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Race disparities in birth outcomes in the U.S. South and the rest of the nation

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Abstract

There are well-documented and as yet unexplained disparities in birth outcomes by race in the United States, even after controlling for socioeconomic status. This paper examines the sources of disparities in low birth weight between blacks and whites in the U.S., by focusing on differences in disparities between two very distinct geographic areas, the Deep South and the rest of the country. Two findings from prior research drive the analyses: First, health overall is worse in the Deep South states; Second, race disparities are smaller in the Deep South than in the rest of the nation. A number of potential explanations for these findings are examined. Results suggest that, first, almost all of the increased burden of low birth weight in the Deep South states may be explained by differences in race composition and socioeconomic status between the Deep South and rest of the nation. Second, the lower race disparities found between the two regions are being driven by much worse outcomes for white mothers in the Deep South (vs. the rest of the country), particularly for poor whites, as opposed to better outcomes for black mothers. Potential paths for future research are recommended.

Introduction

There are well-documented and as yet unexplained disparities in birth outcomes by race in the United States, even after controlling for socioeconomic status. Rates of low birth weight are twice as high among African Americans as they are among whites. The U.S. is not unique in this respect. Similar disparities have been found in the U.K. – a country with a very different health care system and history of immigration.

One question that has been insufficiently explored is how much health disparities vary within the United States. Answering this question may be more fruitful than cross-national comparisons for understanding the causes of health disparities since national policies and many historical factors can be assumed to be constant across region within a country. South-non-South comparisons within the U.S. are possibly of particular value since those areas are thought to differ considerably in terms of race relations and residential segregation, factors that may be associated with health outcomes. The north-south comparison is also of value because overall health has been shown to be worse in the south than in the north, yet there is some evidence that race disparities may be lower in the South.

These two puzzles (worse health overall in the South and lower race disparities in the South) suggest that one or a combination of the following are operating: (1) Socioeconomic status (SES) is lower for all groups in the South compared with the rest of the nation; (2) SES inequality by race is lower in the South than in the rest of the nation; (3) Health returns to SES (i.e. SES/health gradients) are higher for blacks or are lower for whites in the South than in the rest of the nation; or (4) The health disadvantages associated with living in the South are greater for whites as compared with blacks.

In this paper, these potential explanations are explored. First, I examine the extent to which differences in socioeconomic status and race composition explain the observed differences in infant health outcomes between the south and the rest of the country. Second, I explore the relative sizes of race disparities in the South and the rest of the nation before and after controlling for measures of SES and health behaviors. Finally, I test whether the health-enhancing aspects of higher socioeconomic status (returns to SES) differ within racial group by region and across racial group by region.

Background

Non-Hispanic black children, who are also more likely to be poor, have much higher rates of infant mortality, preterm birth, and low birth weight than do white children (Martin et al. 2006; Matthews and MacDorman 2006). A number of social processes have been hypothesized to contribute to these disparities, including poverty, low levels of education, exposure to toxic environments, bad neighborhoods, poor working conditions, lack of access to quality health care, discrimination, and high levels of stress (Williams and Collins 1995). Numerous studies have attempted to explain race disparities, by controlling for some of these risk factors, though few have been able to do so. However, no national data source has information on birth outcomes and all the components of socioeconomic status (income, educational attainment, quality of education, wealth, neighborhood, occupation, perception of one's status), as well as the changes in each component across the life course (Braveman 2007). Without such data, it is impossible to disentangle the independent effects of race and SES.

An alternative approach to understanding the sources of race disparities in health is to examine geographic variations in disparities, taking advantage of the differing political, economic, and social contexts across areas. A recent study compared racial and ethnic disparities

in low birth weight in the U.S. and England, countries with very different policy contexts (provision of universal health care and guaranteed minimum income in the U.K.), immigration patterns (most immigration in U.K. is post-World War II), and racial/ethnic groupings (blacks are recent immigrants from Africa and the Caribbean in the U.K.) (Teitler et al. 2007). Despite these differences, they found: (1) very similar overall rates of low birth weight in the two countries (7.6% in 2000); (2) strikingly similar disparities between black and white children in both places, and (3) that none of the disparity was explained by adjusting for SES and a number of risk factors in either country.

A similar comparative approach can be applied within the U.S., where there is substantial geographic variation in birth outcomes. In 2003, low birth weight rates varied from 6% in Washington state to 11.4% in Mississippi (Martin et al. 2005). A few studies have examined larger geographic areas and have determined that there are important regional differences in the U.S. in many measures of health, which go hand in hand with differences in risk factors. Several studies have found much higher rates of infant mortality, low birth weight, and preterm birth clustered among states in the South (Allen et al. 1987; Thompson et al. 2005), particularly in the deep South (Goldhagen et al. 2005). These differences persisted after controlling for race, suggesting a higher burden of poor child health for all groups in this area. A recent article in The New York Times (Eckholm 2007) drew attention to the sharp increase in infant mortality in Mississippi (and smaller increases in Alabama, Tennessee, North Carolina, Louisiana, and South Carolina), and identified a number of potential contributing factors, which are also much more prevalent in these states, including: extreme poverty, maternal obesity, lack of accessible health care, and cuts in welfare and Medicaid. A recent report from the Commonwealth fund ranked all the states on 32 separate indicators related to quality of the health care system, access to health

care, and several health outcomes (Cantor et al. 2007). Of the 13 states in the bottom quintile (worst performing), 11 were states from the South.

The South also has a unique political and social history, especially with regard to race relations, which provides a useful context in which to explore race disparities in birth outcomes as compared with the rest of the nation. Only one study to our knowledge has explored disparities by region. Using data from 1980, they found that black-white disparities in infant mortality and low birth weight were actually smaller in the South than in some other regions of the U.S, though no adjustments were made for SES or any other risk factors (Allen et al. 1987). There have been many demographic, political, and social changes in the nation in the past 20 years, which call for new and more comprehensive analyses of regional variation in race disparities in infant health in the U.S.

Another approach to understanding the sources of racial disparities is to explore the role of socioeconomic status in improving child health, and how this varies across groups. Numerous studies have documented a graded relationship between various measures of SES and child health (Case, Lubotsky and Paxson 2002; Chen, Martin and Matthews 2006; Currie and Stabile 2003; Finch 2003; Goodman 1999; Starfield, Robertson and Riley 2002). This graded relationship indicates that improvements in health are observed at each higher level of SES, not just at the extremes. A handful of studies have examined the relationship between SES and birth outcomes across different racial/ethnic groups, and have generally found the strongest graded associations for whites, somewhat weaker ones for blacks (Acevedo-Garcia, Soobader and Berkman 2005; David and Collins 1997; Kleinman and Kessel 1987; Pallotto, Collins and David 2000; Parker, Schoendorf and Kiely 1994), and much weaker or non-existent ones for Hispanics and Asians (Acevedo-Garcia et al. 2005; Goldman et al. 2006).

Because of the lack of broader measures in most data, maternal education is the most commonly used measure of SES in research on infant health. Studies that used different indicators of SES found that results were sensitive to the indicator used (Braveman et al. 2001; Parker et al. 1994). The variability in the associations of infant health with SES across race and ethnicity and by SES indicator is consistent with the idea of differential returns to human capital by race and ethnicity (Braveman et al. 2005; Gazmararian, Adams and Pamuk 1996; Kaufman, Cooper and McGee 1997).

A recent study, based on data from a national birth cohort, found that socioeconomic status operates very differently across racial/ethnic groups to impact low birth weight (Nepomnyaschy 2007). Higher levels of income and education are strongly and monotonically associated with reduced rates of low birth weight for whites, but not for most other groups, including non-Hispanic blacks. There was no consistent payoff in better health outcomes for blacks at higher levels of SES. The consequence of this pattern is that the largest black-white disparities in low birth weight were found for those at higher levels of SES. Whether these findings hold in the southern states, given the legacy of institutional discrimination, on the one hand, and worse infant health and higher levels of poverty across all groups, on the other hand, is an important question that has not been addressed.

This study extends previous cross-national work to explore regional differences in racial disparities in birth outcomes within the U.S, a potentially more salient comparison. This study also extends prior work examining associations between SES and birth outcomes across groups, by exploring regional variation in these associations. This work contributes to prior research in this area by using a new, nationally representative study of over 10,000 children, which contains

rich data on family socioeconomic status, parental health, health behaviors and many other individual and family characteristics.

Data and Methods

Data

This study is based on data from the Early Childhood Longitudinal Survey–Birth Cohort (ECLS-B), a nationally representative study of over 10,000 children born in the U.S. in 2001. Births were sampled from Vital Statistics records, and the sample consists of children born in 2001 who were alive at the 9-month baseline interview, had not been given up for adoption, and who were born to mothers 15 years old or older (see Bethel et al. 2005 for detailed study description). The current study is based on interviews with mothers when the infant was 9 months old (baseline), to which birth certificate data were appended. The sample was limited to approximately 8700 singleton births for whom the biological mother was the main respondent, and who were non-missing on birth weight, race/ethnicity, and state of residence at the birth.

Low birth weight is the primary outcome measure in this study. The infant's birth weight, as reported on the birth certificate, is converted into a dichotomous variable for whether the child weighed less than 2500 g (approx. 5 ½ lbs) at birth. Birth weight has been found to be a well-measured, reliable and meaningful indicator of child health and is associated with a number of poor subsequent health and developmental outcomes (Reichman 2005).

The mother's state of residence is taken from the birth certificate and is coded as a dichotomous variable for whether the mother resided in the Deep South at the time of the child's birth. Based on the work of Goldhagen et al. (2005), in this paper, the Deep South is defined as an area made up of the following nine states: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. Though this grouping of states does

not represent a universal definition of the Deep South, these states are a contiguous group of states in the deep south of the U.S. and nearly all have elevated rates of low birth weight as compared with the national average. Based on 2004 data from the National Center for Health Statistics, the low birth weight for the entire U.S. was 8.2%, while for each of the above states (in alphabetical order) it was: 10.4%, 9.3%, 8.5%, 9.3% 10.9%, 11.6%, 9.0%, 10.2%, and 9.2%, respectively (Martin et al. 2006). Nearly 23% of the mothers in the ECLS-B (N~2000) resided in the Deep South at the time of the child's birth.

Mothers' race/ethnicity is taken from the birth certificate and is broken down into the following three groups: non-Hispanic white, non-Hispanic black, and all other race/ethnic group. For analyses examining overall differences between the Deep South/non-Deep South areas, all three groups are included in the analyses. For the majority of the paper, which focuses on black/white disparities, the other race/ethnic group is dropped from the analyses. The final analyses are based on approximately 700 blacks and 900 whites in the Deep South states, and 800 blacks and 2900 whites in the rest of the states.

The following demographic and socioeconomic status variables are considered in these analyses: mother's age (<21, 21-30, >30), mother's education (<HS, HS, some college, BA+), household income, family size, marital status at birth of child, whether family owns home, whether family owns any financial assets, and residence in an urban area. All of these measures are taken from the baseline survey when the child was 9 months old, except for mother's age and marital status, which are from the birth certificate.

A number of health and health behavior measures are also considered: whether the mother smoked during pregnancy (coded as yes if reported either in the birth certificate or in the survey); if she had no prenatal care in first trimester (from birth certificate); her pre-pregnancy

Body Mass Index (BMI – coded from pre-pregnancy height and weight on birth certificate, and collapsed into overweight: BMI >25, or obese: BMI>30); and whether she had any one of a list of medical risk factors noted on the birth certificate (anemia, cardiac disease, acute or chronic lung disease, diabetes, genital herpes, oligohydramnios, hemoglobinopathy, pre-existing or gestational hypertension, eclampsia, incompetent cervix, previous >=4000 gm infant, previous preterm or small for gestational age infant, renal disease, RH sensitization, uterine bleeding, or other risk factor).

Analyses

First, descriptive statistics for all variables included in the analyses, stratified by residence in the Deep South or in the rest of the country and then stratified by race (black and white) within the two regions are presented. Next, each of the potential explanations discussed previously are examined. First, I will examine whether differences in income inequality (and racial composition) are responsible for the poor birth outcomes in the Deep South states as compared with the rest of the country. Raw differences between South/non-South states will be adjusted by demographic, socioeconomic, and medical risk factors. Next, race disparities in birth outcomes in each region will be examined. Raw differences by race (within each region) will be adjusted by these same factors (other than race). Finally, to understand whether returns to SES differ by race and by region, health/SES gradients will be examined. Gradients will be compared for whites in the Deep South vs. non-South states (and for blacks) and for whites vs. blacks in each region. All analyses are performed using Stata 10 SE statistical software package, are based on weighted data, and are adjusted for complex survey design effects using the SVY set of commands in Stata.

Findings

Differences between the Deep South and the Rest of the Country

Table 1 presents differences in birth outcomes and family characteristics between children born in the nine states defined as the Deep South in this paper and the rest of the nation. Children born in the Deep South have less favorable birth outcomes than children born in the other 41 states in the U.S. They weigh less at birth (3291 vs. 3369 g), and are more likely to be low birth weight (7% vs. 5%). These differences are statistically significant at (p=.001). Families of children born in the Deep South have lower socioeconomic status (SES) than do families in the rest of the nation, based on a number of SES indicators. These include maternal education, marital status, family income, and ownership of financial assets. Mothers of children born in the Deep South are more likely than mothers in the rest of the country to have smoked during pregnancy (16% vs. 13%), to have had no prenatal care in the first trimester (17% vs. 16%), and to be obese (16% vs. 14%); however, these differences are not statistically significant. On the other hand, mothers in the Deep South are less likely to have had any one of a list of medical risk factors noted on the birth certificate than are mothers in the rest of the country (26% vs. 32%), though this may be related to differential reporting of risk factors on birth certificates across states.

Table 2 presents the unadjusted and adjusted differences in rates of low birth weight between children born in the Deep South and the rest of the country. The unadjusted Deep South OR for low birth weight is 1.3 and is highly significant. After adjusting for racial composition (non-Hispanic white, non-Hispanic black, or any other race/ethnicity), the OR drops to 1.13 and becomes only marginally significant (p = .066). However, adjusting for several measures of SES, (education, income, marital status, and financial asset ownership), but not race/ethnicity, only reduces the Deep South OR to 1.22 and it remains highly significant. Although only marital

status at birth and income at the fourth quantile are significant in this model, all the SES variables are jointly significant at p = .0001. In the next model, both race/ethnicity and SES measures are included, and the Deep South odds ratio falls to 1.08 and becomes not at all significant. Adjusting for risk factors (smoking, no early prenatal care, and maternal pre-pregnancy BMI), does not reduce the Deep South OR any further, though both smoking during pregnancy and mothers' pre-pregnancy BMI are strongly associated with low birth weight. In sum, the observed difference in the rates of low birth weight between children born in the Deep South and those in the rest of the nation are almost completely accounted for by differences in racial composition and socioeconomic status.

Race Disparities in the Deep South and Non-Deep South States

Table 3 presents mean differences in characteristics between non-Hispanic blacks and whites in the Deep South and the 41 states in the rest of the country (those in the other race/ethnicity category are not considered for the remainder of these analyses). Asterisks indicate black/white disparities that are significantly different between the Deep South states and those in the rest of the country. Black mothers in the non-South states are two times more likely than white mothers to have a low birth weight child (10% vs. 5%), while in the Deep South states, the relative difference is slightly smaller (11% vs. 6%), though there is an absolute difference of 5 percentage points in both areas. This difference in the black/white disparities between the Deep South and the rest of the country is not significant.

The disparities between blacks and whites on most measures of SES (income, education, and asset ownership) are lower in the Deep South than in the rest of the states, though few of these differences are statistically significant. The only exception to this finding is for marital births, the black/white disparity in the Deep South is larger than that in the rest of the nation (50

vs. 42 percentage point difference). These smaller disparities found in the Deep South are mostly due to the fact that white mothers in the Deep South states are worse off on these measures than are white mothers in the rest of the nation, as opposed to black mothers being better off. For example, 50% of white mothers in the non-South states are in the top income quantile compared with only 37% in the Deep South (a 13 percentage point disadvantage), while for black mothers this Deep South disadvantage is only 3 percentage points. The only SES measure for which Deep South black mothers are better off is homeownership, with 27% of black mothers in the Deep South owning their homes compared with only 21% in the rest of the nation.

Black mothers in the Deep South are almost uniformly better off than black mothers in the rest of the nation on risk factors. They are less likely to be overweight, less likely to have smoked during pregnancy, and less likely to have had any medical risk factor at delivery than are black mothers in the rest of the nation.[1] White mothers in the Deep South are very similar on these characteristics to their non-South counterparts.

Table 4 presents unadjusted and adjusted odds ratios of low birth weight for black mothers (as opposed to white mothers). Odds ratios are presented separately for the Deep South and for the rest of the country and are taken from separate regressions for both areas. As described previously, the unadjusted excess rate of low birth weight for blacks in the non-Deep South states is 5.5 percentage points, while in the Deep South states it is 4.9 percentage points (ORs of 2.35 and 1.92, respectively). These disparities are not significantly different from each other. After adjusting for a number of SES characteristics (mother's education, age, marital status, own family background, family income, family size, homeownership, financial asset ownership, and urban residence), the black odds ratio in the Deep South falls to 1.27. These

[1] But, as mentioned previously, there may be incomplete recording on the birth certificates for these items by state and by localities within states.

adjustments reduce the difference in low birth weight between blacks and whites to 2 percentage points, a reduction of more than half of the raw difference. In the rest of the country, adjusting for SES measures reduces the OR to 1.73, representing a 4 percentage point difference between blacks and whites (a reduction of less than one third). In the last model, the associations are further adjusted by maternal risk factors (smoking during pregnancy, prenatal care in the first trimester, mother's first birth, pre-pregnancy obesity, and any medical risk factor from birth certificate). The black/white differentials in both areas go back up and are highly significant. Therefore, adjusting for risk factors does not at all reduce the disparity in low birth weight between blacks and whites in either the Deep South states or in the rest of the country. To sum up, it appears that a much greater proportion of the black/white disparity in low birth weight in the Deep South states can be explained by differences in socioeconomic status than in the rest of the country (59% vs. 27%, respectively).

The role of SES in explaining (or not explaining) black/white disparities in low birth weight can be broken down into two components. The first component is the differential in the amount of SES by group membership. As discussed previously, white families are more advantaged than blacks on every measure of SES considered here. The second component is the difference in the association between SES and low birth weight across groups. Evidence from prior research points to the fact that the relationship between SES and low birth weight is much weaker for black than for white mothers (Nepomnyaschy 2007). In other words, black children in the U.S. may not reap the same benefits (in birth weight) from higher levels of income as do white children. This may be one reason why most studies are not able to explain black/white disparities in low birth weight by adjusting for income.

In the results discussed above, the black/white disparity was reduced to a greater extent in the Deep South than in the non-Deep South states when adjusting for SES. One reason is because the disadvantages in SES between blacks and whites were smaller in the Deep South states than in the rest of the country. It is also possible that the association between SES and low birth weight differs between the groups by region of residence, which would also contribute to the difference in the amount of disparity explained. In Figure 1, the associations between quantiles of household income (<15K, 15-30K, 30-50K, >50K) and proportion low birth weight for blacks and whites in the Deep South and in the rest of the country are presented.

As found in prior research, there is a strong and clear gradient between income and low birth weight for whites. At each higher quantile of income the proportion low birth weight is reduced in both the Deep South and the other states. Whites in the bottom quantile in the non-Deep South states are two times more likely to have a low birth weight child than whites in the top quantile; while in the Deep South states, this difference is almost three-fold. For Blacks, the story is less clear. In the non-Deep South states, blacks in the bottom and top quantiles are not at all different in their rates of low birth weight, and there does not appear to be a clear gradient. In the Deep South states, blacks do benefit from higher income. Black mothers in the bottom income quantile are almost one third more likely to have a low birth weight child than mothers in the top quantile. This evidence suggests that the difference in the amount of black/white disparity explained between the Deep South and non-Deep South states is not only due to smaller gaps in the amount of income (and other measures of SES) between blacks and whites, but also due to the differential effects of SES for blacks and whites in the two regions.

Figure 2 examines these same associations in a different way to explore the last potential explanation discussed earlier: that the health disadvantages in the South are borne primarily by

whites as opposed to blacks. In Figure 2, the same associations between income and low birth weight as seen in Figure 1 are presented within race across regions. The first panel compares gradients for whites in the South and non-South states, while the second panel looks at gradients for blacks in the two regions. The most striking finding here is the difference between low-income whites in the South and non-South areas. Poor whites in the South are nearly 60% more likely to have a low birth weight child than poor whites in the non-South states (11% vs. 7%). Whites in the South at all income levels appear to be slightly worse off than those in the rest of the country, but these differences are small and are not statistically significant. Blacks in the South do not appear to be worse off than blacks in the rest of the country, though there is clearly some noise in the non-South figures.

Finally, to explore the disadvantage of poor whites in the South further, I examine whether differences in health behaviors for whites in the South vs. non-South states differ by SES. Recall that the difference in likelihood of smoking during pregnancy between the South and non-South states was not statistically significant. However, there may be differences at different points in the income distribution that are masked when averaging across the whole group. Figure 3 presents the association between smoking during pregnancy and income for whites in the South and non-South states. Poor whites smoke during pregnancy at the same alarmingly high rates (42%) in the South and non-South states, indicating that the poor Southern white health disadvantage (as compared with poor non-South whites) is not related to prenatal smoking. A similar pattern holds for other risk factors, including early prenatal care, mother's age at birth, and obesity (results not shown).

Conclusion

This paper set out to examine the sources of disparities in low birth weight between blacks and whites in the U.S., by focusing on differences in disparities between two very distinct geographic areas, the Deep South (9 states) and the rest of the country (41 states). Two findings from prior research drove the analyses: health overall is worse in the Deep South states, and race disparities are smaller in the Deep South than in the rest of the nation. Potential explanations for these findings were tested.

Mothers in the Deep South states were 2 percentage points more likely to have a low birth weight child than mothers in the rest of the country. Potential explanations included differences in race composition, differences in socioeconomic status, and differences in behaviors and risk factors between the two regions. I found that controlling for race and various measures of SES almost completely eliminated this disparity between the Deep South and the rest of the country, while differences in health behaviors or other risks were not important factors in explaining the gap. These findings confirm that almost all of the health disadvantage in the Deep South can be explained by racial composition and lower levels of SES in these states.

Confirming prior research, disparities between black and white mothers were slightly smaller in the Deep South states than in the rest of the nation, though this difference was not significant. Potential explanations included lower inequality in SES by race in the Deep South, higher returns to SES for blacks (or lower returns for whites) in the Deep South, and that the Southern health disadvantage is borne more by whites than blacks. I found that differences in SES between blacks and whites were smaller in the Deep South, and controlling for these factors explained a much larger portion of the black/white disparity in the Deep South than in the rest of the country (59% vs. 27%); however, a substantial disparity remained. There was some evidence that blacks in the Deep South states have a higher return to SES (steeper gradient) than blacks in

the non-South states, though these results are not conclusive. Finally, analyses revealed that the worst health outcomes are borne by poor whites in the Deep South, who have a 60% greater chance of having a low birth weight child than poor white mothers in the rest of the country. It appears that this difference is responsible for the smaller black/white disparity in low birth weight in the Deep South as compared with the rest of the nation.

Why do poor white mothers in the Deep South have much higher rates of low birth weight than their counterparts in the rest of the country? The findings here ruled out differences in risk factors: those mothers were no more likely to smoke during the pregnancy, not have prenatal care, be younger, or be obese.

Another possibility is differences in the composition of poor whites in each region. Though whites in the lowest income quartiles in each region have similar mean incomes, these white women in the Deep South have lower levels of education than those in the rest of the country (54% vs. 43% have less than high school) (results not shown). Prior research shows that selection into motherhood differs by economic conditions and by race/ethnicity across economic conditions (Dehejia and Lleras-Muney 2004), with white mothers being negatively selected and black mothers being positively selected during economic downturns. If economic conditions in the Deep South states are generally worse than those in the rest of the country, perhaps white mothers there are negatively selected. The results here are consistent with this potential explanation. Another possible explanation may have to do with selective migration into and out of the Deep South states. These potential explanations for the negative health outcomes of poor whites in the Deep South should be explored in future research.

Future research should also examine differences in outcomes and disparities between other regions of the country. Disaggregating the other areas of the country may prove to be more

useful, since there are important differences by race, ethnicity, and SES between other regions. For these analyses, Vital statistics data must be used in order to get large enough samples of different groups within each region. The analyses here (results not shown) suggest that using education and marital status at birth (which are available in vital statistics data) as proxies for SES produce similar results to those using the richer measures of SES included in this study.

The results from this study indicating that lower disparities in birth weight between blacks and whites in the Deep South states due primarily to worse outcomes for whites as opposed to improved outcomes for blacks suggest that the sources of black/white disparities in birth outcomes are very complicated and much research still needs to be done.

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Table 1: Sample Description by Region of Residence (Deep South vs. Rest of the Country)

	Full Sample	Deep South	Rest of Country
Birth weight (gms) *	3350	3291	3369
Low birth weight*	0.06	0.07	0.05
Mother's Race/Ethnicity *			
Black	0.15	0.28	0.11
White	0.60	0.59	0.60
Other	0.25	0.13	0.29
Mother's Education*			
Less than HS	0.28	0.32	0.26
High school	0.22	0.24	0.21
Some college	0.26	0.24	0.27
College degree	0.24	0.2	0.26
Married at birth	0.67	0.62	0.69
Household income ($) *	50,154	42,123	52,710
Quantiles of Income*			
Bottom income quantile	0.18	0.21	0.17
2nd	0.25	0.29	0.24
3rd	0.21	0.21	0.21
Top income quantile	0.35	0.28	0.37
Own home	0.47	0.49	0.47
Have any financial assets *	0.40	0.34	0.42
Urban residence *	0.74	0.63	0.77
Mother's Age at Birth *			
Less than 21	0.16	0.21	0.15
21-30	0.53	0.56	0.52
More than 30	0.31	0.24	0.33
First birth	0.41	0.4	0.41
Boy child	0.51	0.50	0.52
Child's age (months)	10	11	10
Number of biological children			
One child	0.42	0.41	0.42
Two children	0.34	0.37	0.33
Three or more children	0.24	0.22	0.25
Mother lived w/bio parents until 16 *	0.58	0.5	0.61
Smoked during preg	0.14	0.16	0.13
No prenatal care in 1st trimester	0.16	0.16	0.16
Pre-preg BMI (index)	24.8	24.9	24.8
Obese	0.15	0.16	0.14
Overweight	0.39	0.39	0.39
Medical risk factor	0.30	0.26	0.32
Observations (rounded to nearest 50)	8700	2000	6700

* differences between Deep South and rest of the country are significant at $p < .05$

Table 2: Accounting for Differences in Low Birth Weight between the Deep South and the Rest of the Nation, N = 8650

		Adjusting Models for the Following			
	Unadjusted Odds Ratios	Race / Ethnicity	SES	Race/Eth + SES	+ Risk Factors
Deep South	1.30*	1.13	1.22*	1.08	1.10
	(3.55)	(1.86)	(2.54)	(1.09)	(1.17)
Non-Hispanic black		2.19*		1.63*	1.96*
		(11.70)		(6.03)	(7.63)
All other race/ethnicity		1.11		0.91	1.10
		(1.45)		(1.23)	(1.02)
HS/GED			1.12	1.06	1.10
			(1.22)	(0.58)	(1.01)
Some college			0.99	0.92	1.03
			(0.14)	(0.82)	(0.32)
College degree or better			0.85	0.81	0.92
			(1.12)	(1.49)	(0.62)
Married at birth			0.66*	0.74*	0.79*
			(5.34)	(3.75)	(2.90)
2nd income quantile			0.90	0.98	1.00
			(1.16)	(0.27)	(0.03)
3rd income quantile			0.82	0.89	0.93
			(1.87)	(1.03)	(0.69)
4th income quantile			0.68*	0.74*	0.79
			(2.93)	(2.21)	(1.75)
Any financial assets			0.91	0.92	0.95
			(0.93)	(0.85)	(0.44)
Mother smoked during pregnancy					1.90*
					(6.58)
Prenatal care in 1st trimester					1.00
					(0.01)
Pre-pregnancy BMI					0.98*
					(3.48)

Figures are odds ratios and (t-statistics)
* $p < .05$

Table 3: Sample Description by Race and Region of Residence, N = 5350

	Deep South		Rest of Country	
	Black	White	Black	White
Birth weight (gms)	3104	3368	3181	3424
Low birth weight *	0.11	0.06	0.10	0.05
Mother's Education				
Less than high school	0.37	0.26	0.31	0.14
High school	0.30	0.23	0.29	0.21
Some college	0.23	0.26	0.30	0.30
College degree	0.09	0.25	0.11	0.34
Married at birth *	0.28	0.78	0.36	0.78
Household income ($) *	27,106	50,241	31,523	64,460
Quantiles of Income				
Bottom income quantile	0.42	0.11	0.38	0.11
2nd	0.30	0.28	0.26	0.18
3rd	0.15	0.24	0.2	0.22
Top income quantile	0.14	0.37	0.17	0.50
Own home	0.27	0.61	0.21	0.60
Have any fin asset	0.17	0.44	0.20	0.58
Urban residence *	0.70	0.55	0.95	0.69
Mother's Age at Birth				
Less than 21	0.31	0.16	0.23	0.11
21-30	0.51	0.59	0.53	0.50
More than 30	0.18	0.26	0.24	0.39
First birth	0.37	0.41	0.40	0.41
Boy child *	0.47	0.52	0.53	0.51
Child's age (months)	10	11	10	10
Number of biological children				
One child	0.39	0.41	0.40	0.42
Two children	0.32	0.40	0.30	0.34
Three or more children	0.29	0.19	0.30	0.24
Mother lived w/bio parents until 16	0.33	0.55	0.36	0.64
Smoked during preg *	0.09	0.22	0.12	0.17
No prenatal care in 1st trimester	0.26	0.11	0.26	0.11
Pre-preg BMI (index)	26.0	24.6	25.9	24.5
Obese	0.22	0.14	0.20	0.13
Overweight	0.43	0.37	0.47	0.36
Medical risk factor	0.28	0.26	0.40	0.33
Observations (rounded to nearest 50)	700	900	800	2950

* black/white differences are significantly different between the Deep South and rest of the country at $p < .05$

Table 4: Accounting for Black/White Differences in Low Birth Weight between the Deep South and the Rest of the Nation, N = 8650

	Deep South			Rest of Country		
	Unadjusted	Adjusting for SES	Adjusting for Risks	Unadjusted	Adjusting for SES	Adjusting for Risks
Non-Hispanic black	1.92*	1.27*	1.59*	2.35*	1.73*	1.94*
	(7.12)	(1.98)	(3.15)	(9.10)	(4.36)	(4.80)
High school/GED		1.18	1.24		0.97	1.02
		(0.86)	(1.10)		(0.23)	(0.14)
More than high school		1.23	1.39		0.84	0.90
		(1.10)	(1.63)		(1.63)	(0.89)
Mother 21-30 at birth		0.86	0.98		0.84	0.94
		(0.99)	(0.16)		(1.13)	(0.36)
Mother > 30 at birth		1.69*	1.97*		1.05	1.23
		(2.16)	(2.97)		(0.27)	(0.98)
Married at birth		0.70*	0.85		0.73*	0.85
		(2.35)	(0.89)		(2.19)	(1.12)
Lived w/bio parents till 16		0.80	0.81		1.03	1.03
		(1.71)	(1.80)		(0.26)	(0.24)
Family size		0.96	1.01		0.89*	0.94
		(0.86)	(0.26)		(2.93)	(1.54)
2nd income quantile		0.81	0.73		1.24	1.23
		(1.17)	(1.81)		(1.47)	(1.46)
3rd income quantile		0.80	0.72		1.19	1.26
		(1.26)	(1.75)		(1.08)	(1.47)
4th income quantile		0.52*	0.53*		0.96	1.06
		(2.89)	(2.83)		(0.22)	(0.31)
Own home		1.02	0.92		0.72*	0.75*
		(0.16)	(0.55)		(2.93)	(2.81)
Any financial assets		0.79	0.84		0.77*	0.81
		(1.11)	(0.74)		(2.20)	(1.77)
Urban residence		1.13	1.17		0.99	1.05
		(0.75)	(0.91)		(0.13)	(0.38)
Mother smoked during preg			2.15*			1.87*
			(3.79)			(4.29)
Prenatal care in 1st tri			1.17			0.79
			(0.75)			(1.53)
First birth			1.79*			1.63*
			(3.96)			(3.86)
Obese prior to pregnancy			0.85			0.95
			(1.11)			(0.40)
Any medical risk			2.20*			2.10*
			(4.42)			(5.75)

Observations (rounded to 50)	2200	4450

Figures are odds ratios and (t-statistics)
* $p < .05$

Figure 1: LBW/Income Gradients by Race and Region

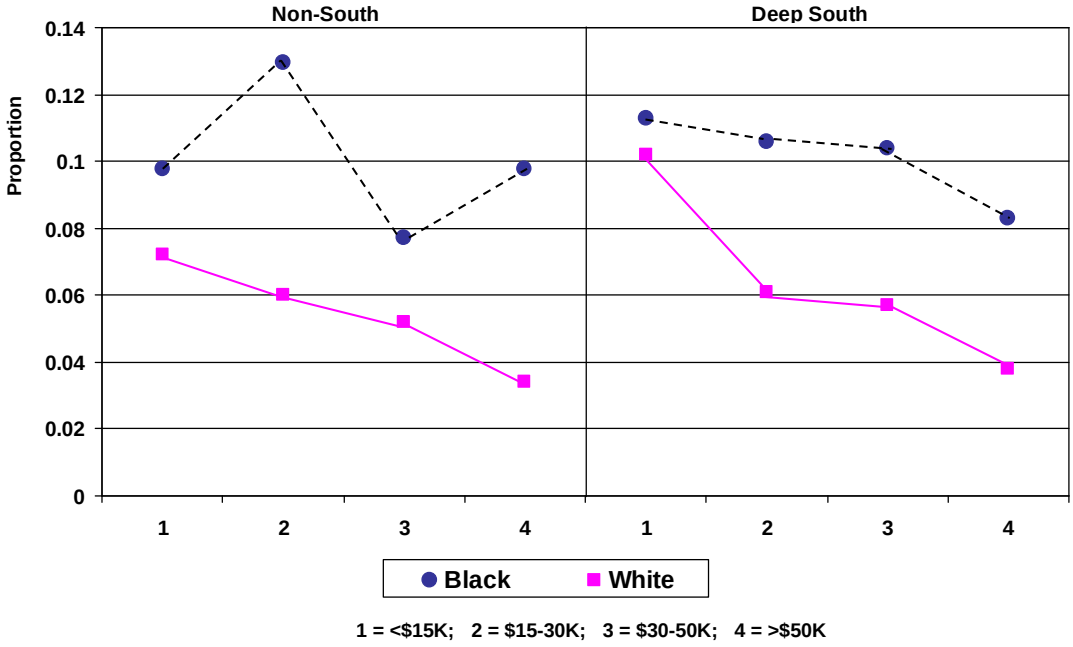
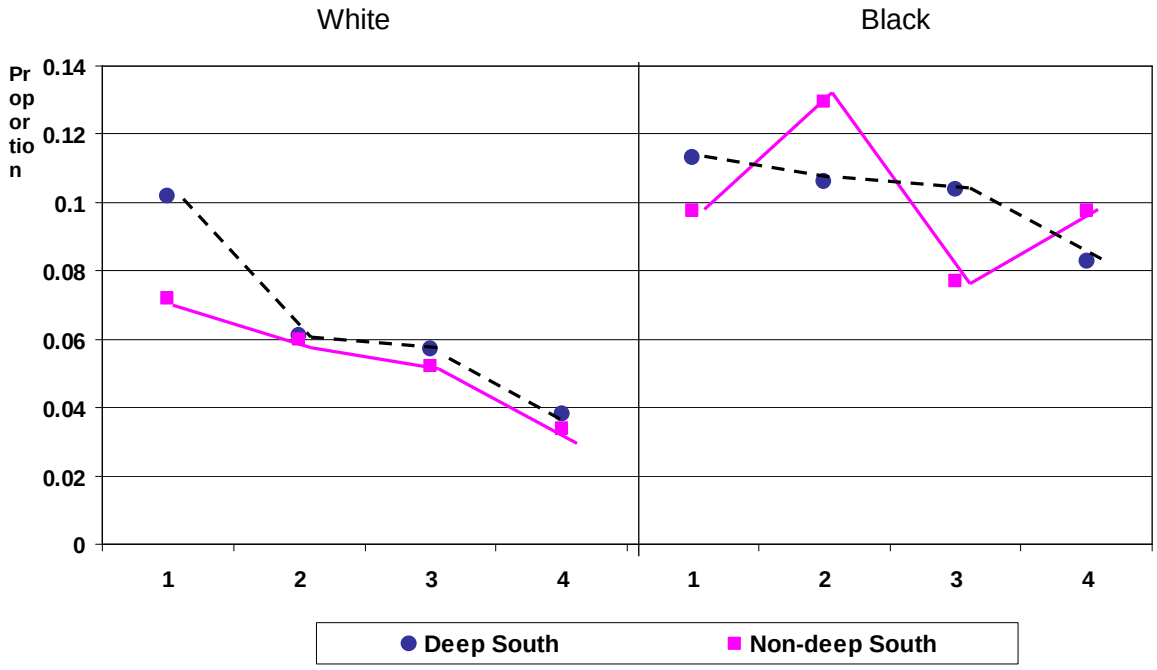


Figure 2: LBW/Income Gradients by Race and Region



1 = <$15K; 2 = $15-30K; 3 = $30-50K; 4 = >$50K

Figure 3: Smoking Across Income for Whites by Region