schools if all schools there had been racially balanced; but as a result of segregation, whites in that county had an average exposure rate that was middling, compared to all of the counties in the state. The biggest factor in that county's segregation was private schools. Our decomposition reveals that 0.36 of this total segregation index can be attributed to the difference in the racial composition of those two private schools 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 3 about here.]

As a methodological aside, our calculations make clear a shortcoming of the many studies of school segregation that do not include private school enrollments. As a way of assessing how big a difference it makes to include data on private schools in the overall measure of segregation, we calculated dissimilarity indices by county for 2016 using only data for public

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<sup>33</sup> 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.

schools. The result was an average segregation rate for the state of 0.17 rather than 0.19.<sup>34</sup> 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 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. Charter schools also became the principal avenue for school segregation in rural northeast Martin County, where 48% of students were Black, 44% were white, and 7% were Hispanic. More than a quarter of white students were in the county's two charter schools, leaving them 84% white. The county's remaining white students were spread relatively 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 U.S. Northeast and Midwest: disparities between school districts within a county. Despite North Carolina's decades-long push to consolidate its school districts, the few counties where racially distinct city districts remain show the power of this kind of legacy. Two North Carolina counties stand out as

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<sup>34</sup> Detailed calculated indices without data on private schools available from authors upon request.



prime examples on this account.<sup>35</sup> One is Davidson, a county in the state's piedmont, which is home to two city districts and a larger, mostly rural and white county district. Of that 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 public 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.<sup>36</sup> White/nonwhite segregation across traditional public schools in the district increased from 0.20 in 2001 to 0.33 in 2006 (Clotfelter, Ladd, & 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, Table 4 presents weighted averages based on 2016 segregation in the same format as other

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<sup>35</sup> For a list of independent city school districts in the state, see Appendix Table A1 in Clotfelter, Ladd and Vigdor (2003).

<sup>36</sup> *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.

summary tables. For the state as a whole, differences in racial composition within districts and sectors explain the bulk of total segregation, accounting for 0.13 of the total 0.19 overall index. Racial 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 a handful of 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, providing 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 state's rural counties.

[Table 4 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 5, the percentage of white students in the state who attended a school with 80% or more white students 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 5 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 that consist of more than one county. We apply the same white/nonwhite measure of segregation as before, but to the schools in the portion of the entire metropolitan area located within the state, not just those in a single county. Overall metropolitan area segregation will be higher in areas where the composition of counties within the area differ one from another more than where they are similar. We employ the same method as above to decompose total white/nonwhite segregation into four additive parts.

Table 6 shows the resulting calculations for the state's 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. These measured segregation indices for North Carolina areas are well below some of those in the rest of the country. 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 in 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 6 about here]

Between 1998 and 2016, 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 (and sector) 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. Other Racial/Ethnic Groupings

To this point, we have based our measures of racial/ethnic segregation 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 a number of previous studies, we also calculated analogous segregation indices, using the dissimilarity index, based on analogous ethno-racial dichotomies, namely, Black/non-Black, Hispanic/non-Hispanic, and Black/Hispanic.<sup>37</sup> The numerous differences between the 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 do in Table 7. The first pair of columns simply repeat the values for white/nonwhite dissimilarity, shown in Table 2, the next two pairs of columns show the corresponding indices for the other two dichotomies, and the last column presents indices based on contact between Black and Hispanic students.

These comparisons show that white students are more segregated from nonwhite students than are any other pair of racial/ethnic groups. This inequality holds true for every county or group shown in 2016 and for all but Wake and rural counties in 2006. The magnitudes of the difference are in most cases small, but the consistency of this finding is striking. A second generalization is that, especially in the five largest counties, Black students are now more segregated from students in other racial groups than are Hispanic students from others. Finally, the general decline in segregation between Hispanic and other students over this decade was not limited to urban areas in that we see a similar decline in this measure for rural areas. These differences may suggest that, despite their recent emergence as a sizable ethnic group, Hispanic

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<sup>37</sup> See, for example, Frey and Farley (1996)'s study of residential segregation.

assimilation has been rapid. We note, though, other related research (Clotfelter et al., 2020) documents that Hispanic students in North Carolina are more segregated within schools than are Black students. Hence the differences shown here between Black and Hispanic segregation across schools clearly do not represent the full story.

[Table 7 about here]

### VIII. Conclusions and Policy Implications

Racial/ethnic segregation in schools is a subject of perennial interest and importance. Segregated schools undermine social cohesion and are often associated with racial disparities in access to school resources. Our aims in this paper are to describe patterns and trends of racial segregation in North Carolina and to distinguish the mechanisms that contributed to demographic imbalance across schools within the state's counties.

Using 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 and its population is diverse, with this diversity manifesting itself with geographical starkness across counties that range from entirely rural to highly urbanized. Our measure of segregation is an index that reflects the degree of racial imbalance in the schools located within a geographical area (Coleman et al., 1975). For most of our calculations, we define the relevant geographic area as a county, which corresponds to a school district in 89 of the state's 100 counties. Thus, we are measuring the degree to which the racial composition of individual schools within a county differs from that of the county's overall racial mix. In order to compare segregation rates in North Carolina to those in other parts of the U.S., we also report segregation indices using the state's 13 metropolitan areas as the relevant geographic unit. Finally, we supplement our racial segregation measures with those based on the economic status of students. We do not examine segregation that may occur within schools.

The beginning and ending years of our study were determined by data availability. We chose the additional year 2006, which was close to the midpoint of the period, in order to explore potential effects of changes in federal court pressure on local districts while avoiding confounding effects related to the start of the Great Recession in 2007. During the full period a large influx of immigrant and first-generation Hispanic students enrolled in schools across the state, boosting the Hispanic share from 3% in 1998 to 16% in 2016 and helping to increase the nonwhite share from 35% to 49% (Appendix Table B1). In addition, the full period was one in which the state legislature embraced and expanded the state's array of charter schools and promoted the use of vouchers for private schools. Over the period, the share of students attending charter schools rose from less than 1% to nearly 5%. Unlike charter schools in most of the country (Logan & 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 requirement that its charter schools 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.

We find that racial segregation rose in North Carolina between 1998 and 2006, largely reflecting the removal of federal court pressure for districts to racially balance their schools, after which it remained level or declined slightly in the following decade. The increase was mainly confined to urban areas, where segregation increased on average by more than a third.<sup>38</sup> In contrast, economic imbalance fell between 1998 and 2006, and then increased over the ensuing decade, perhaps reflecting the effects 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 urban counties and those with higher shares of nonwhite students.

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<sup>38</sup> Similar patterns and trends show up if indices other than our preferred index are used, including the dissimilarity and entropy indices.

Within each county, we decompose segregation into four additive components. While we find that the primary instrument for generating the observed segregation in a few counties was the availability of charter schools, private schools, or the existence of multiple districts within the county, the most consequential contributor to segregation in most counties was disparities across individual schools within districts or sectors. This pattern aligns with previous theoretical work on how parental preferences may generate segregated schools. Nonetheless, given this finding, it might behoove policymakers to publish information on the racial disparities across schools within districts with the hope of changing the behavior of local school boards, legislators, or voters. Indeed, one advocacy group in North Carolina recently made such a suggestion.<sup>39</sup> The proposed legislation would require the calculation for each school in a county of a “disproportionality index,” showing how far that school diverged from the county’s overall racial composition, and that the calculations be included in the school-level accountability reports now issued each year by the state. To facilitate interpretation of the ratings, 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).<sup>40</sup>

To illustrate how this approach 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 8 shows the enrollments by race and ethnicity of all the public schools (including charter schools) in the 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. We have noted the rating that each school would receive based on the

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<sup>39</sup> The organization is the North Carolina Justice Center, <https://www.ncjustice.org/>.

<sup>40</sup> This disproportionality index is actually 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..



proposed rating system. To date, there is no research to suggest how a policy such as this might affect the actions of key decision-makers, including parents, but it seems a worthy topic of future research. We note that this basic approach is fully consistent with current national discussions about promoting equity in education by shifting the focus away from levels of outcomes to differences across schools in educational opportunities (including, as here, those related to racial and ethnic segregation).

[Table 8 about here.]

Regarding segregation in the state's 13 metropolitan areas, we find that 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 for comparably sized 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 of its districts. In the few areas where counties are split into multiple districts, segregation tends to be higher.

One hopeful point on which to conclude is to keep in mind the potential benefits of having the large county-wide school districts that characterize North Carolina and many other states in the South and West. Instead of balkanized districts, which are common in the North and Midwest, 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.

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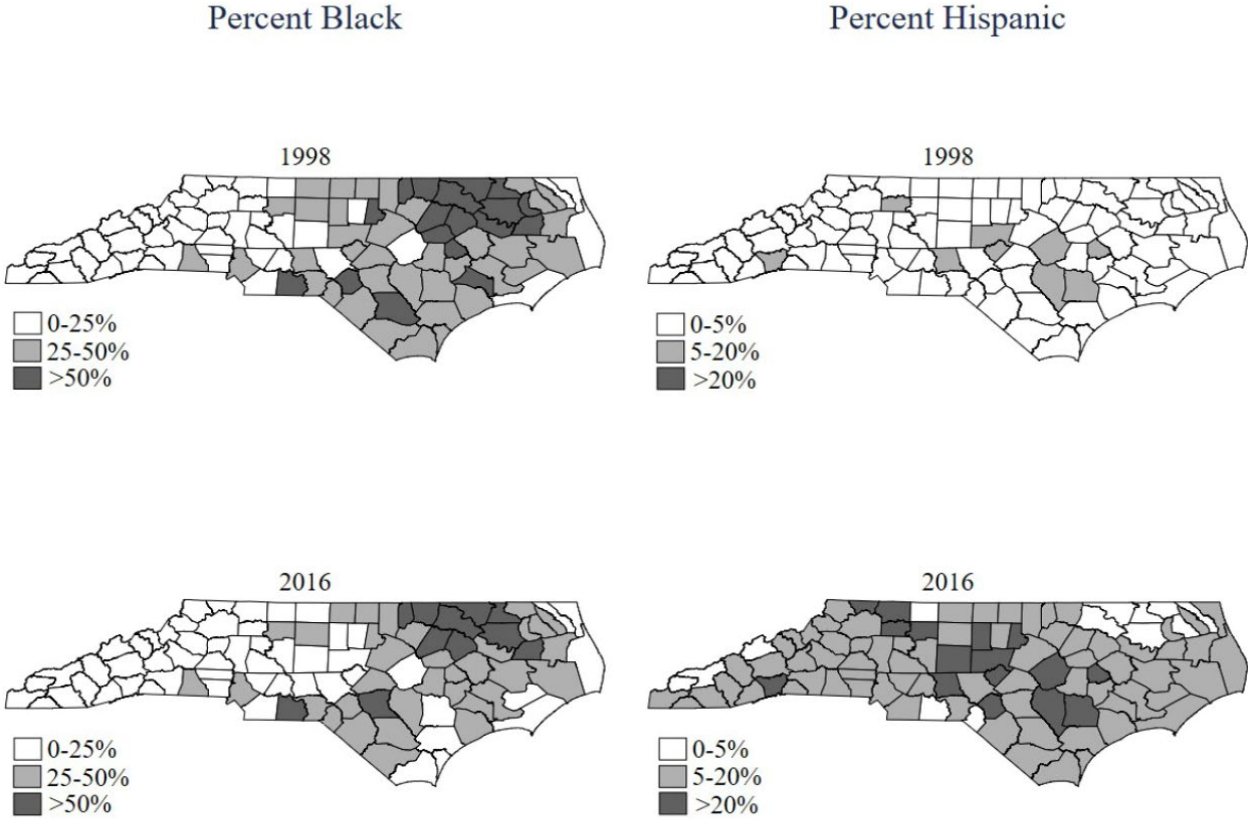
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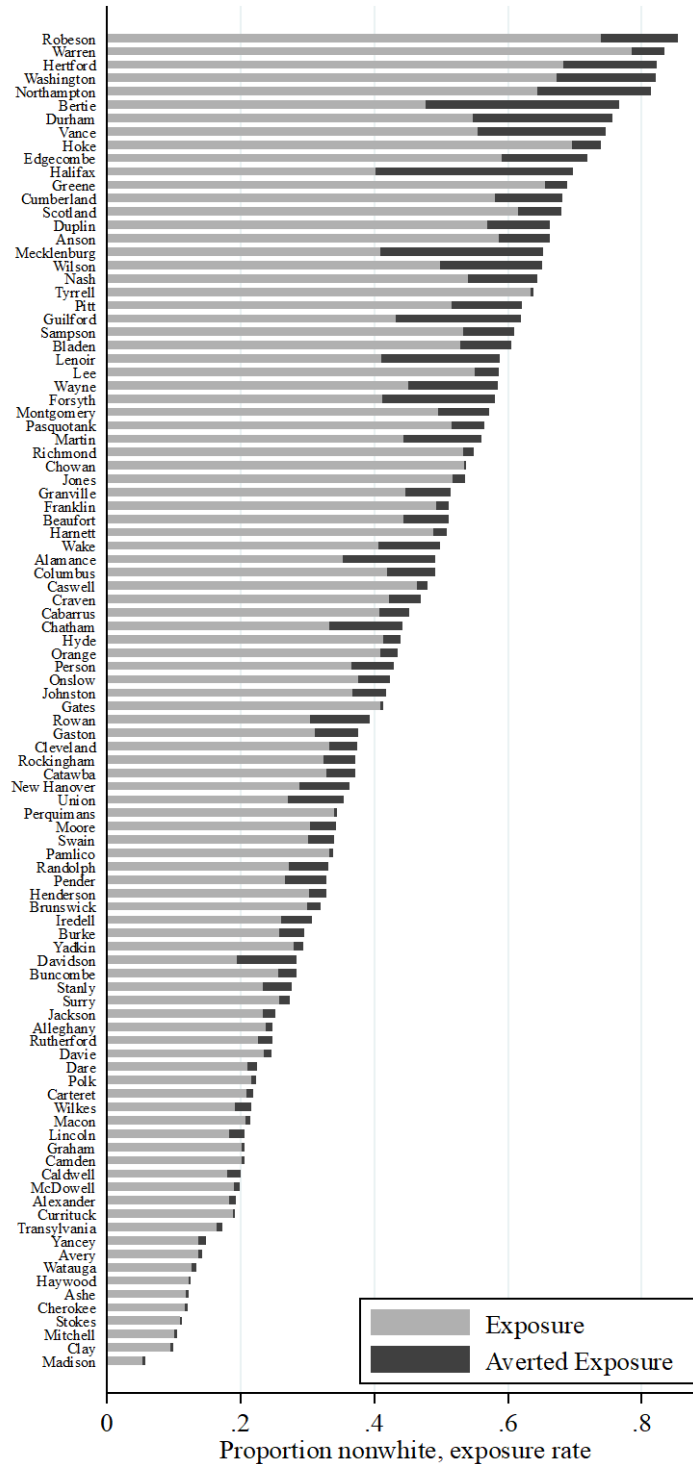
**Figure 1. Counties in North Carolina by Percent Black or Hispanic, 2006 & 2016**



Notes: The two maps for percent Black designate counties where the percentage of students who were Black was less than 25%, 25-50%, and more than 50%, respectively, in 1998 and 2016. The two maps for percent Hispanic designate counties where the percentage of students who were Hispanic was less than 5%, 5-20%, and more than 20%, respectively, in 1998 and 2016. Groups include lower bound.



**Figure 2. Percent Nonwhite and Actual Exposure of White to Nonwhite Students, NC Counties, 2016**



Notes: The length of each bar corresponds to the proportion of a county's students who were nonwhite ( $P_n$ ), and the length of the light portion is the exposure rate of white to nonwhite students ( $E_{wn}$ ), as defined in the text. The Coleman index of segregation is equal to the portion of the entire bar taken up by the dark portion ( $P_n - E_{wn}$ ), which is the portion of exposure that was precluded as a consequence of segregation.

**Table 1. Distribution of North Carolina K-12 Students by School Type and County or County Group, 1998, 2006, and 2016**

Region	Total Enrollment			Traditional public school			Charter			Private			Private (NCES Data)		
	1998	2006	2016	1998	2006	2016	1998	2006	2016	1998	2006	2016	1998	2006	2016
<b>State of North Carolina</b>	1,315,566	1,507,910	1,638,915	93.4	92.0	89.2	0.4	1.8	4.9	6.2	6.1	6.0	5.8	5.2	5.0
<b>Five largest counties</b>															
Mecklenburg (Charlotte)	110,373	145,285	177,741	87.0	85.4	82.3	0.1	2.0	7.3	13.0	12.6	10.4	12.8	10.3	8.8
Wake (Raleigh)	99,291	139,375	185,372	90.4	86.8	85.0	0.6	3.6	5.7	9.0	9.6	9.3	7.7	8.1	8.3
Guilford (Greensboro)	65,588	77,098	84,826	91.3	89.4	86.2	0.0	1.9	6.3	8.7	8.7	7.4	8.1	7.7	7.2
Cumberland (Fayetteville)	54,064	56,993	56,545	94.4	93.3	90.5	0.0	0.1	1.9	5.6	6.5	7.5	5.8	5.7	4.9
Forsyth (Winston-Salem)	49,436	58,236	61,421	87.0	87.4	88.1	1.6	3.2	4.6	11.4	9.4	7.3	11.3	8.5	5.9
<b>Other urban counties (N=28)</b>	484,025	541,292	581,118	93.2	92.9	90.5	0.2	1.2	3.5	6.6	5.9	6.0	6.2	5.1	5.1
<b>Rural counties (N=67)</b>	450,663	482,390	475,355	97.2	96.8	95.4	0.0	0.5	2.1	2.8	2.7	2.5	2.5	2.2	1.8
<b>Included other urban counties (N=27)</b>	476,214	533,401	572,254	93.1	92.8	90.5	0.2	1.3	3.4	6.6	5.9	6.1	6.2	5.1	5.1
<b>Included rural counties (N=58)</b>	425,212	457,088	451,960	97.2	96.7	95.1	0.0	0.5	2.3	2.8	2.8	2.5	2.5	2.3	1.8

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe Data, NC Department of Administration Private School Data; authors' calculations.

Notes: Measures display proportion of category enrollments by sector. Included other urban/rural counties are those counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998. Urban counties are those where at least half of the total population lived in urban areas in 2000.

**Table 2. Segregation in North Carolina Schools, Selected Counties and Divisions: Alternative Measures**

Region	White/Nonwhite Coleman (a)			Dissimilarity index (b)			Entropy index (c)			Economic dissimilarity (d)*				
	1998	2006	2016	1998	2006	2016	1998	2006	2016	TPS 1998	TPS 2006	TPS 2014	All public 2014	All schools 2014
<b>State of North Carolina (N=90)</b>	0.16	0.19	0.19	0.34	0.37	0.36	0.14	0.15	0.13	0.31	0.29	0.31	0.32	0.35
<b>Five largest counties</b>														
Mecklenburg	0.21	0.38	0.37	0.38	0.56	0.58	0.16	0.24	0.23	0.36	0.44	0.47	0.48	0.53
Wake	0.09	0.15	0.18	0.26	0.31	0.34	0.09	0.12	0.15	0.33	0.27	0.31	0.33	0.37
Guilford	0.30	0.33	0.30	0.47	0.47	0.48	0.22	0.22	0.18	0.41	0.40	0.42	0.44	0.47
Cumberland	0.15	0.17	0.15	0.33	0.36	0.35	0.10	0.11	0.09	0.28	0.25	0.29	0.30	0.34
Forsyth	0.21	0.32	0.29	0.37	0.49	0.47	0.18	0.22	0.18	0.33	0.43	0.45	0.46	0.49
<b>Included other urban counties (N=27)</b>	0.15	0.17	0.16	0.34	0.35	0.33	0.14	0.13	0.12	0.31	0.27	0.29	0.30	0.33
<b>Included rural counties (N=58)</b>	0.14	0.14	0.13	0.33	0.32	0.29	0.13	0.12	0.10	0.27	0.23	0.23	0.25	0.27

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; authors' calculations.

\*Comparable data on free lunch eligibility in 2016 not available. See text.

Note: Segregation indices for the state and county groups are weighted averages of county statistics, where weights are county enrollments. Urban counties are those where at least half of the population lived in urban areas in 2000. State measures include counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998.

a) White/nonwhite Coleman index. See text, equation (2).

b) See text, equation (1).

c) See text.

d) See text.

TPS is traditional public schools. All public include charter schools and TPS. All schools include public and private schools.

**Table 3. Noteworthy Examples of Four Segregation-Serving Instruments, 2016**

County and prominent instrument	Reduced exposure due to racial disparities between...				Total proportional reduction in exposure (a)
	Private and public sectors	Charter and TPS sectors	School districts	Schools within districts or sectors	
<i>Private schools prominent</i>					
Bertie	<b>0.36</b>	0.00	0.00	0.02	0.38
Northampton	<b>0.19</b>	0.00	0.00	0.02	0.21
Hertford	<b>0.15</b>	0.00	0.00	0.02	0.17
<i>Charter schools prominent</i>					
Vance	0.09	<b>0.14</b>	0.00	0.03	0.26
Martin	0.00	<b>0.12</b>	0.00	0.09	0.21
Durham	0.11	<b>0.07</b>	0.00	0.09	0.28
<i>Multiple districts prominent</i>					
Davidson	0.01	0.00	<b>0.29</b>	0.02	0.32
Halifax	0.04	0.01	<b>0.37</b>	0.01	0.42
Randolph	0.01	0.01	<b>0.11</b>	0.05	0.18
<i>Within-districts and sectors prominent</i>					
Mecklenburg	0.08	0.05	0.00	<b>0.24</b>	0.37
Union	0.00	0.00	0.00	<b>0.23</b>	0.24
Alamance	0.03	0.03	0.00	<b>0.22</b>	0.28

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; authors' calculations. See Appendix Table A3 and text.

Notes: Counties with the largest component in each category are shown. a) Equal to the Coleman index. The Coleman index gives the proportional gap between actual exposure of white to nonwhite students and the theoretical maximum exposure (the nonwhite percentage of all students in a county),  $S_{wn} = (P_n - E_{wn}) / P_n$ , where  $E_{wn}$  is the share of nonwhite students who are enrolled in the school of the average white student. This gap is decomposed into the four components shown. See Appendix A for a fuller description of the decomposition. TPS refers to traditional public schools.

**Table 4. Coleman Index of White/Nonwhite Segregation Decomposed, by Segregation-Serving Instrument, 2015-2016**

<b>Region</b>	<b>Actual</b>	<b>Public/ Private</b>	<b>TPS/ Charter</b>	<b>Between districts</b>	<b>Within Districts and Sectors</b>
<b>State of North Carolina (N=90)</b>	0.19	0.03	0.02	0.01	0.13
<b>Five largest counties</b>					
Mecklenburg	0.37	0.08	0.05	0.00	0.24
Wake	0.18	0.04	0.02	0.00	0.12
Guilford	0.30	0.06	0.03	0.00	0.21
Cumberland	0.15	0.03	0.00	0.00	0.12
Forsyth	0.29	0.04	0.03	0.00	0.22
<b>Included other urban counties (N=27)</b>	0.16	0.03	0.01	0.00	0.12
<b>Included rural counties (N=58)</b>	0.13	0.01	0.01	0.03	0.07

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; authors' calculations.

Notes: Indices for the state and county groups are weighted averages of county statistics where weights are county enrollments. State measures include counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998. The Coleman index gives the proportional gap between actual exposure of white to nonwhite students and the theoretical maximum exposure (the nonwhite percentage of all students in a county). This gap is decomposed into the four components shown. See Appendix A for a fuller description of the decomposition.

**Table 5. White Students Enrolled in Schools 80% or Greater White**

	<b>1998</b>	<b>2006</b>	<b>2016</b>
<b>White students in 80%+ schools</b>	391,950	345,888	224,726
As a percentage of all white students	46.3	39.8	27.1
<b>Percentage of these students attending</b>			
Traditional public schools	83.1	79.2	70.9
Charter schools	0.3	3.2	9.1
Private schools	16.5	17.6	20.0
<b>Total</b>	100	100	100

Sources: NCES Common Core of Data, Private School Universe; authors' calculations.

**Table 6. White/Nonwhite Segregation in 11 Metropolitan Areas, 1997/1998 and 2015/2016**

Metro Area	1997/98					2015/16				
	Total	Public/ private	TPS/ charter	Between TPS districts	Within districts and sectors	Total	Public/ private	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	0.17	0.01	0.01	0.00	0.14
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	12.5	8.1	22.8	56.6

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

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

Metro Area Name	Component NC counties (and districts other than county)
Asheville	Buncombe (Asheville City Schools); Haywood; Henderson; Madison
Charlotte-Concord-Gastonia	Anson; Cabarrus (Kannapolis City Schools); Gaston; Mecklenburg*; Union
Durham-Chapel Hill	Chatham; Durham; Orange (Chapel Hill-Carrboro City Schools); Person
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

**Table 7. Dissimilarity Indices, Three Racial/Ethnic Dichotomies, 2005/2006 and 2015/2016**

<b>Region</b>	<b>White/ Nonwhite</b>		<b>Black/ Nonblack</b>		<b>Hispanic/ Nonhispanic</b>		<b>Black/ Hispanic</b>	
	<b>2006</b>	<b>2016</b>	<b>2006</b>	<b>2016</b>	<b>2006</b>	<b>2016</b>	<b>2006</b>	<b>2016</b>
<b>State of NC (N=90)</b>	0.37	0.36	0.35	0.31	0.33	0.30	0.30	0.25
<b>Five largest counties</b>								
Mecklenburg	0.56	0.58	0.47	0.42	0.40	0.40	0.33	0.33
Wake	0.31	0.34	0.32	0.32	0.30	0.29	0.27	0.21
Guilford	0.47	0.48	0.43	0.36	0.33	0.30	0.32	0.24
Cumberland	0.36	0.35	0.35	0.31	0.17	0.12	0.19	0.16
Forsyth	0.49	0.47	0.42	0.31	0.40	0.38	0.33	0.26
<b>Included other urban (N=27)</b>								
	0.35	0.33	0.34	0.30	0.34	0.30	0.30	0.26
<b>Included rural (N=58)</b>								
	0.32	0.29	0.31	0.28	0.32	0.27	0.30	0.25

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; author's calculations.

Note: Segregation indices for the state and county groups are weighted averages of county statistics where weights are county enrollments. State measures include counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998. County designation for region and rural/urban are shown in Appendix Table A1. For consistency with NC enrollment data prior to 2010, for 2015/2016 Black and Multiracial students are grouped together in Black category, and Asian and Pacific Islander students are grouped together in the Asian category.



**Table 8. 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%		

Sources: 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 A: Decomposition of Segregation Index

We decompose the Coleman index of 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 measure 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.<sup>1</sup>

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 we 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 we 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 we 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:

$$\frac{(P_n - E_{wn})}{P_n} = S_{wn}$$

$$S_{wn} = \frac{(P_n - E_{wn}^*)}{P_n} + \frac{(E_{wn}^* - E_{wn}^{**})}{P_n} + \frac{(E_{wn}^{**} - E_{wn}^{***})}{P_n} + \frac{(E_{wn}^{***} - E_{wn})}{P_n}$$

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:

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

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<sup>1</sup> For previous studies that decompose school segregation, see, for example, Clotfelter (2004) or Fiel (2013).

Appendix Table B1. Enrollment and Racial Composition by County, 1997/98, 2005/06 and 2015/16

County	Urban/ rural	Enrollment			Percentage White			Percentage Black			Percentage Hispanic		
		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	8.1	15.7
Alamance	Urban	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	8,139	7,891	7,488	56.6	55.6	48.9	41.5	37.1	35.5	1.5	7.0	15.1
Bertie	Rural	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	Rural	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	Rural	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	Urban	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	Urban	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	Urban	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	Urban	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	Rural	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	Urban	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	Rural	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	Urban	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Urban	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	Urban	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	Rural	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	Urban	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	Rural	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	Rural	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	Rural	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	Urban	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	Urban	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	Urban	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	Rural	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	Urban	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	Rural	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	Rural	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	Rural	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	Rural	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	Urban	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	Rural	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	Rural	15,479	18,567	21,218	64.0	56.8	49.1	30.6	31.7	29.9	3.9	9.8	18.9
Haywood	Urban	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	Urban	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	Rural	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	Rural	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	Rural	824	689	658	53.9	50.5	56.1	44.9	39.6	25.1	1.2	9.9	18.8
Iredell	Urban	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	Rural	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	Rural	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	Rural	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	Urban	9,250	10,118	10,868	61.6	51.0	41.5	27.2	26.4	24.8	9.8	21.3	32.1
Lenoir	Urban	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	6,576	6,622	6,365	92.4	86.7	80.1	4.5	4.7	6.1	0.9	6.6	12.3

Mecklenburg	Urban	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	Rural	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	Rural	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	Rural	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	Urban	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 Hanover	Urban	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	Rural	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	Urban	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	Urban	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	Rural	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	Urban	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	Rural	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	Rural	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	Rural	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	Urban	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	Rural	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	Rural	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	Urban	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	Rural	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	Rural	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	Urban	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	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	Rural	795	644	595	49.7	46.1	36.3	48.9	41.8	42.2	0.8	11.6	18.0
Union	Urban	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	Rural	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	Urban	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	Rural	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	Rural	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	Rural	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	Urban	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	Rural	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	Urban	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	Rural	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	Rural	2,503	2,701	2,276	96.8	91.5	85.1	1.2	1.7	2.0	1.7	6.0	12.4

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; 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. Urban counties are those where at least half of the population lived in urban areas in 2000. State measures include counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998.

**Appendix Table B2. Segregation by County, Four Measures, 1997/98, 2005/06 and 2015/16**

County	Coleman index			Dissimilarity index			Entropy index			Economic dissimilarity		
	1998	2006	2016	1998	2006	2016	1998	2006	2016	1998	2006	2014
Alamance	0.16	0.27	0.28	0.36	0.46	0.48	0.12	0.17	0.16	0.31	0.36	0.38
Alexander	0.07	0.06	0.05	0.25	0.20	0.22	0.10	0.07	0.05	0.28	0.19	0.18
Alleghany	0.00	0.01	0.04	0.11	0.15	0.22	0.03	0.02	0.04	0.16	0.12	0.20
Anson	0.09	0.12	0.11	0.20	0.27	0.30	0.08	0.10	0.08	0.22	0.22	0.20
Ashe	0.00	0.01	0.01	0.25	0.22	0.16	0.05	0.03	0.02	0.17	0.12	0.12
Avery	0.04	0.05	0.03	0.40	0.30	0.21	0.15	0.12	0.05	0.13	0.19	0.17
Beaufort	0.13	0.14	0.13	0.28	0.31	0.27	0.11	0.11	0.08	0.23	0.23	0.20
Bertie	0.36	0.48	0.38	0.47	0.56	0.46	0.29	0.36	0.27	0.18	0.20	0.22
Bladen	0.14	0.13	0.12	0.33	0.32	0.29	0.11	0.10	0.09	0.26	0.14	0.19
Brunswick	0.03	0.06	0.06	0.16	0.24	0.21	0.03	0.06	0.05	0.24	0.17	0.17
Buncombe	0.19	0.15	0.09	0.46	0.36	0.28	0.20	0.14	0.09	0.30	0.23	0.21
Burke	0.07	0.07	0.13	0.26	0.26	0.27	0.10	0.10	0.12	0.25	0.14	0.18
Cabarrus	0.07	0.09	0.10	0.29	0.28	0.25	0.07	0.07	0.08	0.27	0.30	0.35
Caldwell	0.18	0.14	0.10	0.51	0.41	0.31	0.24	0.15	0.09	0.26	0.23	0.21
Camden	0.01	0.00	0.00	0.07	0.06	0.06	0.01	0.00	0.01	0.11	0.07	0.10
Carteret	0.05	0.05	0.04	0.26	0.26	0.21	0.08	0.07	0.05	0.22	0.19	0.23
Caswell	0.05	0.02	0.03	0.15	0.09	0.12	0.04	0.02	0.03	0.19	0.09	0.14
Catawba	0.11	0.12	0.12	0.33	0.31	0.29	0.10	0.10	0.08	0.31	0.25	0.21
Chatham	0.11	0.23	0.25	0.28	0.39	0.41	0.10	0.19	0.17	0.27	0.37	0.38
Cherokee	0.02	0.02	0.01	0.27	0.24	0.14	0.08	0.05	0.04	0.23	0.13	0.14
Chowan	0.08	0.01	0.00	0.21	0.04	0.04	0.06	0.01	0.00	0.22	0.13	0.09
Clay	0.00	0.00	0.00	0.14	0.15	0.08	0.02	0.03	0.01	0.21	0.08	0.10
Cleveland	0.10	0.11	0.11	0.27	0.27	0.27	0.08	0.08	0.08	0.26	0.19	0.19
Columbus	0.14	0.15	0.14	0.29	0.31	0.32	0.15	0.15	0.12	0.24	0.17	0.23
Craven	0.06	0.09	0.10	0.18	0.21	0.22	0.06	0.08	0.07	0.23	0.24	0.26
Cumberland	0.15	0.17	0.15	0.33	0.36	0.35	0.10	0.11	0.09	0.28	0.25	0.29
Currituck	0.02	0.00	0.01	0.15	0.06	0.12	0.03	0.01	0.02	0.14	0.22	0.24
Dare	0.04	0.07	0.06	0.32	0.33	0.25	0.09	0.09	0.05	0.20	0.28	0.20
Davidson	0.39	0.42	0.32	0.71	0.65	0.50	0.34	0.28	0.19	0.45	0.39	0.33
Davie	0.04	0.06	0.04	0.24	0.26	0.21	0.07	0.06	0.04	0.33	0.28	0.27
Duplin	0.14	0.17	0.14	0.33	0.36	0.33	0.12	0.13	0.10	0.24	0.26	0.21
Durham	0.22	0.25	0.28	0.38	0.46	0.48	0.17	0.18	0.17	0.41	0.31	0.30
Edgecombe	0.16	0.18	0.18	0.31	0.40	0.43	0.14	0.16	0.15	0.21	0.20	0.24
Forsyth	0.21	0.32	0.29	0.37	0.49	0.47	0.18	0.22	0.18	0.33	0.43	0.45
Franklin	0.07	0.06	0.04	0.24	0.20	0.13	0.05	0.04	0.03	0.28	0.19	0.20
Gaston	0.14	0.18	0.17	0.36	0.37	0.35	0.13	0.14	0.11	0.43	0.28	0.32
Gates	0.01	0.00	0.00	0.07	0.02	0.02	0.01	0.01	0.00	0.16	0.12	0.09
Graham	0.01	0.00	0.01	0.11	0.03	0.09	0.01	0.00	0.01	0.21	0.12	0.05
Granville	0.13	0.10	0.13	0.31	0.27	0.32	0.09	0.06	0.09	0.25	0.21	0.25
Greene	0.10	0.07	0.05	0.15	0.14	0.09	0.08	0.05	0.03	0.21	0.29	0.11
Guilford	0.30	0.33	0.30	0.47	0.47	0.48	0.22	0.22	0.18	0.41	0.40	0.42
Halifax	0.60	0.62	0.42	0.77	0.80	0.69	0.48	0.49	0.33	0.43	0.40	0.38
Harnett	0.05	0.04	0.04	0.16	0.14	0.14	0.05	0.05	0.04	0.20	0.18	0.19
Haywood	0.02	0.01	0.01	0.21	0.15	0.12	0.08	0.04	0.02	0.18	0.16	0.16
Henderson	0.10	0.08	0.08	0.32	0.25	0.23	0.13	0.08	0.07	0.30	0.27	0.28
Hertford	0.25	0.30	0.17	0.32	0.38	0.26	0.19	0.21	0.10	0.18	0.16	0.15
Hoke	0.11	0.07	0.06	0.25	0.26	0.21	0.09	0.10	0.06	0.24	0.18	0.20
Hyde	0.11	0.10	0.06	0.22	0.25	0.18	0.15	0.12	0.14	0.30	0.28	0.53
Iredell	0.13	0.16	0.15	0.34	0.35	0.32	0.11	0.12	0.11	0.27	0.34	0.36
Jackson	0.19	0.15	0.07	0.42	0.32	0.23	0.21	0.16	0.09	0.21	0.15	0.11
Johnston	0.09	0.11	0.12	0.28	0.29	0.26	0.07	0.07	0.08	0.30	0.34	0.34

Jones	0.04	0.07	0.03	0.14	0.19	0.13	0.04	0.06	0.03	0.22	0.09	0.10
Lee	0.09	0.08	0.06	0.22	0.20	0.17	0.07	0.05	0.05	0.24	0.22	0.21
Lenoir	0.35	0.35	0.30	0.51	0.52	0.46	0.29	0.30	0.25	0.37	0.24	0.28
Lincoln	0.08	0.14	0.11	0.35	0.39	0.32	0.09	0.12	0.08	0.24	0.29	0.31
Macon	0.01	0.02	0.03	0.17	0.16	0.17	0.08	0.03	0.03	0.23	0.17	0.17
Madison	0.01	0.01	0.00	0.36	0.16	0.05	0.12	0.04	0.03	0.23	0.12	0.11
Martin	0.16	0.22	0.21	0.32	0.40	0.37	0.12	0.15	0.14	0.25	0.23	0.27
McDowell	0.04	0.04	0.04	0.23	0.20	0.17	0.08	0.07	0.04	0.29	0.18	0.14
Mecklenburg	0.21	0.38	0.37	0.38	0.56	0.58	0.16	0.24	0.23	0.36	0.44	0.47
Mitchell	0.01	0.03	0.03	0.28	0.32	0.26	0.09	0.07	0.05	0.25	0.09	0.14
Montgomery	0.09	0.10	0.13	0.22	0.26	0.33	0.11	0.15	0.14	0.19	0.29	0.27
Moore	0.09	0.11	0.11	0.28	0.29	0.27	0.11	0.12	0.10	0.31	0.28	0.29
Nash	0.22	0.13	0.16	0.37	0.27	0.32	0.20	0.14	0.15	0.33	0.20	0.20
New Hanover	0.11	0.16	0.21	0.28	0.36	0.37	0.09	0.12	0.15	0.36	0.30	0.35
Northampton	0.29	0.35	0.21	0.47	0.49	0.29	0.26	0.30	0.14	0.22	0.19	0.14
Onslow	0.12	0.11	0.11	0.31	0.30	0.28	0.08	0.07	0.07	0.25	0.18	0.17
Orange	0.03	0.05	0.06	0.14	0.19	0.18	0.06	0.07	0.09	0.26	0.22	0.21
Pamlico	0.02	0.03	0.01	0.10	0.13	0.10	0.02	0.05	0.02	0.19	0.16	0.11
Pasquotank	0.09	0.10	0.09	0.22	0.21	0.22	0.07	0.07	0.06	0.44	0.17	0.20
Pender	0.10	0.13	0.19	0.29	0.33	0.43	0.07	0.10	0.14	0.20	0.28	0.36
Perquimans	0.01	0.00	0.00	0.05	0.06	0.04	0.01	0.01	0.01	0.13	0.07	0.08
Person	0.09	0.12	0.14	0.22	0.24	0.32	0.07	0.09	0.09	0.28	0.22	0.21
Pitt	0.11	0.15	0.17	0.24	0.29	0.33	0.10	0.12	0.13	0.23	0.29	0.30
Polk	0.02	0.04	0.03	0.14	0.21	0.16	0.04	0.04	0.03	0.26	0.15	0.17
Randolph	0.10	0.16	0.18	0.40	0.39	0.37	0.13	0.13	0.12	0.29	0.23	0.21
Richmond	0.04	0.05	0.03	0.13	0.14	0.11	0.04	0.05	0.03	0.23	0.09	0.20
Robeson	0.26	0.19	0.13	0.53	0.50	0.45	0.24	0.22	0.19	0.26	0.14	0.22
Rockingham	0.10	0.13	0.13	0.29	0.30	0.29	0.09	0.10	0.09	0.27	0.21	0.24
Rowan	0.23	0.24	0.22	0.49	0.46	0.41	0.20	0.18	0.15	0.33	0.24	0.24
Rutherford	0.14	0.09	0.08	0.36	0.27	0.23	0.14	0.09	0.07	0.27	0.17	0.16
Sampson	0.09	0.12	0.12	0.25	0.26	0.28	0.09	0.09	0.08	0.23	0.16	0.29
Scotland	0.07	0.11	0.09	0.19	0.23	0.23	0.06	0.08	0.06	0.28	0.21	0.17
Stanly	0.16	0.15	0.16	0.38	0.37	0.35	0.16	0.15	0.14	0.28	0.27	0.24
Stokes	0.05	0.04	0.02	0.31	0.27	0.17	0.12	0.08	0.04	0.29	0.16	0.14
Surry	0.04	0.05	0.05	0.26	0.23	0.22	0.10	0.07	0.07	0.24	0.19	0.20
Swain	0.08	0.08	0.11	0.28	0.23	0.23	0.08	0.06	0.10	0.18	0.10	0.06
Transylvania	0.04	0.04	0.04	0.31	0.27	0.25	0.11	0.08	0.07	0.28	0.23	0.14
Tyrrell	0.00	0.01	0.01	0.01	0.07	0.07	0.00	0.01	0.01	0.28	0.17	0.18
Union	0.27	0.28	0.24	0.51	0.44	0.39	0.21	0.19	0.16	0.41	0.46	0.49
Vance	0.19	0.15	0.26	0.30	0.27	0.39	0.16	0.12	0.16	0.31	0.16	0.22
Wake	0.09	0.15	0.18	0.26	0.31	0.34	0.09	0.12	0.15	0.33	0.27	0.31
Warren	0.29	0.02	0.06	0.37	0.12	0.27	0.21	0.15	0.15	0.23	0.22	0.26
Washington	0.04	0.04	0.18	0.16	0.16	0.46	0.03	0.05	0.14	0.21	0.13	0.27
Watauga	0.02	0.04	0.05	0.30	0.29	0.27	0.09	0.07	0.06	0.25	0.27	0.15
Wayne	0.32	0.26	0.23	0.46	0.40	0.42	0.25	0.22	0.19	0.38	0.34	0.30
Wilkes	0.12	0.13	0.11	0.53	0.41	0.33	0.19	0.13	0.09	0.24	0.17	0.16
Wilson	0.13	0.21	0.23	0.30	0.38	0.38	0.10	0.17	0.15	0.25	0.30	0.30
Yadkin	0.03	0.05	0.05	0.23	0.22	0.20	0.08	0.07	0.04	0.30	0.18	0.20
Yancey	0.01	0.05	0.08	0.22	0.28	0.32	0.07	0.07	0.09	0.21	0.16	0.14

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; authors' calculations.

Notes: Urban counties are those where at least half of the population lived in urban areas in 2000. State measures include counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998. Economic dissimilarity measures presented for traditional public schools only.

Appendix Table B3. White-Nonwhite Segregation Index Decomposition in NC Schools by County, 1998 and 2016

County	1998					2016					
	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	0.16	0.02	0.00	0.00	0.14	0.28	0.03	0.03	0.00	0.22	0.27
Alexander	0.07	0.00	0.00	0.00	0.07	0.05	0.00	0.00	0.00	0.05	0.05
Alleghany	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.03	0.03
Anson	0.09	0.00	0.00	0.00	0.09	0.11	0.00	0.00	0.00	0.11	0.11
Ashe	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01
Avery	0.04	0.00	0.03	0.00	0.01	0.03	0.00	0.00	0.00	0.03	0.03
Beaufort	0.13	0.04	0.00	0.00	0.09	0.13	0.01	0.03	0.00	0.10	0.12
Bertie	0.36	0.31	0.00	0.00	0.06	0.38	0.36	0.00	0.00	0.02	0.04
Bladen	0.14	0.01	0.00	0.00	0.14	0.12	0.04	0.01	0.00	0.08	0.08
Brunswick	0.03	0.00	0.00	0.00	0.03	0.06	0.01	0.00	0.00	0.05	0.05
Buncombe	0.19	0.01	0.00	0.14	0.04	0.09	0.02	0.01	0.01	0.06	0.08
Burke	0.07	0.00	0.00	0.00	0.07	0.13	0.00	0.00	0.00	0.12	0.13
Cabarrus	0.07	0.01	0.00	0.03	0.03	0.10	0.02	0.01	0.02	0.06	0.08
Caldwell	0.18	0.02	0.05	0.00	0.11	0.10	0.00	0.00	0.00	0.09	0.09
Camden	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Carteret	0.05	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.04	0.04
Caswell	0.05	0.01	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.03	0.03
Catawba	0.11	0.01	0.00	0.07	0.03	0.12	0.02	0.00	0.04	0.06	0.10
Chatham	0.11	0.00	0.00	0.00	0.11	0.25	0.01	0.04	0.00	0.21	0.24
Cherokee	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.01
Chowan	0.08	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Clay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cleveland	0.10	0.00	0.00	0.07	0.03	0.11	0.00	0.00	0.00	0.10	0.11
Columbus	0.14	0.04	0.00	0.00	0.10	0.14	0.01	0.02	0.01	0.11	0.14
Craven	0.06	0.02	0.00	0.00	0.05	0.10	0.03	0.00	0.00	0.07	0.07
Cumberland	0.15	0.03	0.00	0.00	0.12	0.15	0.03	0.00	0.00	0.12	0.13
Currituck	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.01
Dare	0.04	0.00	0.00	0.00	0.04	0.06	0.00	0.00	0.00	0.06	0.06
Davidson	0.39	0.00	0.00	0.38	0.01	0.32	0.01	0.00	0.29	0.02	0.32
Davie	0.04	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.04	0.04
Duplin	0.14	0.01	0.00	0.00	0.13	0.14	0.01	0.00	0.00	0.13	0.13
Durham	0.22	0.10	0.00	0.00	0.11	0.28	0.11	0.07	0.00	0.09	0.21
Edgecombe	0.16	0.08	0.00	0.00	0.08	0.18	0.00	0.03	0.06	0.09	0.18
Forsyth	0.21	0.06	0.01	0.00	0.14	0.29	0.04	0.03	0.00	0.22	0.27
Franklin	0.07	0.00	0.00	0.00	0.07	0.04	0.00	0.01	0.00	0.02	0.04
Gaston	0.14	0.02	0.00	0.00	0.12	0.17	0.01	0.00	0.00	0.15	0.16
Gates	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Graham	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01
Granville	0.13	0.03	0.00	0.00	0.09	0.13	0.00	0.03	0.00	0.10	0.13
Greene	0.10	0.09	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.00
Guilford	0.30	0.05	0.00	0.00	0.25	0.30	0.06	0.03	0.00	0.21	0.27
Halifax	0.60	0.15	0.00	0.44	0.01	0.42	0.04	0.01	0.37	0.01	0.41
Harnett	0.05	0.01	0.00	0.00	0.04	0.04	0.01	0.00	0.00	0.03	0.03
Haywood	0.02	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.01
Henderson	0.10	0.00	0.00	0.00	0.10	0.08	0.00	0.00	0.00	0.07	0.08
Hertford	0.25	0.23	0.00	0.00	0.01	0.17	0.15	0.00	0.00	0.02	0.02
Hoke	0.11	0.00	0.00	0.00	0.11	0.06	0.00	0.00	0.00	0.06	0.06
Hyde	0.11	0.00	0.00	0.00	0.11	0.06	0.04	0.00	0.00	0.02	0.02
Iredell	0.13	0.01	0.00	0.00	0.12	0.15	0.01	0.02	0.00	0.12	0.14
Jackson	0.19	0.00	0.00	0.00	0.18	0.07	0.00	0.00	0.00	0.06	0.07
Johnston	0.09	0.00	0.00	0.00	0.09	0.12	0.00	0.00	0.00	0.11	0.12
Jones	0.04	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.03	0.03
Lee	0.09	0.04	0.00	0.00	0.06	0.06	0.03	0.00	0.00	0.03	0.03
Lenoir	0.35	0.09	0.01	0.00	0.25	0.30	0.11	0.01	0.00	0.18	0.23
Lincoln	0.08	0.00	0.00	0.00	0.08	0.11	0.00	0.00	0.00	0.11	0.11
Macon	0.01	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.02	0.02
Madison	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Martin	0.16	0.00	0.00	0.00	0.16	0.21	0.00	0.12	0.00	0.09	0.21



McDowell	0.04	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.04	0.04
Mecklenburg	0.21	0.08	0.00	0.00	0.13	0.37	0.08	0.05	0.00	0.24	0.34
Mitchell	0.01	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.03	0.03
Montgomery	0.09	0.01	0.00	0.00	0.07	0.13	0.03	0.00	0.00	0.11	0.11
Moore	0.09	0.02	0.00	0.00	0.08	0.11	0.01	0.00	0.00	0.10	0.11
Nash	0.22	0.06	0.00	0.00	0.16	0.16	0.07	0.01	0.00	0.08	0.10
New Hanover	0.11	0.03	0.00	0.00	0.08	0.21	0.02	0.01	0.00	0.17	0.19
Northampton	0.29	0.17	0.00	0.00	0.12	0.21	0.19	0.00	0.00	0.02	0.02
Onslow	0.12	0.01	0.00	0.00	0.11	0.11	0.01	0.00	0.00	0.10	0.10
Orange	0.03	0.02	0.00	0.00	0.01	0.06	0.01	0.01	0.01	0.03	0.04
Pamlico	0.02	0.00	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01
Pasquotank	0.09	0.04	0.00	0.00	0.05	0.09	0.03	0.00	0.00	0.05	0.06
Pender	0.10	0.00	0.00	0.00	0.10	0.19	0.00	0.00	0.00	0.19	0.19
Perquimans	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Person	0.09	0.01	0.00	0.00	0.09	0.14	0.01	0.06	0.00	0.08	0.14
Pitt	0.11	0.06	0.00	0.00	0.05	0.17	0.05	0.00	0.00	0.12	0.13
Polk	0.02	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.03	0.03
Randolph	0.10	0.00	0.00	0.05	0.04	0.18	0.01	0.01	0.11	0.05	0.17
Richmond	0.04	0.01	0.00	0.00	0.03	0.03	0.01	0.00	0.00	0.02	0.02
Robeson	0.26	0.04	0.00	0.00	0.22	0.13	0.00	0.02	0.01	0.10	0.13
Rockingham	0.10	0.01	0.00	0.00	0.10	0.13	0.01	0.00	0.00	0.11	0.12
Rowan	0.23	0.01	0.00	0.00	0.22	0.22	0.01	0.00	0.01	0.21	0.22
Rutherford	0.14	0.00	0.00	0.00	0.14	0.08	0.00	0.01	0.00	0.07	0.08
Sampson	0.09	0.03	0.00	0.01	0.06	0.12	0.05	0.00	0.01	0.06	0.08
Scotland	0.07	0.01	0.00	0.00	0.06	0.09	0.04	0.00	0.00	0.06	0.06
Stanly	0.16	0.00	0.00	0.00	0.16	0.16	0.01	0.01	0.00	0.14	0.15
Stokes	0.05	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.02	0.02
Surry	0.04	0.00	0.00	0.01	0.03	0.05	0.00	0.01	0.00	0.04	0.05
Swain	0.08	0.00	0.00	0.00	0.08	0.11	0.05	0.01	0.00	0.06	0.07
Transylvania	0.04	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.04	0.04
Tyrrell	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01
Union	0.27	0.01	0.00	0.00	0.27	0.24	0.00	0.00	0.00	0.23	0.24
Vance	0.19	0.10	0.00	0.00	0.09	0.26	0.09	0.14	0.00	0.03	0.19
Wake	0.09	0.03	0.00	0.00	0.06	0.18	0.04	0.02	0.00	0.12	0.16
Warren	0.29	0.28	0.00	0.00	0.01	0.06	0.00	0.01	0.00	0.05	0.06
Washington	0.04	0.00	0.00	0.00	0.04	0.18	0.00	0.00	0.00	0.18	0.18
Watauga	0.02	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.04	0.05
Wayne	0.32	0.04	0.00	0.00	0.28	0.23	0.04	0.02	0.00	0.16	0.20
Wilkes	0.12	0.00	0.00	0.00	0.12	0.11	0.00	0.00	0.00	0.10	0.11
Wilson	0.13	0.04	0.01	0.00	0.08	0.23	0.10	0.03	0.00	0.10	0.15
Yadkin	0.03	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.04	0.04
Yancey	0.01	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.07	0.08

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; authors' calculations.

**Appendix Table B4. Racial/Ethnic Distribution of North Carolina K-12 Students by County or County Groups, 1998, 2006, and 2016**

Region	White			Black			Hispanic			Asian			American Indian		
	1998	2006	2014	1998	2006	2014	1998	2006	2014	1998	2006	2014	1998	2006	2014
<b>State of NC (N=90)</b>	63.8	57.3	50.4	30.4	31.0	29.3	2.7	8.2	15.8	1.6	2.1	3.3	1.5	1.5	1.3
<b>Five largest counties</b>															
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
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
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
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
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
<b>Included other urban counties (N=27)</b>	67.8	62.0	54.9	27.8	27.9	26.8	2.5	7.7	15.4	1.6	2.0	2.6	0.3	0.4	0.3
<b>Included rural counties (N=58)</b>	64.0	60.8	56.4	29.1	27.2	24.4	2.6	7.7	14.8	0.6	0.7	0.9	3.6	3.6	3.5
<b>State of NC (all 100 counties)</b>	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

Sources: National Center for Education Statistics, Common Core of Data, Private School Universe; authors' calculations.

Notes: 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. Urban counties are those where at least half of the population lived in urban areas in 2000. State measures include counties which had nonwhite student populations greater than or equal to 4% of the total student population in 1998.