An Empirical Analysis of Racial Segregation in Higher Education[*]

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Abstract: This descriptive paper documents how segregation between blacks and whites across colleges in the United States has evolved since the 1960s. It also explores potential channels through which changes are occurring, and it uses recent data to study the issue of segregation within colleges. The main findings are as follows: (1) White exposure to blacks has been rising since the 1960s, whereas black exposure to whites increased sharply in the late 1960s and early 1970s and has fluctuated since then. Meanwhile, black-white dissimilarity and the Theil index fell sharply in the late 1960s and early 1970s and have fallen more gradually since. (2) There has been regional convergence, although colleges in the South remain more segregated than those in any other region when measured by dissimilarity, by the Theil index, or by black exposure to whites. (3) A major channel for the decline in segregation is the declining share of blacks attending historically black colleges and universities. (4) Although there is segregation within universities, most segregation across major × university cells occurs across universities.

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I. Introduction

In the early twentieth century, Southern states operated dual systems of higher education, and universities in other regions of the country enrolled very few African-American students. But then several important Supreme Court rulings held that the separate higher education accommodations provided to blacks were in fact unequal (*Missouri ex rel. Gaines v. Canada* in 1938, *Sipuel v. Board of Regents of the University of Oklahoma* in 1948, and *Sweatt v. Painter* and *McLaurin v. Oklahoma State Regents for Higher Education* in 1950), which helped set the stage for the 1954 *Brown v. Board of Education* ruling that separate can never be equal. Some states took longer than others to integrate their colleges, but U.S. colleges today are open to students of all races. But as evidenced by affirmative action bans in several states, recent court rulings, ongoing college desegregation litigation, and the fact that the Supreme Court recently heard the affirmative action case *Fisher v. University of Texas* and will soon hear the case *Schuette v. Coalition to Defend Affirmative Action*, issues of race and higher education are still high on the public policy agenda. Further, colleges today are less segregated than they were a century ago, but students of different races still have differing enrollment patterns.

The main purpose of this descriptive paper is to document how racial segregation between blacks and whites has evolved across four-year colleges in the United States since the 1960s and to consider some potential channels through which changes are occurring. Although little is known about racial segregation at the college level, research on K-12 schools has found negative effects of racial segregation on students and has found positive effects of desegregation plans (Guryan 2004; Johnson 2010, 2011; Reber 2010; Weiner, Lutz, and Ludwig 2009). Moreover, the Supreme Court has taken the view in two important affirmative action cases, 1978's *Regents of the University of California v. Bakke* and 2003's *Grutter v. Bollinger*, that

affirmative action is constitutional on the grounds that there are educational benefits to racial diversity. Furthermore, racial segregation across colleges may have important implications for social networks, job networks, and housing patterns. This may in turn affect incomes, economic inequality, and social cohesion. But even though little is certain about the consequences of racial segregation in higher education, documenting its extent and considering some explanations for its trends should be a worthwhile step toward a more complete understanding of racial segregation at the college level.

In showing how the level of racial segregation has changed over the years, I utilize data on the racial composition of nearly every college in the continental 48 states and the District of Columbia in the even years between 1968 and 1988 and every year between 1990 and 2011. I also make use of data on the racial compositions of public universities in the South every year from 1960 to 1967. I employ standard measures of segregation such as the index of white exposure to blacks, the index of black exposure to whites, the black-white dissimilarity index, and the Theil index to study how segregation has evolved nationally. I also examine differences by geographic region and public/private control, and I explore potential channels for changes in segregation over time. At the end of the paper I use data from 2011 to study the issue of segregation across majors within colleges. The main results are:

(1) White exposure to blacks has been rising since the 1960s, whereas black exposure to whites increased sharply in the late 1960s and early 1970s and has fluctuated since then. Meanwhile, black-white dissimilarity and the Theil index fell sharply in the late 1960s and early 1970s and have fallen more gradually since.

(2) There has been regional convergence, although colleges in the South remain more segregated than those in any other region when measured by dissimilarity or by black exposure to whites.

(3) A major channel for the decline in segregation, especially in the South, is the declining share of blacks attending historically black colleges and universities.

(4) Although there is segregation within universities, most segregation across major × university cells occurs across universities.

The next section of this paper discusses previous related research, and the following section discusses the data. The next three sections show results for segregation across colleges. After that, I consider the issue of segregation within colleges, and I conclude by summarizing the results and discussing possible directions for future research.

II. Previous Research

There has been a large amount of research on racial segregation in contexts other than higher education in recent years, especially in the context of elementary and secondary schools. This work on elementary and secondary schools includes descriptive work (Clotfelter 2004; Cascio et al. 2008; Rivkin and Welch 2006) and research on the impact of financial incentives on desegregation (Cascio et al. 2010). It also includes work on the effects of K-12 desegregation policy on segregation levels (Reber 2005), school district finances (Reber 2011), housing prices (Boustan 2012), residential and school choices (Baum-Snow and Lutz 2011), educational outcomes (Guryan 2004; Reber 2010; Johnson 2011), economic outcomes (Johnson 2011),

health (Johnson 2010, 2011), and crime (Weiner, Lutz, and Ludwig 2009; Johnson 2011).[1] Clotfelter, Vigdor, and Ladd (2006); Lutz (2011); and Reardon et al. (2012) have studied whether there is "resegregation" now that desegregation plans are being lifted. Billings, Deming, and Rockoff (2012) study the effects of ending a desegregation plan on academic outcomes and crime. Apart from the study of schools, other areas of recent research interest include residential segregation (Ananat 2011; Ananat and Washington 2009; Boustan 2011; Card, Mas, and Rothstein 2008; Card and Rothstein 2007; La Ferrara and Mele 2007); labor market segregation (Hellerstein and Neumark 2008; Hellerstein, Neumark, and McInerney 2008); and hospital desegregation (Almond, Chay, and Greenstone 2006; Chay, Guryan, and Mazumder 2009).

Although racial segregation in other contexts has been thoroughly studied, there is very little research on segregation at the college level. A notable exception is Clotfelter (2004, Ch. 6), who documents segregation levels at U.S. colleges and universities in 1976, 1986, and 1998.[2] Clotfelter (2004, Ch. 6) also makes use of selected pre-1976 data by reporting racial compositions of a set of 28 selective institutions in 1951, 1967, and 1970; showing the exposure rate of whites to nonwhites for a sample of 175 institutions for 1970 as well as the four-year private institutions among them for 1967; and reporting a segregation index for four-year public institutions in the South in 1961, 1965, and 1970. This paper adds to Clotfelter (2004, Ch. 6) by taking the full sample of universities farther back in time, going farther forward in time, and exploring the dynamics of segregation over shorter intervals (every other year from 1968 to 1988 and year-to-year from 1990 to 2011). I also consider some explanations for the observed trends,

[1] Rivkin and Welch (2006) provide useful background information and a review of earlier research on elementary and secondary school desegregation. For another overview, see Vigdor (2011). For a recent cross-country study of segregation, see Alesina and Zhuravskaya (2011).

[2] Another piece about racial segregation at the college level, albeit not about segregation in the overall student body, is Goff, McCormick, and Tollison (2002). That paper finds that winning Atlantic Coast Conference (ACC) basketball teams integrated first and that doing so further improved their records.

show the full distribution of exposure in addition to showing the average, and consider segregation across majors within colleges. To the extent that it is possible to compare, the results in Clotfelter (2004, Ch. 6) and this paper are broadly consistent. However, some important results emerge from using the additional data, including the fact that there was a large decline in segregation between 1968 and 1972, the trends in segregation since 1998, and the fact that changes in segregation are generally more gradual than episodic.

III. Data

The data I use in most of the analysis are data on fall full-time undergraduate enrollment by race for nearly every college in the continental United States. These data exist for the even years from 1968 to 1988 and for every year from 1990 to 2011. The data since 1986 come from the Integrated Postsecondary Education Data System (IPEDS), data from 1976-1984 come from the Higher Education General Information Survey (HEGIS), and data for the earlier years come from surveys conducted by the Office for Civil Rights (OCR) whose results I digitized (U.S. Department of Health, Education, and Welfare Office for Civil Rights 1969, 1972, 1974, 1976).

Although other racial groups have played an increasingly prominent role in American higher education over the years, there are several reasons why this paper focuses on segregation between blacks and whites. First, much of the history of race relations in the United States centers around blacks and whites. Second, as seen in Figure 1, representation of other racial groups at U.S. colleges and universities was limited until recently. Third, although the results are not reported here, the overall trends in segregation between underrepresented minorities collectively (i.e., combining blacks, Hispanics, and Native Americans into one group) and whites and also between non-whites and whites are similar to the trends in segregation between blacks

and whites. Many of the same trends are also evident when examining particular minority groups other than blacks, as well.

A few additional points about the data are in order. First, I exclude Alaska and Hawaii from the analysis because these states do not appear in the data I employ until 1976. However, the main results are not sensitive to the exclusion or inclusion of colleges in these states.[3] Second, I focus on four-year colleges. But although not shown here, many of the trends with two-year colleges are similar. One difference, though, is that black-white dissimilarity fluctuates more across two-year colleges than across four-year colleges, even though in both cases the general trend is toward less segregation. Third, although again the results are not shown here, the same general trends in segregation are seen when limiting the data to a balanced panel of universities that appear in the data set in each year. However, entry and exit of colleges may be an important channel through which changes in segregation occur, which is why the results shown in this paper include the full sample available in each year. Fourth, due to the nature of the data, my calculations of segregation by region are based on region of college attendance rather than region of residence. However, most students attend college in their home census region. For example, according to my calculations from the 2011 IPEDS Residence and Migration survey, 89.5% of four-year college students in 2011 attended a college in their home region.[4] It is also worth noting that, to the extent that college students live near their college after they exit, studying college racial segregation by the census region of college attendance may provide some information about later residential segregation or segregation of friendship groups.

[3] On the other hand, I keep data from West Virginia even though data from that state are missing in 1970. But again, the main results are not sensitive to this decision.
[4] The data do not permit breaking this figure down by race.

To help put the later results on segregation in context, Figure 1 shows how the racial composition of colleges overall has evolved over time. The figure reveals that colleges in the U.S. have become less white and more black over time. The figure also shows that representation of other racial groups was limited until recently. Although not shown here, analysis of data from the October Current Population Survey education supplements from 1968 to 2010 suggests that the rising ratio of blacks to whites in four-year colleges comes about at least in part because of a rising ratio of blacks to whites in the college-aged population. Trends in the black-white relative four-year college attendance rate are more difficult to discern with the CPS data, although blacks in recent years do seem to be attending college at a relatively higher rate compared to whites than they did in the earlier years.

IV. Exposure

One way of conceptualizing segregation is as isolation, which can lead to methods of measuring segregation based on exposure indexes. The principle is to measure how much contact students may potentially have with members of various races. I begin by showing the extent to which whites are attending college with blacks by using the index of white exposure to blacks. Suppose there are N colleges; that there are W white students overall; and that college i enrolls w_i white students, b_i black students, h_i Hispanic students, a_i Asian students, and n_i Native American students. Then the exposure index of whites to blacks is defined as $100 \times \frac{1}{W} \sum_{i=1}^{N} w_i \frac{b_i}{w_i + b_i + h_i + a_i + n_i}$. This measures the percentage of students at the average white student's university who are black. Lower values of this index correspond to higher levels of segregation.

Figure 2 shows that white exposure to blacks has been rising almost continuously over time.[5] In 1968, the typical white student attended a college that was 2.3% black. By 2011, this had risen to 10.2%. This increase may be partly attributed to the rising share of blacks amongst four-year college students seen in Figure 1. Black representation overall rose from 5.5% to 13.9% over this period. However, the magnitude of the increase in exposure in proportional terms is much larger than the increase in black composition overall, which suggests that changes in choices of which colleges to attend may also be partly responsible for the increase in exposure. Figure 2 also reveals that at one time whites were more exposed to blacks at public universities but now are at private universities. Table 1 shows that the states with the lowest exposure of whites to blacks in both 1968 and 2011 were Western states with low black populations. There have, however, been some changes in the states with the greatest exposure of blacks to whites. In 1968 these tended to be Midwestern states such as Michigan and Illinois, whereas in 2011 they were Southern states with large black populations such as Mississippi and Georgia. It is also worth noting that exposure of whites to blacks increased dramatically at the higher end. The highest value in 1968 was 6.0% in the District of Columbia, whereas the highest value in 2011 was Mississippi's 25.9%. Figure 3 further explores regional differences. Exposure of whites to blacks has risen in each census region. The increase has been particularly large in the South, although in recent years there has been a spike in white exposure to blacks in the West.[6]

The exposure index of whites to blacks gives the percentage of students who are black at the average white student's university, but it may also be of interest to study the full distribution

[5] Although not shown here, the results are similar when calculating the denominator as simply w_i+b_i.
[6] This large increase in the West in recent years is in large part due to the University of Phoenix. If this institution is dropped from the analysis, the increase in white exposure to blacks in the West in recent years becomes less dramatic and Arizona is no longer one of the states with the highest exposure of whites to blacks. However, the other results in the paper are substantively the same.

over which this average is taken. For example, one way in which an exposure index of 10 could come about is through all white students attending colleges that are 10% black, but a different way it could come about is through 90% of whites attending colleges that are 1% black and 10% of whites attending colleges that are 91% black. These two distributions have very different implications for the experience of the modal student. In order to investigate exposure in more detail, Figure 4 plots the distribution for white students of the percentage of students who attend their college who are black at four points in time: 1968, 1982, 1996, and 2011. The distribution in 1968 has a very high peak at very low levels of percent black, showing that many white students attended colleges enrolled very few blacks. This peak has fallen dramatically over time as the distribution has shifted to the right, which shows that white students are not only on average attending colleges that have greater black representation but that they are doing so throughout the distribution.

It is also useful to measure the extent to which blacks attend college with whites by using the index of black exposure to whites. Using the same notation as before and letting B refer to the total number of black college students, this is defined as $100 \times \frac{1}{B} \sum_{i=1}^{N} b_i \frac{w_i}{w_i + b_i + h_i + a_i + n_i}$. This measures the percentage of white students at the average black student's college. The index of black exposure to whites need not reveal the same trends in segregation as the index of white exposure to blacks if, as is actually the case, the racial composition of the overall pool of students is changing over time.

Figure 5 shows that black exposure to whites increased sharply in the late 1960s and early 1970s but has fluctuated since then.[7] In 1968, the typical black student attended a college that was 38.6% white. By 1972, this had risen to 51.2%. In 2011, this figure stood at 48.7%.

[7] Although not shown here, the results are again similar when calculating the denominator as simply w_i+b_i.

The figure also reveals that blacks have greater exposure to whites at public universities, although the trends over time are similar between publics and privates. Table 2 shows which states had the highest and lowest black exposure to whites in 1968 and 2011. In both years, Western and New England states with large white populations were the ones with the highest exposure of blacks to whites. Southern states are heavily represented amongst those with the lowest exposure in both years. However, the table also shows that there was a large increase in exposure at the lower end between 1968 and 2011. For example, only 3.6% of students at the college of the average black student in North Carolina were white in 1968, but this had risen to 35.0% by 2011. Figure 6 shows trends by census region over time. The most striking result here is the regional convergence. The South had much lower exposure of blacks to whites than the other regions in 1968, but exposure of blacks to whites there has risen over time. There was an especially large increase in the 1970s. Meanwhile, exposure of blacks to whites has fallen in the other regions. This falling exposure is surely in large part due to the declining white representation overall observed in Figure 1, but it is also worth noting that it comes at a time when inequality in the labor market, for example, is generally rising (Autor, Katz, and Kearney 2008).

Figure 7 shows the full distribution of percent white for black students in 1968, 1982, 1996, and 2011. In 1968 the distribution was bimodal, with a large peak near 0 and a substantial amount of mass at very high levels of percent white. Black students of this time period thus experienced polar opposite college racial compositions. But the distribution of percent white for black students has become much more uniform over time. There still are black students who enroll at colleges that enroll few whites, although this is much less common than before. It is

also much more common for black students to attend colleges that enroll intermediate percentages of white students.

V. Black-White Dissimilarity

Changes in exposure come about through both changes in the overall representation of the various racial groups and changes in how evenly those groups are distributed across colleges. It may be useful to isolate the changes in how evenly students of different racial groups are distributed across different colleges in a way that is not sensitive to the overall sizes of the groups. One way to do so is with the black-white dissimilarity index, which is defined as $100 \times \frac{1}{2} \sum_{i=1}^{N} \left| \frac{b_i}{B} - \frac{w_i}{W} \right|$. This measures the percentage of members of one racial group who would need to switch colleges in order for all colleges to have the same ratio of white to black students as one another. Higher values of the dissimilarity index correspond to greater segregation.

Figure 8 reveals that black-white dissimilarity fell sharply in the late 1960s and early 1970s and has fallen gradually since then. In 1968, 63.9% of whites (or 63.9% of blacks) would have needed to move to a different university in order for all universities to have the same ratio of white to black students as one another. This figure had dropped to 52.5% by 1972 and to 48.0% by 2011. Figure 8 also reveals that the private sector is more segregated than the public sector when segregation is measured by the black-white dissimilarity index. A similarity between Figures 2, 5, and 8 is the large decline in segregation between 1968 and 1972. To put the magnitudes of the black-white dissimilarity index in higher education in perspective, Rivkin and Welch (2006) report that the black-white dissimilarity index in elementary and secondary schools in the United States was 81.2% in 1968 and 68.7% in 2000. Thus, the higher education sector is less segregated than the K-12 sector when measured by black-white dissimilarity. In

fact, K-12 schools were more segregated in 2000 than colleges and universities were in 1968. However, one point to keep in mind when comparing segregation at the college level to segregation at the elementary and secondary level is that college attendance is not compulsory, and so the results do not necessarily measure the extent of segregation experienced by all individuals of college age in their daily lives. Furthermore, if college attendance rates change, the results may be sensitive to the type of college attended by the marginal student. But despite this caveat, the results should still be valid as a measure of segregation amongst those students who are enrolled in college.

Table 3 shows which states were the most and least segregated according to the black-white dissimilarity index in 1968 and 2011. The states with the lowest dissimilarity indexes tend to be Western states, especially in 2011 but also to a lesser extent in 1968. The list of the most segregated states in 1968 includes Deep South states like Georgia, Alabama, and Mississippi. In 2011, these states are missing from the list, but the list includes the border states Maryland and Delaware, as well as the District of Columbia. It is also noteworthy that the most segregated states in 2011 were much less segregated than the most segregated states in 1968. For example, in Virginia in 1968, nearly 97% of students of one race would have needed to switch colleges in order for all colleges to have the same ratio of white to black students as one another. North Carolina appears in a similar slot in the two lists, but the dissimilarity index had fallen by nearly 35 percentage points between 1968 and 2011.

Figure 9 shows trends by region over time. This figure clearly demonstrates regional convergence. Segregation has fallen dramatically over time in the South, and it has increased in the other regions. But despite this regional convergence and dramatic decline in segregation in the South, colleges in the South have consistently remained more segregated than those in any

other region when measured by dissimilarity or by black exposure to whites. This is in contrast to the case of K-12 schools, in which, at least from 1972 to 2000, schools in the South were actually less segregated than those in other regions (Clotfelter 2004, Table 2.1; Rivkin and Welch 2006, Table 4).[8] A simple explanation for the lower K-12 segregation but higher college segregation in the South is that it may be more difficult to desegregate colleges than elementary and secondary schools. For example, college attendance is not compulsory, and students generally have more choice of which college to attend than which high school to attend. It is more common to move away for college than it is for high school, and the private sector, which is less subject to government oversight than the public sector, is larger for colleges than for K-12. Although parents choose elementary and secondary schools through residential location choices, there is no analog of "forced busing" or "attendance zones" in higher education. This high level of choice in higher education may facilitate racial segregation at the college level. On the other hand, since colleges generally have wider catchment areas than elementary and secondary school districts, college desegregation policy is not limited by residential segregation to the extent that elementary and secondary desegregation policy is.

Figure 10 gives evidence of the decline in segregation in South over a longer time period by using data on Southern public universities going back to 1960. The pre-1968 data consist of information from a *Chronicle of Higher Education* article that published results from an Office for Civil Rights survey on the racial compositions of colleges enrolling 500 students or more in 1967, as well as reports from the Southern Education Reporting Service (SERS) on the racial compositions of public universities in the South from 1960-1966 (Southern Education Reporting

[8] Additionally, when compared to the results for elementary and secondary schools presented by Rivkin and Welch (2006), elementary and secondary schools in the South show a similar level of segregation to colleges and universities in that region over the years. In other regions, however, K-12 schools are more segregated than colleges are.

Service 1961a, 1961b, 1962, 1963-64, 1964-65, 1965-66, 1966-67; *The Chronicle of Higher Education* 1968). Contrary to the case of the other data sources used in this study, there is a fair amount of missing data in the SERS reports. But taking the results at face value, Figure 10 reveals that the decline in black-white dissimilarity in the South is even more dramatic when viewed over a longer period of time. Furthermore, the public university systems in Alabama, Mississippi, and South Carolina were completely segregated at the beginning of the time period I examine, and the university systems in all the Southern states were completely segregated in the beginning part of the twentieth century. Thus, extrapolating the results in Figure 10 back in time would make the decline in segregation appear yet more dramatic.[9]

VI. Theil Index

A strength of the dissimilarity index as a measure of unevenness is that its magnitudes have a natural interpretation as the percentage of members of one group who would need to switch colleges in order for colleges to be racially balanced. A weakness, however, is that the dissimilarity index does not allow one to partition segregation into different components in order to take a closer look at why segregation exists (Reardon, Yun, and Eitle 2000). I thus turn to an alternative index, the Theil index, which does allow for such decompositions.

The Theil index is built up from a measure of entropy. Letting $P = \frac{B}{B+W}$ and $p_i = \frac{b_i}{b_i + w_i}$, the overall entropy is defined as $E = P \cdot \ln\frac{1}{P} + (1-P) \cdot \ln\frac{1}{1-P}$ and the entropy at

[9] However, one caveat is that, as Wallenstein (2009) points out, blacks attended the University of South Carolina as undergraduates during Reconstruction, so references to "the first black student to attend a white university in the South" often actually refer to the first student to do so in the twentieth century. Furthermore, the University of Alabama had briefly enrolled a black student in 1956, but public institutions in Alabama were completely segregated again after that.

college i is defined as $E_i = p_i \cdot \ln\frac{1}{p_i} + (1-p_i)\cdot \ln\frac{1}{1-p_i}$. The magnitudes of entropy are difficult to interpret, but note that these functions are maximized at and are also symmetric about $P = .5$ and $p_i = .5$. They are thus measures of racial imbalance. The Theil index is then an enrollment-weighted average of how the entropy at particular colleges differs from overall entropy and is defined as $H = 100 \times \sum_{i=1}^{N} (\frac{b_i + w_i}{B+W})(\frac{E - E_i}{E})$. Higher values of the Theil index correspond to higher levels of segregation. Comparing Figure 11, Figure 12, and Table 4 to Figure 8, Figure 9, and Table 3 shows that trends in segregation as measured by the Theil index are similar to trends in segregation as measured by the dissimilarity index. However, unlike the dissimilarity index, the Theil index allows for decompositions that partition segregation additively into different components. Although these decompositions do not necessarily answer any causal question and are more of an accounting exercise, they can still be useful for identifying channels through which changes in segregation occur and for potentially ruling out other channels.

I first partition segregation into a within-state component and an across-state component. One potential reason why there is segregation between blacks and whites is that blacks and whites live in different states from one another, or at least choose to attend colleges in different states from one another. On the other hand, there may be substantial segregation within states. Letting H_S refer to the quantity obtained when aggregating the data up to the state level and calculating the Theil index across the 48 states in the data and the District of Columbia, H_s refer to the Theil index within state s, E_s refer to the entropy within state s, B_s refer to the number of blacks attending college within state s, and W_s refer to the number of whites attending college

within state s, the Theil index can be written as $H = H_S + \sum_{s=1}^{49} (\frac{B_s + W_s}{B + W}) \frac{E_s}{E} \cdot H_s$. The first term on the right-hand side is the cross-state component, and the second term is the within-state component.[10] Figure 13 displays the results when performing this decomposition for each year of the data. The results show that the within-state component is much larger than the between-state component and also that, at least in an accounting sense, the overall Theil index has been falling primarily because the within-state component is falling. This leaves open the question of why the within-state component has been falling, but it suggests that differences in the states in which whites and blacks attend college are not the major contributor to segregation or to its decline over time.

A further channel through which the decline in racial segregation over time is occurring is the large decline in the share of black college students who are attending historically black colleges and universities (HBCUs). HBCUs are higher education institutions that were created prior to 1964 with the goal of educating black Americans, and the vast majority of them are located in the South. Private HBCUs were primarily founded in the latter half of the nineteenth century by Northern missionaries and philanthropists, and many of the public HBCUs are the consequence of the 1890 Second Morrill Act, which prohibited federal land grant funding from going to states that operated universities intended for students of one race unless they also

[10] If it were not for the presence of $\frac{E_s}{E}$ in the second term, the second term would be a weighted average of within-state Theil indexes. The $\frac{E_s}{E}$ factor appears in the decomposition only because the initial definition of the Theil index includes the scaling factor $\frac{1}{E}$. See Reardon, Yun, and Eitle (2000) for an explanation of Theil index decompositions.

operated universities for students of other races. Over 100 HBCUs still exist today, the large majority of which are four-year institutions.

Figure 14 shows that as recently as 1970 over half of black college students enrolled in a four-year college were enrolled in an HBCU. That share is now down to less than 20%. Meanwhile, although whites are eligible to attend HBCUs, Figure 14 shows that a very small fraction of white college students choose to do so. Figure 15 reveals that, whereas non-HBCUs enroll a mix of racial groups, HBCUs continue to have a largely black student body. This figure may even give the impression that there are more whites at the typical HBCU than there actually are, since a large share of the white HBCU attendance is concentrated at a small number of HBCUs that have large white representations. Two HBCUs in West Virginia, Bluefield State College and West Virginia State University, were 87.2% and 78.7% white in 2011. Lincoln University in Missouri was over half white at one point and was 41.9% white in 2011. These three institutions combined enrolled 34.4% of the whites enrolled at HBCUs in 2011. On the opposite extreme are institutions such as Lane College, a private HBCU in Tennessee that was 100% black in 2011, and Spelman College, which was 99.5% black in 2011 and enrolled no whites. The median HBCU in 2009 was 96.6% black. Because HBCUs have a predominantly black enrollment and non-HBCUs do not, as seen in Figure 15, the shift in black enrollment from HBCUs to non-HBCUs observed in Figure 14 would presumably decrease measured segregation.

To study the relationship between HBCU attendance and racial segregation across colleges more formally, I divide colleges into two sectors: HBCUs and traditionally white institutions (TWIs, or non-HBCUs). Figure 16 presents results from decomposing the Theil index into a between-sector component and a within-sector component. The results suggest that in the earlier part of the time period I study, most segregation was attributable to the fact that a

large share of blacks attended HBCUs but very few whites did. However, the amount of segregation attributable to the between-sector component has been falling over time, whereas the within-sector component has actually been rising. This trend has occurred to such a large extent that the within-sector component of segregation now outweighs the between-sector component.

Although it appears that declining HBCU enrollment is lowering segregation levels, the effect of HBCUs on segregation levels is just one factor that should be taken into account when evaluating the merits of HBCUs.[11] For example, it is well known that HBCUs have a long history of being a training ground for black leaders. They may provide a welcoming atmosphere for black students and remedial education opportunities for underprepared students. Mykerezi and Mills (2008) find that HBCUs led to higher wage growth for black males using the 1979 National Longitudinal Survey of Youth. Fryer and Greenstone (2010) find that the returns to attending an HBCU were positive in the 1970s, but they do find that the returns were negative in the 1990s.

Fryer and Greenstone's findings may be useful in explaining the declining HBCU attendance seen in Figure 14 and the accompanying reduction in segregation seen in Figure 16, or vice versa. On the one hand, the lower return to attending an HBCU may cause an enrollment shift away from HBCUs and toward non-HBCUs. On the other hand, the lower return may be a consequence of the enrollment shift if, for example, lower enrollments made HBCUs less efficient or if high-ability black students (or faculty) left HBCUs for non-HBCUs and left the remaining students in a lesser position to benefit from peer effects. A third possibility, however, is that declining black HBCU enrollment is somewhat mechanical. The number of HBCUs presumably will not increase over time, since they are carryovers of an earlier era when Southern

[11] In addition, to the extent that HBCUs are drawing in students who would not attend college otherwise, it is not clear that it should be cause for concern that HBCUs are increasing racial segregation amongst those who are enrolled in college.

states operated dual systems of higher education and higher education opportunities for blacks were extremely limited. In fact, federal legislation *defines* HBCUs as having existed prior to 1964. Thus, under this definition, any increase in HBCU enrollment would need to come about through increases in enrollment at existing HBCUs rather than through entry of new HBCUs. To the extent that the existing HBCUs have limited capacity to expand, it is natural that a smaller share of black college students will be attending HBCUs over time as the number of black college students rises. In fact, in results not shown here, I find that the count of black students enrolled at HBCUs has actually risen over time but that this increase has not been as large as the increase in the number of black college students overall.

VII. Segregation within Colleges

Even if blacks and whites are attending the same colleges as one another, this does not mean that they are taking the same courses, participating in the same activities outside of the classroom, living near each other, or that they are friends with one another. Segregation across courses, extracurricular activities, residential location, and friendship groups within colleges may be just as important as or more important than segregation across colleges.

Data for studying segregation across the entire country at a finer level than the college level are limited, but I attempt to shed some light on the issue by measuring segregation in earned degrees across all major × university combinations using data from the 2011 IPEDS Completions survey. This data set provides university-level information on the number of students of each race who received a bachelor's degree by two-digit, four-digit, and six-digit Classification of Instructional Programs (CIP) major codes. To give an example of these major codes, the six-digit code 450601 is "Economics, General," the four-digit code 4506 combines

"Economics, General" with related categories like "Econometrics and Quantitative Economics" and "International Economics," and the two-digit code 45 combines the various economics majors with majors in other social sciences such as political science and sociology. This data set provides some information about the extent to which students are in the same classroom with students of a different race and possibly about the extent to which members of different racial groups are interacting with one another, but there are also several limitations to using these data to study segregation at the college level. First, since not every college student goes on to graduate, there are many students who attended college but are not included in the data. Second, major choice is only one measure of interaction. Course selection within the major, extracurricular activities, living groups, and friendship groups may be important as well. But even though the data are not ideal and the evidence is admittedly limited, the results should still be valid as measures of segregation across majors amongst college graduates.

The results using the within-college data are presented in Table 5. The first column aggregates the major data up to the university level to look at segregation across colleges just for those who graduated. The results in this column are somewhat similar to those presented in Figures 2, 5, 8, and 11 for segregation across colleges for all enrolled students in recent years. However, the results in the first column of Table 5 for college graduates suggest that there is lower white exposure to blacks amongst graduates than amongst all students but less segregation amongst graduates by the other measures. As the table moves across columns, it measures segregation across smaller units. Students would presumably have more interaction in the classroom with those at their university with whom they share the same six-digit major code than they would with the average student at the university, and they would presumably also have

more interaction with those at their university with whom they share a two-digit or four-digit major code than they would with those with whom they only share a six-digit major code.

Interestingly, when moving across columns from the university level to eventually the two-digit major level at the university, the results do not change a great deal. For example, 7.9% of the graduates at the typical white graduate's university are black, and 7.2% of the graduates at the typical white graduate's university sharing the same six-digit major code are black. This suggests that, although there is segregation within colleges, much of the segregation observed in higher education is segregation across colleges rather than segregation within colleges across majors. The row giving results for the Theil index provides information required to show this more formally in a decomposition of segregation across major × university combinations into a cross-university component and a within-university component. For example, the Theil index of 34.3 across six-digit major × university combinations can be decomposed into the 25.0 shown in the first column attributable to segregation across universities and the remaining 9.3 (34.3 – 25.0) attributable to segregation within universities. Segregation across four-digit and two-digit major × university combinations can be decomposed in a similar way, and in each case the across-university component is substantially larger than the within-university component.

Table 5 also shows decompositions of segregation into within- and between-state components and within- and across-HBCU/TWI sector components. Consistent with the results in Figures 13 and 16 for all students in recent years, the results in the first column show that most segregation across colleges for college graduates in 2011 was attributable to the within-state component and to the within-HBCU/TWI component. The other columns of Table 5 show that the within-state component and the within-HBCU/TWI component are even larger when studying major × university combinations, although this is true mechanically because the

"across" components are the same and the "within" component cannot fall when studying segregation at a finer level.

VIII. Conclusion

The results of this paper suggest that, by several different measures, segregation at the college level has declined over the years. Black-white dissimilarity and the Theil index have fallen, whites have been increasingly exposed to blacks, and black exposure to whites is higher than it was in 1970 even though it has fluctuated since then. The trend of blacks attending HBCUs at a lower rate may be decreasing segregation, although on the other hand segregation is rising within traditionally white institutions. Further, in three of four census regions, the index of black exposure to whites, the black-white dissimilarity index, and the Theil index all point to greater segregation over time. Additionally, based on the results of this paper, substantially increasing the amount of interaction between blacks and whites in the classroom would seem to necessitate students attending different colleges rather than changing students' choices of field of study within colleges. When viewed as a whole, the results of this paper may suggest some successes but also some cause for concern for those who are concerned about racial segregation in higher education.

This paper represents a step toward understanding racial segregation at the college level by documenting how it has evolved over time and considering some channels through which changes in segregation are occurring. A useful avenue for future research would be to estimate the impact of higher education segregation on social networks, job networks, housing patterns, educational outcomes, earnings, income inequality, and other outcomes. It may also be fruitful to study the effects on segregation of other factors, such as college tuition policy. It is also worth

noting that policies and events that coincide with declining segregation, including falling enrollment at HBCUs, may come along with other costs or benefits. Understanding these costs and benefits would be useful as well. There are many difficult issues involved in making policies related to issues of race in higher education; but the effects of policies on segregation levels and other outcomes, as well as the effects of segregation, are factors that should be taken into account when thinking about which policies to enact.

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Figure 1: Racial Composition of Colleges

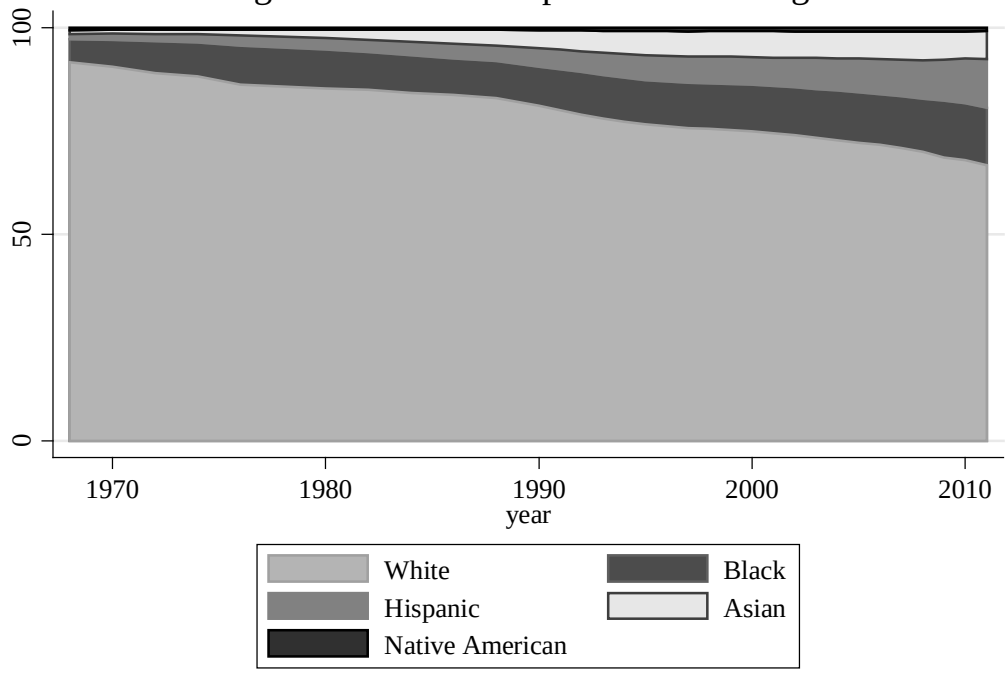


Figure 2: White Exposure to Blacks

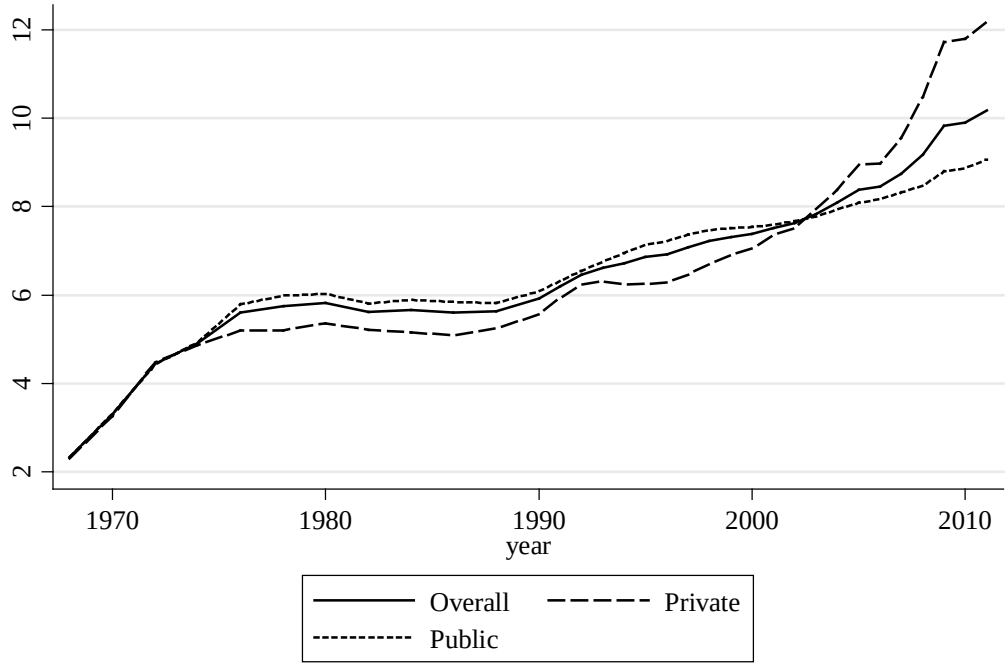


Figure 3: White Exposure to Blacks by Census Region

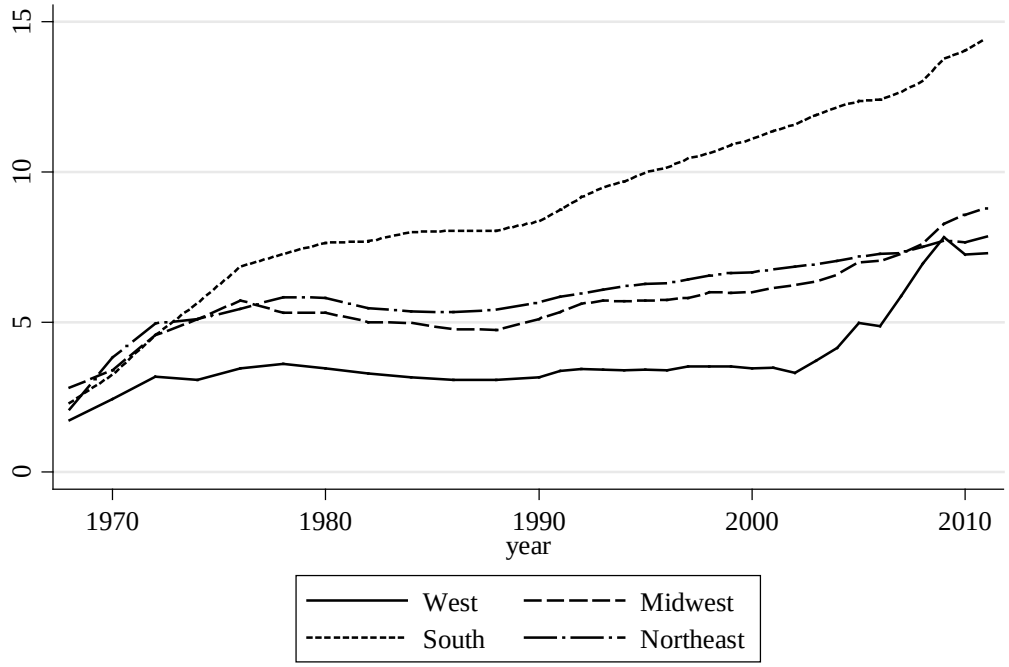


Figure 4: Distribution of White Exposure to Blacks

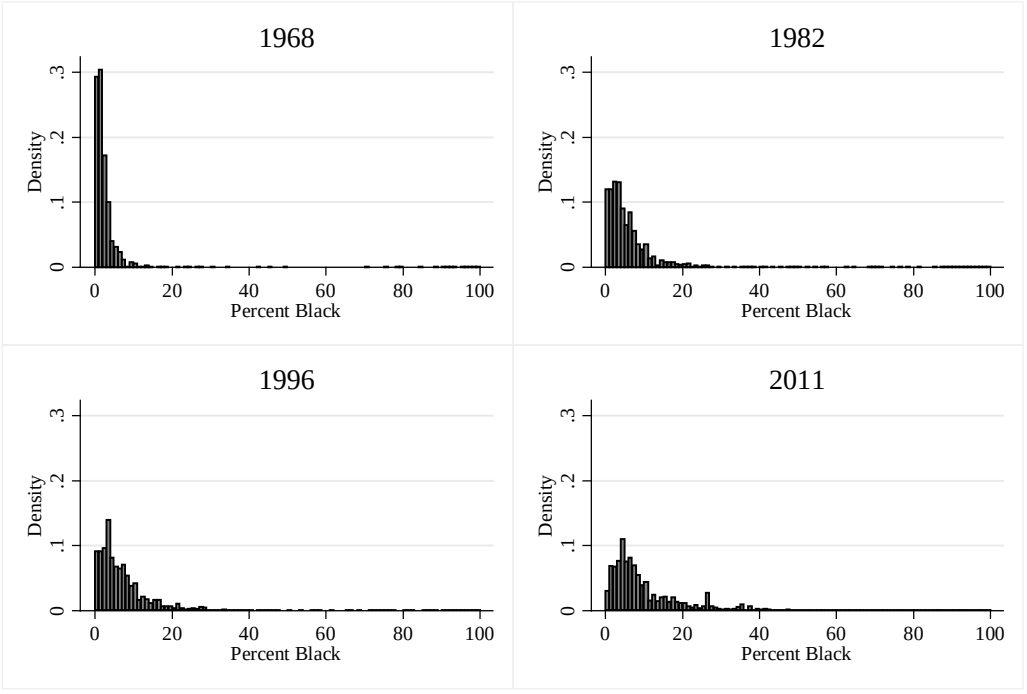


Figure 5: Black Exposure to Whites

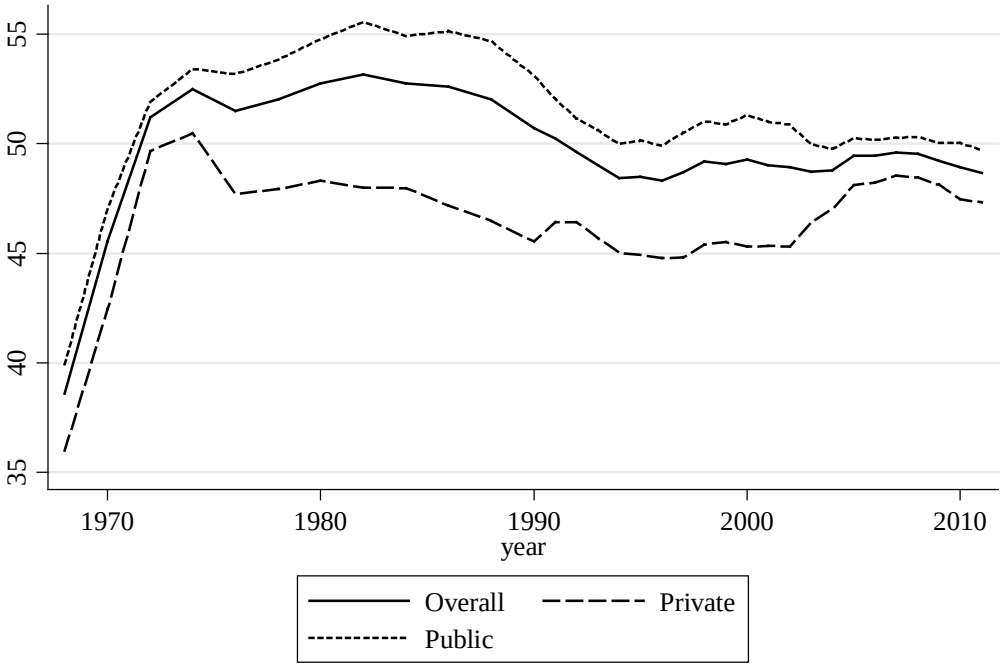


Figure 6: Black Exposure to Whites by Census Region

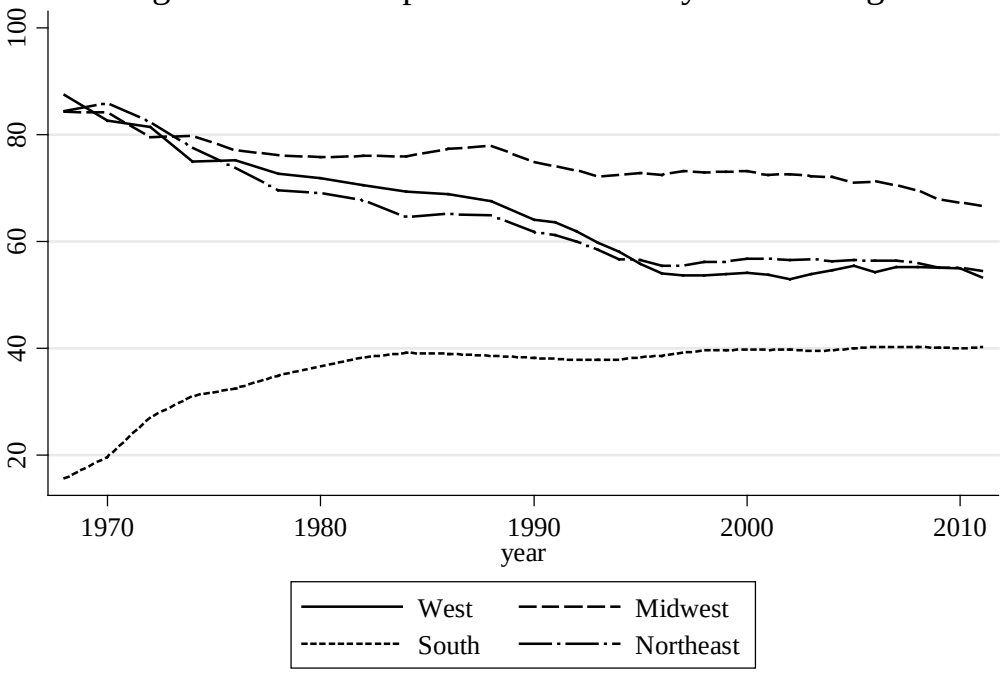


Figure 7: Distribution of Black Exposure to Whites

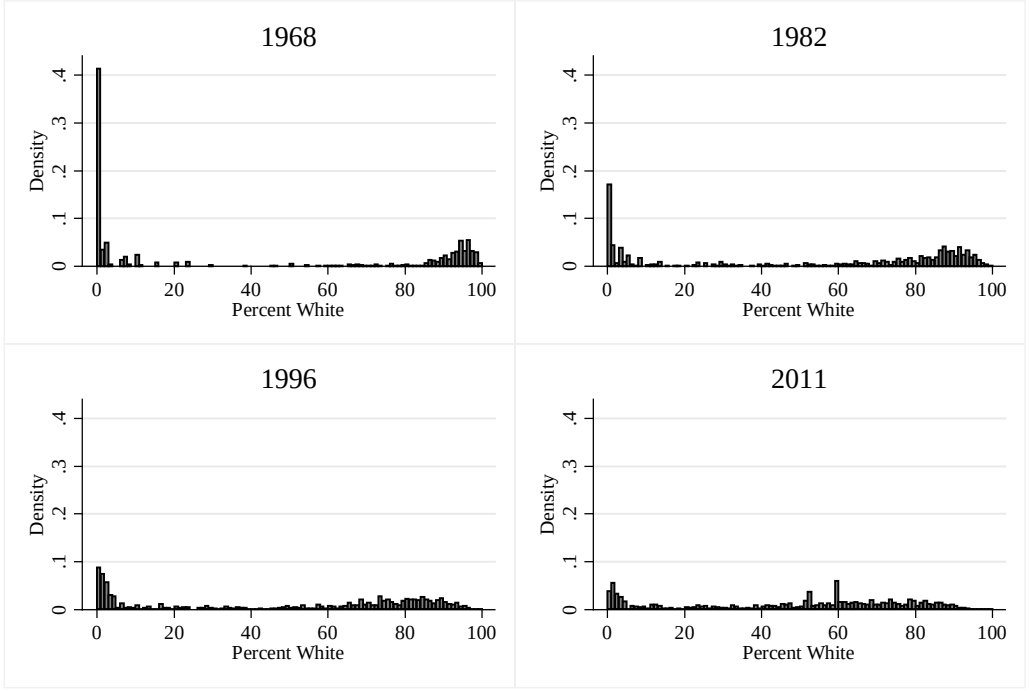


Figure 8: Black-White Dissimilarity

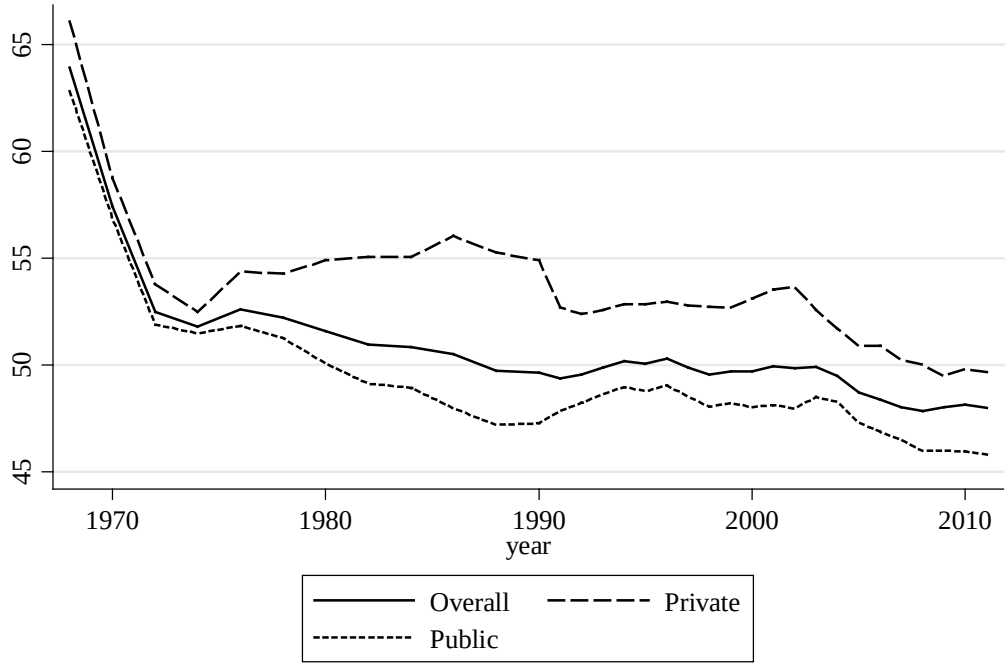


Figure 9: Black-White Dissimilarity by Census Region

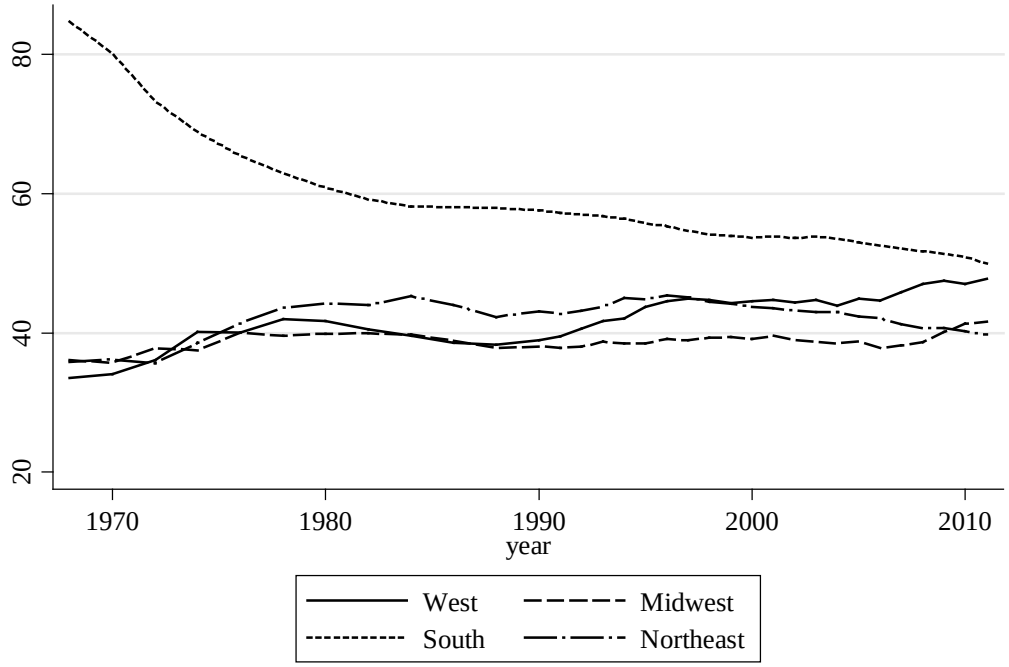


Figure 10: Black-White Dissimilarity in Southern Publics

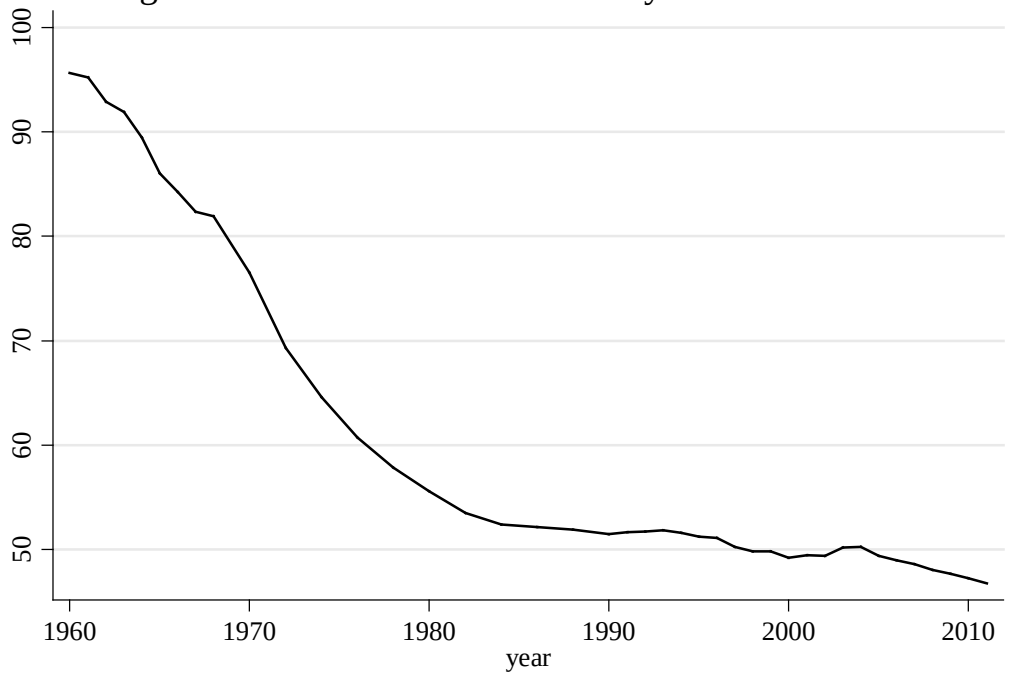


Figure 11: Theil Index

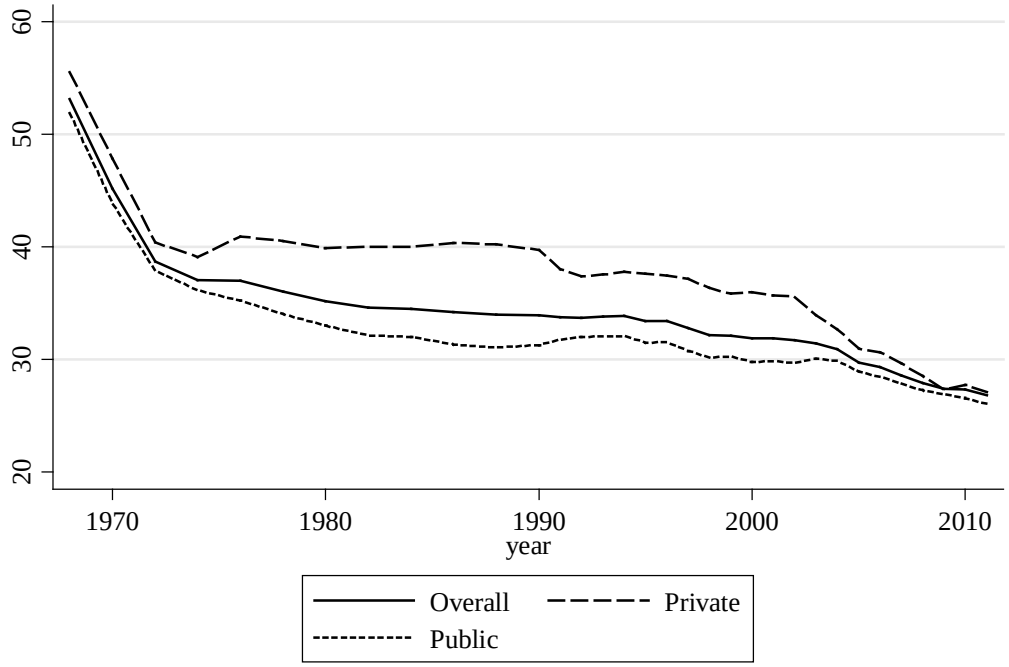


Figure 12: Theil Index by Region

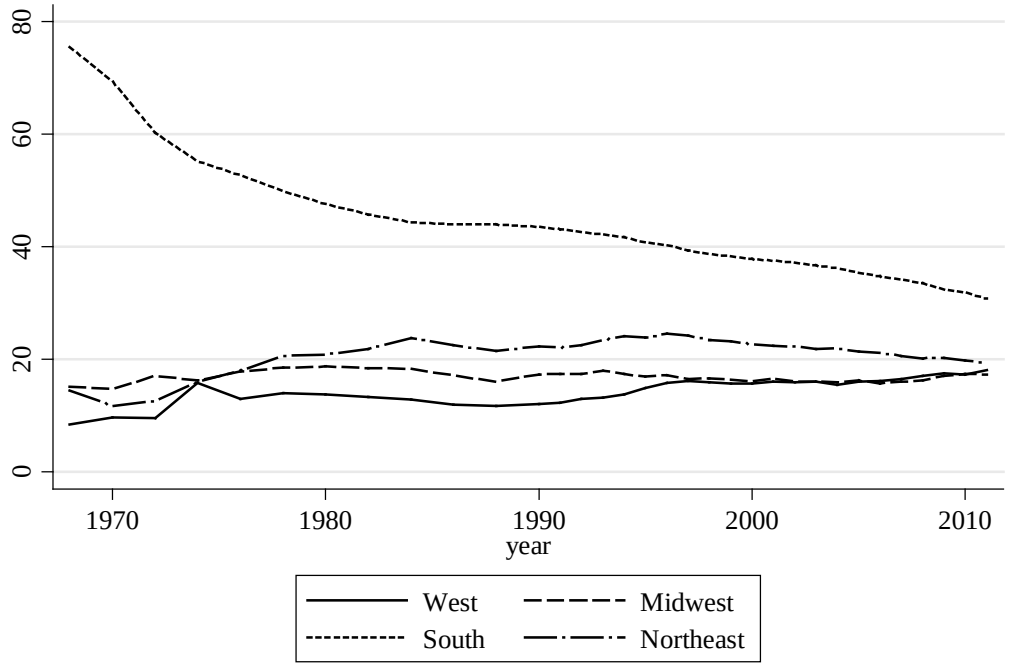


Figure 13: Theil Index Decomposition, Within vs. Between States

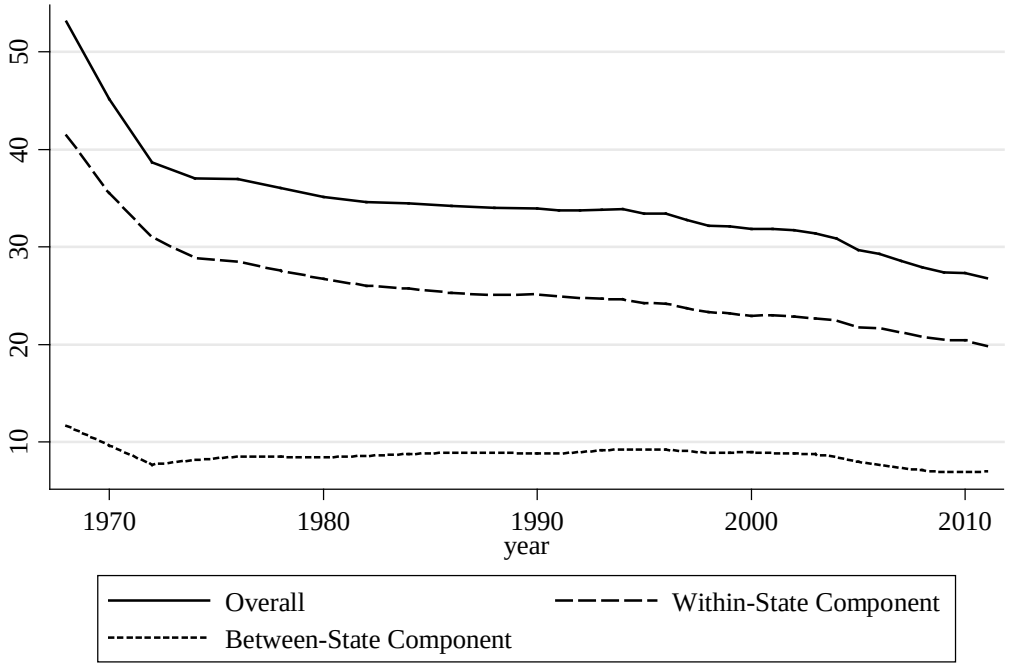


Figure 14: Percentage of Students at HBCUs

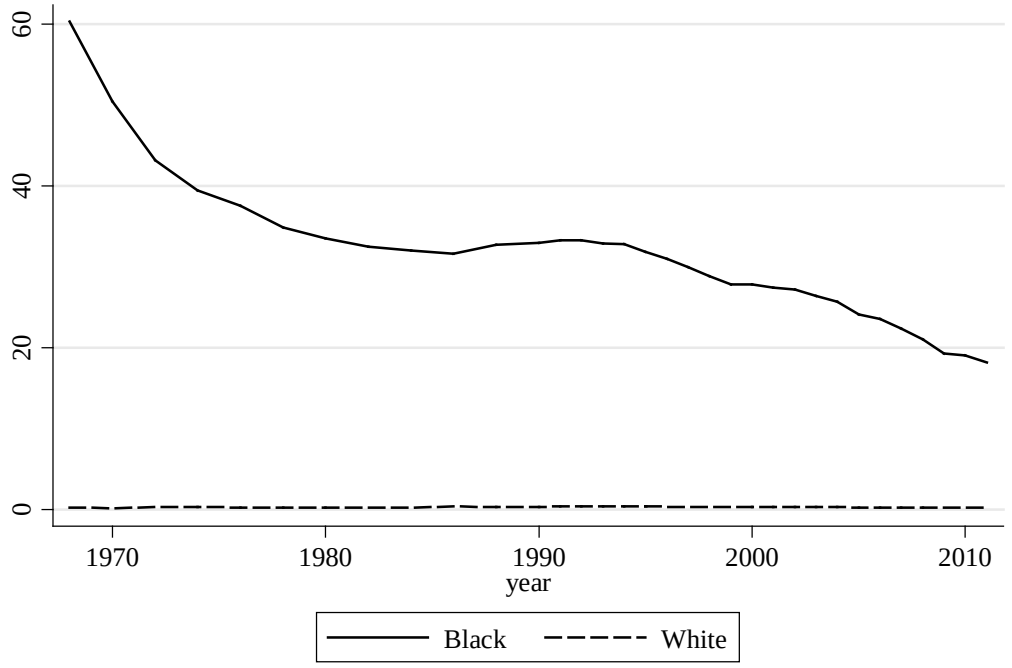


Figure 15: Racial Composition of HBCUs and non-HBCUs

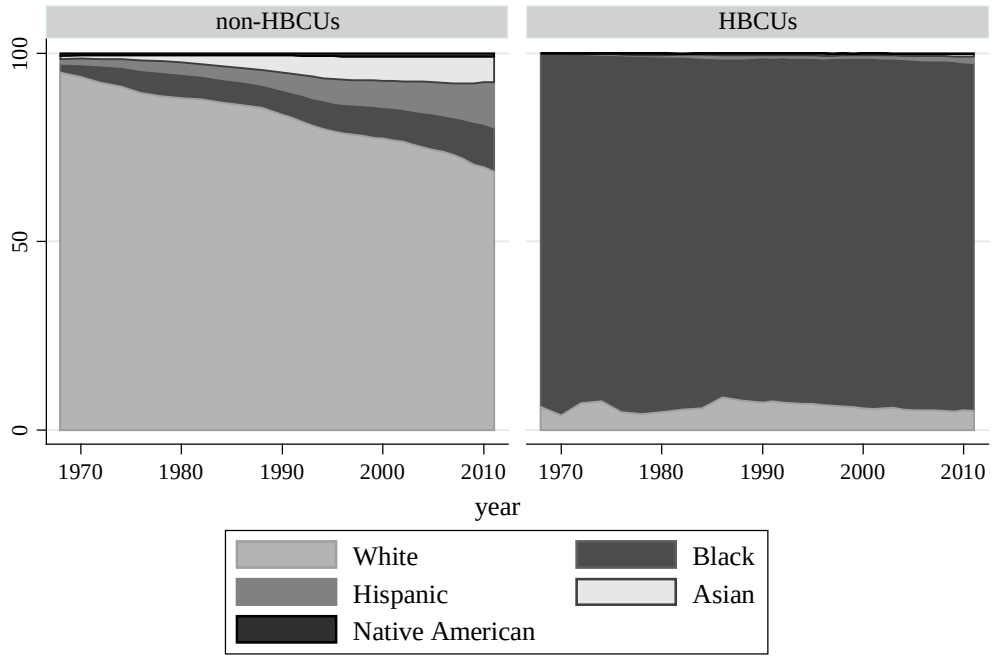


Figure 16: Theil Index Decomposition, Within vs. Between HBCU/TWI

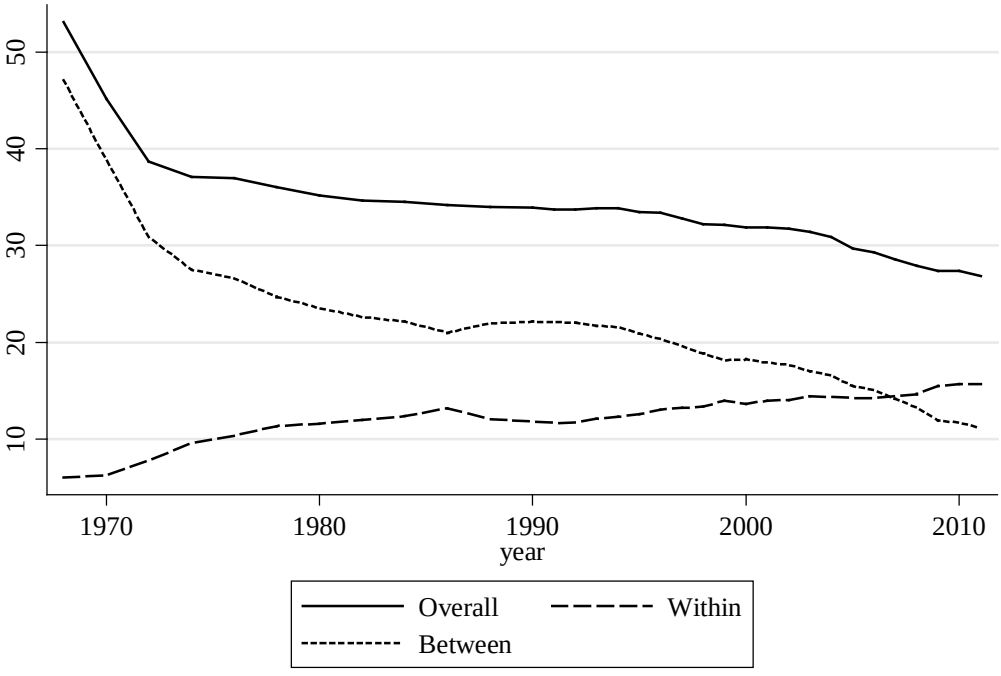


Table 1: Highest and Lowest White Exposure to Blacks in 1968 and 2011

1968		2011	
1 DC	6.0	1 Mississippi	25.9
2 Illinois	4.3	2 Georgia	21.8
3 Michigan	4.1	3 Alabama	19.3
4 Louisiana	3.8	4 Arizona	18.4
5 Missouri	3.2	5 Louisiana	17.4
45 Idaho	0.5	45 Vermont	2.2
46 Montana	0.4	46 South Dakota	1.8
47 South Dakota	0.4	47 Wyoming	1.3
48 Utah	0.4	48 Idaho	1.2
49 North Dakota	0.3	49 Montana	0.8

Table 2: Highest and Lowest Black Exposure to Whites in 1968 and 2011

1968		2011	
1 Wyoming	98.0	1 South Dakota	90.9
2 Idaho	97.6	2 Wyoming	89.9
3 North Dakota	97.5	3 Montana	89.7
4 Maine	97.1	4 Vermont	89.3
5 New Hampshire	97.0	5 Maine	88.6
45 Georgia	8.3	45 California	35.0
46 North Carolina	7.6	46 North Carolina	35.0
47 Alabama	7.4	47 Delaware	33.3
48 Mississippi	3.9	48 Maryland	32.2
49 Virginia	3.9	49 DC	13.5

Table 3: Lowest and Highest Black-White Dissimilarity in 1968 and 2011

1968		2011	
1 Wyoming	0.0	1 Wyoming	5.2
2 Arizona	7.9	2 Montana	10.8
3 Kansas	17.9	3 New Mexico	20.0
4 Connecticut	21.2	4 Idaho	20.6
5 Indiana	22.3	5 Oregon	20.8
45 Georgia	91.7	45 South Carolina	54.8
46 North Carolina	92.4	46 Maryland	56.2
47 Alabama	92.7	47 North Carolina	57.5
48 Mississippi	95.9	48 Delaware	69.5
49 Virginia	96.9	49 DC	82.1

Table 4: Lowest and Highest Theil Index in 1968 and 2011

1968		2011	
1 Wyoming	0.0	1 Montona	1.0
2 Arizona	0.4	2 Wyoming	1.2
3 Washington	2.8	3 Idaho	2.2
4 Kansas	2.8	4 Oregon	3.5
5 New Mexico	3.2	5 Vermont	3.6
45 Georgia	84.8	45 South Carolina	36.1
46 North Carolina	85.5	46 Maryland	37.0
47 Alabama	86.0	47 North Carolina	38.4
48 Mississippi	90.0	48 Delaware	45.1
49 Virginia	91.8	49 DC	65.1

Table 5: Segregation Across Universities and Majors for 2011 Graduates

	Level of Observation			
		Major × University		
Segregation Measure	University	Two-Digit	Four-Digit	Six-Digit
White Exposure to Blacks	7.9	7.5	7.3	7.2
Black Exposure to Whites	54.0	51.3	49.9	49.5
Black-White Dissimilarity	45.4	51.4	54.5	55.2
Theil Index	25.0	30.4	33.5	34.3
Within-State Component	18.8	24.1	27.3	28.1
Between-State Component	6.2	6.2	6.2	6.2
Within HBCU/TWI	14.5	19.9	23.0	23.8
Across HBCU/TWI	10.5	10.5	10.5	10.5
N	2,606	29,134	56,643	70,123