DIVERGENT PATHS: A NEW PERSPECTIVE ON EARNINGS DIFFERENCES BETWEEN BLACK AND WHITE MEN SINCE 1940

PATRICK BAYER
DUKE UNIVERSITY AND NBER

KERWIN KOFI CHARLES
UNIVERSITY OF CHICAGO AND NBER

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ABSTRACT

This paper presents new evidence on the evolution of black-white earnings differences among all men. We study two measures: (i) the level earnings gap - the racial earnings difference at a given quantile; and (ii) the earnings rank gap - the difference between a black man's percentile in the black earnings distribution and the position he would hold in the white earnings distribution. After narrowing from 1940 to the mid-1970s, the median black-white level earning gap has since grown as large as it was in 1950. Even as his relative earnings improved then worsened, the median black man's relative position in the earnings distribution has remained essentially constant. At the same time, black men at higher percentiles have experienced significant gains in relative earnings since 1940. Unlike blacks at the median and below, whose relative earnings changes have been chiefly the result of narrowing and stretching of the overall earnings distribution, higher percentile blacks have also experienced significant positional gains over the past 70 years.

Keywords: Racial Inequality, Earnings Inequality, Racial Earnings Gap, Mass Incarceration, Labor Force Participation, Wage Structure

JEL Code: J15, J31, J71, K42, N32, N92.

I. INTRODUCTION

Among the most important historical features of American society has been the stubborn persistence of racial differences in socioeconomic outcomes. Not surprisingly, these differences have been the focus of a large body of scholarship in the social sciences, with the difference in labor market outcomes being particularly intensely studied by economists.[1] This paper presents new estimates of the black-white difference in earnings among prime-aged men since 1940, and assesses the role played by different factors in driving relative earnings changes. Our analysis extends and differs from previous work in several ways, and the results substantially revise current understanding about how and why earnings differences have changed over the past seven decades.

Previous work on racial earnings differences has mostly studied mean or median differences in wages among workers. By contrast, we measure differences among all men, including those not working for pay; separately examine changes at the top, middle and bottom of the earnings distribution, and use annual earnings as the measure of earnings. Perhaps the main reason we make these modifications to the standard approach is the recent increase in non-work among U.S men (Charles et al. 2016; Moffit 2012), with disproportionately large reductions for blacks because of rising incarceration and labor force non-participation (Western 2002; Neal and Rick 2014).

Like other recent authors (Chandra 2000, 2003; Western and Pettit 2005), we include all men in our analysis to deal with the well-known problem (Butler and Heckman 1978; Heckman, Lyons, and Todd 2000), that examining only workers is unlikely to yield valid representations of changes for the population as a whole, especially in an era of historically large rates of non-work. Changing work patterns also explain why we use the holistic measure of annual earnings, which subsumes the effect of changes in the wage and in the probability or intensity of working. Finally, various political, social, and economic changes over the past 70 years, including rising overall earnings inequality (Autor, Katz and Levy, 2008), may have differentially affected the relative labor market

[1] Important examples of work on black-white earnings or wage gaps include Smith and Welch (1989), Bound and Freeman (1992), Heckman and Donohue (1991) and Neal and Johnson (1996). See comprehensive review of literature on wage and earnings difference in handbook chapter by Altonji and Blank (1999). Among the other economic outcomes studied in the literature on difference by race are wealth (Barsky, Bound, Charles and Lupton 2002; Oliver and Shapiro 2006) and long-run changes in relative per capita income (Margo 2016).

outcomes for blacks at different points in the distribution. Our analysis moves beyond the traditionally narrow focus on the mean or median.

The analysis in this paper consists of three parts. We first present new facts about racial differences in earnings over the past seven decades. We study two dimensions of racial earnings differences: the earnings level gap, which has been the focus of virtually all of the existing literature; and what we call the earnings rank gap, which, as far as we know, has not been previously documented. Whereas the level gap at a given percentile is the difference in earnings between black and white men at the same percentile of their respective earnings distributions, the rank gap measures how far below his percentile in the black distribution a black man's earnings would rank in the white distribution. These two measures give a more comprehensive picture of black relative earnings than does either alone.

Using quantile regressions, we find that after narrowing consistently from 1940 to 1970, the black-white difference in median annual earnings among all men has since widened substantially, growing by the end of the Great Recession to its size in 1950. Studying only men with positive earnings, as was the convention in most previous work, yields a different picture of the evolution of the earnings level gap: a decline in the gap over 1940-1970 with little change after that, entirely missing the widening median gap in annual earnings among all black and white men since 1970.[2] Like the median gap, the gap in earnings levels at the 90th percentile among all men has worsened in recent decades after closing over 1940-1970, but the recent re-widening has been quite modest by comparison.

Rank earnings gaps have evolved quite differently from differences in earnings levels. Among all men, the median black man's earnings would have placed him at the 24th percentile of the white earnings distribution in 1940. Years after the end of the Great Recession, his position had scarcely budged, rising to only the 27th percentile. In fact, during 1940-1970, when the black-white difference in median earnings among all men fell, and despite massive migration by blacks away from the South to places more hospitable to them, the median rank gap among all men worsened, before recovering by the end of the sample period to where it was in 1940. By contrast, at the upper end of the

[2] The early part of this "slowdown" in convergence among workers has been famously documented by Bound and Freeman (1992) and Juhn, Murpy and Pierce (1991).

distribution, the earnings rank of the black man at the 90th percentile has steadily improved, rising from about the median to the 75th percentile of the white earnings distribution over the study period.[3]

What explains these changes in black relative earnings? We argue that the cumulative effect of the various factors that affect earnings gaps operate through two distinct types of forces. Positional convergence shifts the relative positions of blacks and whites within the earnings distribution. Labor market discrimination and occupational exclusion or racial skill differences that might arise from differences by race in school quality are examples of factors likely to affect this type of convergence. What we call distributional convergence, by contrast, arises from changes in the shape of the overall earnings distribution that affect black-white relative earnings because blacks and whites occupy different initial positions in that distribution. Factors responsible for this type of convergence might include skill-biased technical change, declining residual earnings inequality, or institutional changes like higher wage minima or declining unionization.

The second part of the paper quantitatively assesses the relative importance of positional versus distributional convergence over the past seventy-plus years. We formally decompose decade-by-decade changes in black relative earnings using a non-parametric method that builds on the seminal work of Juhn, Murphy, and Pierce (1991, 1993) (henceforth JMP) who introduce these decomposition methods to literature.[4] The decomposition method that we develop is a non-parametric generalization of Lemieux (2006). This generalization not only allows us to account for non-participation but also, in the spirit of the key insight of Lemieux's paper, to capture the way that observable skill – i.e., educational attainment – affects the earnings distribution in each time period in a completely flexible way.

We find that relative earnings of black men at the median have risen and fallen principally as the result of distributional convergence: the "Great Compression" and the

[3] These findings echo results from other work showing growing intra-race heterogeneity in wages (Grodsky and Pager 2001) and income (Darity and Myers 1998).

[4] Previous work using decomposition methods in the spirit of Juhn, Murphy and Pierce (1991, 1993) to study changes in racial earnings gaps have typically analyzed median gaps among workers and thus do not address participation, as we do. These papers have also generally employed parametric decomposition methods rather than the non-parametric approach we follow. See, for example, Maloney (1994) for the period 1940-60, Card and Lemieux (1996) for the 1980s, and Mason (1999) for the period 1967-88.

rise of the middle class from 1940-1970, and the growth in overall earnings inequality since 1970.[5] By contrast, positional convergence has been substantially more important than distributional factors in driving changes in relative earnings for blacks at the 90th percentile. Our method can also be used to do a decomposition of the differential evolution of work status among black and white men. We find that the especially rapid relative increase after 1970 in the fraction of black men with zero earnings has been primarily driven by distributional forces that worsened labor market prospects after 1970 for all low-skilled men. Black men were disproportionately affected by these forces because of their significant over-representation at the bottom of the earnings distribution.

The final part of the paper assesses the role of educational attainment in explaining changes in racial earnings gaps. Two key results emerge from this analysis. The first is that the median black man did not experience positional earnings gains over the past seventy years chiefly because of the phenomenon of rising labor market returns to schooling. Since 1960, massive historical racial differences in elementary school and high school attainment have been sharply reduced, and racial differences in school quality have also closed.[6] One might, therefore, have expected that these relative educational gains for blacks would have resulted in the median black man making positional earnings gains; however, these positional gains did not materialize, because while the difference in completed schooling between the median black and median white man was shrinking, the labor market returns for an extra unit of education, regarding both wages and the probability of working, was rising dramatically. The positional gains that low-skilled black men would have otherwise made by acquiring more education were almost perfectly counteracted by what can be thought of as a headwind as the labor market placed an ever-higher penalty upon the racial differences in education that remained.[7]

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[5] Goldin and Margo (1992) provide a comprehensive analysis of the great compression in earnings in the 1940s. The growth in overall income inequality in the U.S. over since at least 1970s has been studied extensively in a massive literature. See Katz and Murphy (1992), Piketty and Saez (2003), and Autor, Katz, and Kearney (2008).

[6] See Collins and Margo (2006) and Neal (2006) for detailed analyses of the evolution of the racial gap in educational attainment over our study period. The *Brown v. Board of Education* decision led to improvements in schooling quality for blacks, with positive labor market consequences (see, for example, Smith and Welch (1989) and Card and Krueger (1992). See Brown (1982) for analysis of federal anti-discrimination efforts.

[7] This phenomenon is reminiscent of the "swimming upstream" idea of Blau and Kahn (1997) as the main explanation for why gender wage gaps did not decline in the 1980s.

The second main result concerning education is that the improvement that the 90th percentile black man experienced in his earnings relative to his white counterpart was chiefly the result of positional earnings gains made by higher-skill blacks within higher education categories. Whether because of more equal access to quality higher education, or because of the opening of high-skilled occupations and professions, differences in earnings between black and white men with at least a college education have systematically fallen over time.

The rest of the paper is organized as follows. Section 2 describes the earnings process, presents the two measures of racial earnings differences we analyze, and outlines the mechanisms that might contribute to changes in the racial earnings gap. Section 3 describes the data used in our analysis and presents key summary statistics. Our main estimates of the evolution of the level and positional earnings gaps throughout the distribution are presented in Section 4. We describe and present results from the decomposition analysis in Section 5. Section 6 examines the multi-faceted role of education. Section 7 concludes with a discussion of the broader implications of our findings.

All of the appendix material discussed in the Introduction may be found in the Online Appendix.

II. EARNINGS GAP: FORMULATION AND EMPIRICAL SPECIFICATION

Undergirding the analysis to follow is a simple formulation of the earnings process, which leads naturally to two alternative summary measures of racial earning differences that are the focus of our empirical work.[8] We represent the log earnings *log(E)* of white and black men in each period t as a function of an individual's level of skill q: $f_t^w(q)$ and $f_t^b(q)$, respectively. We use white men as the reference group and normalize white skill in

[8] We discuss the strengths and limitations of this single-index framework for decomposing changes in earnings gaps, and relate it to the previous literature, in Section 5 below. The analysis of the evolution earnings gaps presented in Section 4 does not require any of the corresponding assumptions required for the decompositions.

each period to be distributed uniformly on the unit interval.[9] This normalization is without loss of generality and convenient because f_t^w then simply maps each percentile q of the white skill distribution to the corresponding level of earnings.

Consider a black man whose skill places him at the q^{th} percentile of the black skill distribution. This man's skill (as perceived by the labor market) can be mapped to the corresponding percentile of the white distribution as: $q_t^w(q)$. The function, $q_t^w(q)$ captures two reasons why the q^{th} percentile black man may earn less than the q^{th} percentile black man. The first is the potential difference in the *actual* skill of the black and white men who hold the same position in the skill distributions for their respective races. The historical difference in the quality of schools attended by blacks and whites is an obvious reason why the skill of the q^{th} percentile black man might be less than the q^{th} percentile white man.

The second reason why the q^{th} ranked black man might earn less than the q^{th} ranked white man is a penalty that lowers the labor market return that black men get for their skill, as might arise because of labor market racial discrimination.[10] As in the famous formulation of Becker (1957), a race-specific price penalty captures the idea that black men are paid as if their skills were less than they actually are. This paper is not concerned with teasing apart the separate importance of race-specific factors. Rather, we focus on the overall effect of factors that affect the rank matching function, $q_t^w(q)$.[11]

Given our characterization of the earnings process, the racial earnings level gap at percentile q is simply the difference in earnings between black and white men at the q^{th} percentiles of the earnings distributions of their respective races: $G^q(E) = f_t^b(q) - f_t^w(q) = f_t^w\left(q_t^w(q)\right) - f_t^w(q)$. While level gaps have been studied extensively, much less

[9] Our analysis examines shifts in the black earnings distribution relative to the white earnings distribution. This formulation is convenient for the definition of the earnings level and rank gaps that we describe below. All of the results presented in the paper are qualitatively robust to using either the male or full earnings distributions as the reference distribution.

[10] Another possibility is any race-specific difference in job access over the study period due, for example, to strong residential segregation within cities and the historical concentration of the black population in the rural South.

[11] Distinguishing the contributions of actual skill differences and labor market discrimination has been the focus of numerous studies (see, for example, Neal and Johnson (1996), Arcidiacono et al. (2010), Lang and Manove (2011), Black et al. (2006), and Hilger (2016). Conceptually, the positional gaps that we measure capture the combination of both current labor market discrimination and skill differences, which in turn are partly determined by historical educational and labor market discrimination.

attention has been paid to another summary measure of racial earnings difference that flows naturally from the framework: the difference between a black man's position in the black earnings distribution and the position his earnings would occupy in the white earnings distribution. We call this second measure of racial earnings differences at percentile q, the $rank$ gap: $G^q(rank) = q_t^w(q) - q$.

Figure I illustrates these two summary measures of racial earnings differences. The figure plots two cdf's for the log earnings of black and white men. The horizontal line represents an arbitrary percentile, q. The earnings level gap at q, $G^q(E)$, is the horizontal difference at q, read from the black and white cdf's. The rank that the q^{th}-ranked black man would hold in the white distribution, q^w, is the position on the y-axis where the earnings of the q^{th} black hits the white cdf. The rank earnings gap, $G^q(rank)$, is the vertical difference between q and this value.

II.A. Regression Specifications for Estimating Earnings Gaps

We use quantile regressions to measure the two types of earnings gaps. For the level gap, we estimate regressions of the form:

$$\log(E_{it}) = \alpha_t(q) + \beta_t(q) r_i + \varepsilon_{it}(q) \quad (1)$$

where r indicates a set of dummy variables for each category of race and ethnicity. Assuming that white is the omitted race, the log earnings of the q^{th} ranked white man is given by: $\alpha_t(q) = f_t^w(q)$ and $\beta_t(q)$ measures the racial earnings gap at the q^{th} percentile: $\beta_t(q) = f_t^w\left(q_t^w(q)\right) - f_t^w(q) = G^q(E)$.

Besides being tightly linked to our specification of the earnings process, quantile regressions have other attractive features for estimating earnings gaps compared to measuring differences at the mean. As we show below, a large and growing fraction of men are non-workers, creating an important selection problem in the analysis of racial earnings inequality. The primary strategy advanced in the literature for addressing this problem is to include those with zero earnings in the estimation sample and use median

regressions to study earnings differences.[12] Quantile regressions also help to uncover possible variation in the general price of skill and any race-specific penalty across the skill distribution. By estimating (1) at both the median and the 90th percentile, we study the evolution of the racial earnings gap in the middle and upper tail of the earnings distribution.

To measure the rank earnings gap at a percentile q, we estimate quantile regressions of the form:

$$rank(E_{it}) = a_t(q) + b_t(q)r_i + u_{it}(q) \quad (2)$$

where the dependent variable is the percentile rank the person's earnings would hold in the white earnings distribution. In this regression, $a_t(q)$ is simply the identity function, $a_t(q) = q$, and parameter $b_t(q)$ measures the earnings position gap at a given percentile, $G^q(rank)$: $b_t(q) = q_t^w(q) - q$.

III. DATA AND SUMMARY STATISTICS

The paper uses decennial US Census data from 1940-2000, and the annual American Community Survey (ACS) from 2005-2014. We construct ten samples, one for each of the Census decades and three ACS samples: '2007', which includes data from 2005-2007, '2010' which uses just the 2010 sample, and '2014' which covers 2013-2o14. The 2007 and 2014 samples show results just before and after the Great Recession. To ensure that the men studied have completed schooling and are not yet retired, we restrict the sample to ages 25-54. We divide men into three categories of race and ethnicity: non-Hispanic black (black), non-Hispanic white (white), and all others. Throughout, the paper compares black and white outcomes while controlling for those of other races and ethnicities. Because a large part of the workforce is in agriculture in the earliest years we study, the

[12] By construction, this is a valid descriptive approach for studying the evolution of the racial gap in actual earnings at the median. This is also a valid method for studying the evolution of the gap in earnings *potential* at the median if employment is positively selected so that non-workers would have earned less than the median earnings (Darity and Myers 1998; Vigdor 2006). Similarly, this approach provides a valid way to study the evolution of the racial gap in well-being if well-being is monotonic in earnings and the well-being of non-workers is less than the median person in the earnings distribution.

paper uses labor market plus business and farm income as the measure of earnings.[13] As shown below, we conduct a series of extensions to our main results using alternative sample and data definitions, finding qualitatively similar results.

Figure II.A helps explain why our analysis uses annual earnings and includes both workers and non-workers. The figure plots trends in rates of non-work for blacks and whites in our sample, as derived from the two sources of information about work behavior in the Census/ACS. The solid lines show that the fractions of both black and white men who report not currently working have risen dramatically since 1960. For black men, the rate went from only 18% in 1960 to 37.8% in 2010. Though starting from a lower basis, the rate for white men also more than doubled over the same period, going from 7.9 to 18.6 percent. As the divergence between the two lines shows, blacks have become systematically more likely than whites not to be currently working, with the racial gap in the shares gr0wing by 9.1 percentage points between 1960 and 2010.[14] The two broken lines in the figure plot the share of black and white men who report earning zero earnings during the entire previous year – the other measure of non-work in the Census. This longer-term measure shows the same pattern as "not currently working": a sharp increase among both black and white men, with a growing difference by race over time.

What accounts for this increase in non-work, and for its differential evolution by race? The census reports the activity of men not currently working. Figure II.B sorts non-workers across the three mutually exclusive categories: (i) institutionalized; (ii) not institutionalized and out of the labor force, or (iii) in the labor force but unemployed. While the type of institution is not recorded in the Census/ACS beginning in 1980, the majority of men in our sample who are institutionalized are incarcerated, as relatively few

[13] Business and farm income is not measured in the 1940 Census, so we impute it by first using the 1950 Census to calculate (i) the likelihood of having any business and farm income and (ii) the ratio of the mean per capita business and farm income among those with positive amounts to the mean earnings among those with positive earnings. Whenever possible, we estimate these two numbers separately by state *s*, race *r*, age *a*, education *e*, industry *i* (agriculture vs. other) categories as well as an indicator for whether the individual has positive labor market earnings *p*. We then apply these imputations to the 1940 Census, randomly assigning a positive amount of business and farm income to men in each (*s, r, a, e, i, p*) cell with the probability from calculation (i) and the amount from calculation (ii) based on the mean earnings among those with positive labor market earnings in the corresponding cell in 1940. When data is not available for a particular cell, we fill in any missing cells by using data from nearby cells by dropping conditioning variables in the following order: age, education, industry, state, race.

[14] Recent papers have studied the decline in male employment rates since 2000 (Moffitt 2012; Charles et al. 2016), but there has been much less attention to the fact that non-employment has been growing since 1970 and that it has differed substantially across race in magnitude and source.

prime-aged men are in mental institutions or nursing homes – the two other possible types of institutions (Neal and Rick 2014).[15] The sharp increase in incarceration rates in the U.S. over the second half of our sample is also responsible for the vast majority of observed changes in institutionalization rates for white and black men. The patterns we show below are also consistent with what other sources reveal about incarceration trends (Western, 2006).

Figure II.B shows that rates of institutionalization for men in our sample have increased sharply since 1980, more than doubling for both white (0.7 to 1.5 percent) and black men (3.3 to 8.0 percent) by 2014. Black-white differences in these rates have also more than doubled from 2-3 percentage points in 1960-1980 to 6.5-7.6 percentage points in each sample since 2000. Labor force participation rates have also changed substantially over time, falling sharply for both black and white men since the middle of the 20th Century. While 7.3 percent of black men were out of the labor force (and not institutionalized) in 1960, this figure peaked at 19.4 percent in 2000 and remains above 16 percent in the 2007-14 samples. The increase in the share of white men out of the labor force has been similarly stark, albeit from lower initial levels, rising from 3.5 percent in 1960 to over 9.8 percent by 2014. Following a similar trajectory as the incarceration gap, the black-white out-of-the-labor-force gap rose from 5.3 percent in 1970 to a peak of 10.4 percent in 2000 and remains above 6 percent in the 2007-2014 samples.

Unlike the other two dimensions of non-work, unemployment rates have not exhibited a long-term secular increase for black and white men, but have rather risen and fallen with general labor market conditions. In the ten samples shown here, unemployment rates were highest in 2010 at 7.7 and 13.1 percent for white and black men, respectively. A point worthy of note is that unemployment rates for black men have been at least 50 percent greater than those of comparable white men from 1950-2010. The black-white unemployment gap has remained between 3.9-5.4 percent from 1980-2014 and remains near its highest level in the latter stages of the recovery from the Great Recession in the 2014 sample.[16]

[15]Neal and Rick (2014) provide a detailed analysis of the causes of recent sharp increase in the severity of punishment in the U.S. criminal justice system and its impact on the racial incarceration and labor force participation gaps.

[16] See Ritter and Taylor (2011) on black white unemployment rate differences.

Overall, we estimate that 22 percent of the 1960-2010 growth in racial gap in the probability of work is due to the increasing unemployment gap, 43 percent to the expanding "incarceration" gap, and 34 percent to the growing labor force participation gap. Because we can only infer current incarceration from the institutionalization variable, it is not possible to identify men who are unable to find work because of prior incarceration. A significant portion of the increase in the labor force participation and unemployment gaps may thus also be due to the effects of mass incarceration. [17]

Racial differences in annual earnings will be our focus in the work to follow. Figure III plots real annual earnings (measured in 2014 dollars) over time among the populations of black and white men, at the median and 90th percentile. Median real earnings rose sharply for both black and white men through 1970 followed by a period of decline. Since 1970, real earnings have fallen by 19 percent for the median white man – from $52,200 to $42,100 in 2014 – and by 32 percent for the median black man – from $30,800 to $21,000 in 2014. By contrast, at the 90th percentile, real earnings have risen by 18 percent for blacks (from $58,300 to $69,000 in 2014) and 16 percent for whites (from $97,900 to $114,000) since 1970.[18]

IV. BENCHMARK ESTIMATES OF EARNINGS LEVEL AND RANK GAPS

We now present estimates of the earnings level and rank gaps between black and white men holding the same position in the earnings distribution of their respective races. In estimating the quantile regressions (1) and (2), we condition on six 5-year age categories to account for cohort size and life-cycle effects.[19] The regressions do not control for skill. Later, we explore at length how much and by what mechanism schooling accounts for the gaps we document.

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[17] See Western (2002, 2006), Western and Pettit (2005) and Kling (2006) for an analysis of the impact of incarceration on labor force participation and earnings upon release. Importantly, the Census and ACS do not provide any information regarding whether an individual has previously been incarcerated. Work by Kahn-Lang (2017) suggests that there may systematic non-reporting of labor market outcomes by persons, especially blacks, with high incarceration risk.

[18] Recognizing the difficulty of accounting for inflation over long horizons, the main point of Figure III is to highlight the different experiences of men at the top versus middle of the earnings distribution. All earnings are converted into constant 2014 dollars by using the CPI-U price deflator. We use the CPI-U rather than an alternative deflator to remain as consistent as possible with the existing literature and because it is available for the full study period.

[19] Since both race and age are discrete categories, none of the common difficulties associated with the interpretation of quantile regressions apply here.

Figure IV plots the estimated median and 90th quantile earnings level gaps from 1940-2014. We do not plot standard error bands in these and later figures since the results are very precisely estimated. The solid lines plot earnings level gaps among workers, while the dashed lines plot them among the population of all men – workers plus non-workers. In 1940, the median black man in the population had earnings roughly 100 log points less than his white counterpart. Between 1940 and 1980, this gap closed by roughly 50 percent, with large decreases during the 1940s and 1960s. Since 1980, however, the median level gap in the population has re-widened, growing so considerably that by 2014 it reached 68 log points - its level in 1950. When analysis ignores the growing prevalence of non-work among men, the estimated median gap shrinks more during 1940-1980 than was true in the population and the gap is stagnant after 1980, missing the substantial worsening of the median black man's relative earnings in the population.

The lines with circular markers plot the estimated earnings level gap among men at the top of the distribution. As at the median, the level gap at the 90th percentile declined considerably from 1940 to 1980 before re-widening after 1980, although the re-widening was much smaller than that at the median. Indeed, about half of the relative earnings gains from 1960 to 1980 for the 90th percentile black man have held in recent decades, in contrast to the complete erosion of the corresponding gains that occurred at the median. The 90th percentile earnings level gap among working men has more closely tracked the gap in the population.

Figure IV also highlights how differently blacks at the top and middle of the distribution experienced the Great Recession, compared to whites. While the gap at the median increased by over 15 percentage points from 2007 to 2010, the gap at the 90th percentile increased by only 2 percent over the same period. In fact, the increase in the median earnings level gap in the Great Recession, which has largely persisted through 2014, is responsible for the majority of the re-widening of the median earnings level gap since 1980.

Figure V shows the earnings rank gaps at the median and the 90th percentile for the population of all men.[20] The earnings rank gap at the median presents a starkly different

[20] The dependent variable in the regressions from which these estimates come is the individual's percentile rank in the white earnings distribution, although all of the results are qualitatively robust to using percentile rank in the male or overall earnings distributions.

picture of the evolution of racial earnings inequality compared to the earnings level gaps. Whereas the median level gap shrank substantially over 1940-1970, the relative position of the median black man in the population worsened considerably over the same time, falling from the 23rd percentile to the 18th percentile of the white male earnings distribution. Since 1980, as the median level gap has re-widened, the median rank gap has remained essentially constant at around 22-24 percentile points throughout this entire period, including the Great Recession. Strikingly, then, while the median level gap among men has narrowed and then widened substantially over the past 70-plus years, the relative position of the median black man has changed very little.

Unlike the median, black men at the top of the earnings distribution have experienced substantial rank gains over the study period. In particular, the estimated rank gap at the 90th percentile closed from 37 percentile points in 1940 to 16 in 2014. The majority of these gains occurred from 1960 to 1980, and the rank gap has remained essentially constant at around 16 percentile points in every sample year from 2000 through 2014. Put another way, the 90th percentile man in the black earnings distribution would rank at the 74th percentile of the white earnings distribution in 2014 versus the 53rd percentile in 1940 or 1960.

One of the most surprising aspects of these results is that the relative position of the median black man eroded between 1940 and 1970, even as the earnings level gap closed considerably. This rank erosion within the national economy was even more remarkable because it occurred during the second half of the Great Migration when large numbers of black workers moved from the South to the industrial cities elsewhere in the country. In 1940, almost 75 percent of prime-aged black men lived in the South, where median earnings across for blacks and whites was less than half their levels in other regions. By 1970, less than half of the population lived in the South, where overall earnings had largely converged to levels elsewhere.

Figure VI plots the evolution of earnings gaps among all men within each of the four Census regions (South, North, Midwest, and West) along with the national rank gap. In 1940, median rank gaps in the different regions, and especially in the South, were lower than the median rank gap nationally. The large national rank gap in 1940 was chiefly due to blacks' concentration in the low-wage South. Between 1940 and 1970 the median rank gap grew substantially within each region of the country, increasing from 16 to 26

percentile points when averaged across regions.[21] Yet, the national median rank gap widened by only 3.5 percentile points over the same interval. This difference reflects the impact of the reallocation of black men to higher wage regions, which partially mitigated the large decline in earnings position that black men experienced in each regional economy.[22] Differences between the national and regional position gaps are much less pronounced in more recent decades as regional differences in racial composition and, especially, earnings narrowed sharply over the study period.

How sensitive are our main results in Figures IV and V to alternative sample restrictions and data definitions? Tables I.A and I.B present, respectively, estimated median and 90th percentile level and rank gaps in selected years. Each row of the tables shows results under different data or sample criteria than the baseline results plotted in Figures IV and V and reproduced in the top row of each panel of the tables. The alternatives we assess include (i) broadening the age range of the study from 25-54 to 19-64, (ii) considering only native-born white and black men, (iii) using usual weekly earnings rather than annual earnings; and (iv) using a narrower measure of earnings that excludes business and farm income. The tables show results for 1940, 1970, 2000, 2007 (the last year before the Great Recession), and 2014 – the most recent year in our data.[23] Changes over these years nicely capture the essential patterns in the benchmark estimates plotted in Figures IV and V for the two types of gaps.

Although they obviously differ across samples and restrictions, the point estimates across the various specifications generally follow the same pattern as our benchmark results. The only results that stand out as potentially different are those using the wider age range, for which the there is a more obvious erosion of earnings level and rank at the median in the Great Recession. The measured rank gaps for the narrower earnings

[21] To the best of our knowledge, this sharp decline in the relative standing of black men within each regional economy has gone undocumented in the literature to date.

[22] It is worth noting that some of the increases in within-region position gap might be explained by the systematic migration of relatively high-skilled black men to the North, which might have reduced the average black skill level in the South. Despite any such selection effects, the systematic migration of black men to higher wage regions should have improved their position in the national economy, all else equal. Appendix Table V reports a full set of earnings level and position gaps for each region, revealing a number of interesting patterns, including, for example, that both the racial earnings level and position gaps are now smaller in the South than the North or Midwest.

[23] The Appendix provides a full set of results – i.e., statistics or point estimates for each sample year – for each figure and table presented in the paper. We do not present these additional numbers in this table or elsewhere to avoid clutter.

definition that excludes agricultural income is also noticeably smaller in 1940 compared to the baseline earnings measure. As a result, the erosion of the position of the median black man in the 1940-70 period – one of our key findings – is even more pronounced in this alternative specification.

V. DECOMPOSING CHANGES IN RACIAL EARNINGS GAPS

The results we document: (i) for earnings rank versus level; (ii) at the median versus the 90th percentile; (iii) nationally versus within region; and (iv) with and without accounting for men with zero earnings, present a substantially richer and more nuanced picture of the evolution of racial earnings inequality than has previously appeared in the literature. To better understand the factors responsible for these patterns, we decompose changes in racial earnings level gaps into the two main types of forces implied by our specification of the earnings process – distributional and positional convergence.

Given our formulation of the earnings process, the change over time in the earnings level gap at a given percentile in period *t* can be written:

$$\left(f_t^w\left(q_t^w(q)\right) - f_t^w(q)\right) - \left(f_0^w\left(q_t^w(q)\right) - f_0^w(q)\right) \tag{3}$$

Adding and subtracting terms yields the decomposition:

$$\underbrace{\left[\left(f_t^w\left(q_0^w(q)\right) - f_0^w\left(q_0^w(q)\right)\right) - \left(f_t^w(q) - f_0^w(q)\right)\right]}_{[A]} + \underbrace{\left[f_t^w\left(q_t^w(q)\right) - f_t^w\left(q_0^w(q)\right)\right]}_{[B]} \tag{4}$$

The first bracketed term [A] measures the effect on the earnings level gap of changes in how skill, in general, and without regard to race, is rewarded in the market. These changes to the overall structure of the earnings distribution differentially affect white and black men solely because their initial positions within the skill distribution as perceived by the market are not the same. These changes are race-neutral, in the sense that they stretch out or compress both the black and white earnings distributions leaving people's relative position within their own distribution, or in the overall earnings distribution, unchanged.

[24] We call this component of changes in racial earnings differences distributional convergence or divergence. The general compression of earnings in the middle of the 20th Century and the secular increase in the earnings inequality in more recent decades are examples of the types of factors that cause this kind of change.

The second bracketed term [B] captures changes in how the market perceives and rewards a black man relative to a white man in the same initial percentile positions of their respective race's earnings distribution. Anything producing a relative change in the actual skill of the black man compared to the white, or which changes the relative price paid to black versus white skill would be part of [B]. Thus, the relative increase in the quality of schools attended by black children following the *Brown v. Board of Education* ruling, or a decline in wage discrimination or occupation exclusion against blacks would be included in [B].[25] We call this portion of the change in the earnings gap positional convergence or divergence, since it measures the effect of shifts in the relative positions of black and white men within the overall earnings distribution.

Figure VII graphically illustrates the two sets of forces. Both panels A and B of the figure illustrate a decline in the earnings gap by showing changes in two pairs of black and white earning distributions in pdf form. In Panel A, the earnings gap at the median declines because the overall earnings distribution gets compressed around the mean level of earning in the population – the solid vertical line. This is what we label distributional convergence. In panel B, the racial earnings gap at the median closes because the black earnings distribution changes position relative to the white distribution; it advances relative to the white distribution, which we illustrate as not having changed at all in this example. This is the most extreme form of positional convergence. In general, earnings gaps widen and close through a combination of these two forces. We outline below a method for decomposing the relative quantitative importance of these forces since 1940.

[24] We use the term 'race-neutral' here to refer to changes in the overall structure of the earnings distribution including the fraction of men with zero earnings. Given the role of social and economic policy in shaping aspects of the structure of the earnings distribution (including incarceration), a number of researchers, e.g., Bonilla-Silva (2006) and Massey (2007), have pointed out that racial motivations may shape 'race-neutral' policies that have a differential racial impact given the relative position of blacks and whites in the economy and society. We fully appreciate this point and use the terms 'race-neutral' in the narrow sense described.

[25] Several important papers have assessed the role of improved school quality in driving changes in the racial earnings gap – see, for example, Smith and Welch (1989), Card and Krueger (1992) and Grogger (1996). Collins and Margo (2006) provide a complete review of this literature.

Our framework for decomposing earnings gaps according to equation (4) is based on what is commonly referred to as a time-invariant single-index model of skill. This model was the basis for JMP, and its implications and empirical validity have been studied extensively in the literature, most notably by Card and Lemieux (1996).[26] The single index assumption allows one to attribute changes in earnings at a given quantile of the white earnings distribution to distributional forces that affect both blacks and whites, plus a positional component for any residual change in the relative earnings of a black man. This straightforward decomposition would not be possible if skill were multidimensional, and black and white men at a given quantile of the white earnings distribution having different combinations of skills, each dimension of which commanded a different price. The decomposition under the single-index assumption provides a natural starting point for characterizing relative earnings changes over the long historical period we study. In Section 6 below, we extend this framework to two dimensions to explore the role of racial difference in education level and its price.

V.A. Nonparametric Decomposition Method

The key objects in our decomposition are the two components of equation (4). To calculate the distributional component, we use a nonparametric counterfactual simulation that measures how the earnings gap would change between time periods *0* and *t* if black and white men were to hold their relative positions in the earnings distribution from period *0* but the level of earnings associated with each position was as in period *t*. The difference between the earnings gap in period *0* and the simulation measures the effect of distributional convergence. And, since we compute the simulation by holding position constant, the difference between the simulated and actual gap in period *t* captures the effect of any positional convergence on the change in the racial earnings gap.

Our approach can also be used to decompose changes in the racial makeup of the set of men not working (i.e., with zero annual earnings) into positional and distributional components. The counterfactual simulation, in this case, measures how the employment

[26] It is important to note that our analysis of the employment gap below also relies on this single-index assumption – i.e., implicitly assumes that the same index of skill affects earnings among workers and the propensity to be employed.

gap would have changed if men held their initial positions in the earnings distribution and the distribution is truncated from below at an increasing threshold. The method is only valid when the incidence of non-work monotonically increases, as has been true for both black and white men since 1970.

It is straightforward to extend this decomposition to condition on any discrete characteristic simply by conditioning each component of equation (4) on that characteristic. Since we condition on age in the earnings level and rank gaps presented above, we continue to do so here for our benchmark decomposition. To construct the simulated sample for each year *t*, then, we proceed as follows:

1. Randomly draw a large sample of observations from the sample at time *t*. Let *i(race, age)* indicate an observation in this simulated data set.
2. For each *i*, randomly draw an individual *j(race, age)* in the same race and age category in the sample at time 0. Assign *j*'s rank $q_0^{wi}(j)$ within the white earnings distribution at time 0.
3. Assign the earnings associated with this percentile rank in the white earnings distribution at time *t* to individual *i*: $f_t^w(q_0^i(j))$.

Step 1 ensures that the simulated sample reflects the sample composition at time *t*; Step 2 applies the rank function, $q_0^{wi}(r)$, at time 0; and Step 3 applies the white earnings function at time *t*, $f_t^w(q)$.

Figure VIII graphically illustrates the two components into which the decomposition splits earnings changes. The two dotted cdf's in the figure are black and white earnings in period 0, and the solid cdf's are for black and white earnings in period *1*. In this example, the earnings gap at percentile *q* falls from *AA'* to *BB'* between the periods, as shown in the first panel.

The second panel shows what the gap would be in period 1 if there were only distributional convergence and no positional convergence in the economy between period 0 and 1. Since each person's position in the white earning distributions remains constant under pure distributional convergence, the period 1 earnings for the q^{th} ranked white man changes from A' to B', while the earnings of the q^{th} ranked black man goes from *A* to whatever earnings correspond to the earnings of the q^w ranked white man in period 1. This level of earnings is labeled *C* in the second panel. Had there been only distributional

change, the racial earnings gap at percentile q would thus have been CB'. In fact, black earnings at percentile q in period 1 were actually B rather than C. There must therefore have been a positional loss for blacks, which acted to counter the beneficial distribution. This adverse positional force is seen in the decline of the black man's rank in white earnings distribution, q^w, between periods 0 and 1. In this example, distributional convergence and positional convergence act in opposite directions. In general, these forces can either complement or oppose on another.[27]

V.B. Benchmark Decomposition Results

We conduct decompositions of decade-by-decade changes in earnings gaps at the median and the 90th percentile and in the employment gaps over our study period. Figures IX.A, IX.B and IX.C plot the estimates of the relevant actual and accumulated simulated gap in each year. An upward sloping simulated series indicates that distributional forces acted to close the gap during those years; during periods when the simulated series slopes down, distributional divergence acted to widen the gap. The difference between the series represents the portion of the actual gaps attributable to positional rather than distributional convergence up to that time in the study period. We summarize the size and sign of the two forces in Table II, which aggregates the decade-by-decade results over three longer time periods: 1940-70, 1970-2014, and 1940-2014.

We find very different results at the bottom, middle, and top of the distribution. As the figures show, distributional forces enormously affected the median earnings gap, both during 1940-70, when the compression of the earnings distribution lowered the median gap by 64 log points, and during 1970-2014, when the increase in secular inequality (especially during the Great Recession) reversed 39 log points of these gains.

By contrast, at the median, positional forces acted in the opposite direction to and were much less important than distributional factors. Consistent with previous results showing that the median earnings rank gap even as the earnings level gap closed sharply between 1940 and 1970, Figure IX.A shows that distributional convergence during these years would have shrunk the median gap more than the narrowing that actually occurred,

[27] See Appendix Figure I for an illustration of a case of positional and distribution forces acting in the same direction.

had blacks not experienced these adverse positional shifts. The virtual coincidence of the patterns for the simulated and actual earnings gaps since 1980 implies that essentially all of the changes in the median gap over the second half of the study period have been driven by distributional forces. Strikingly, even the large increase in the median earnings gap during the Great Recession is not the result of any positional divergence in the middle of the earnings distribution. Instead, the median black man's earnings were especially hard hit by the Great Recession because (i) he was initially located 22-23 percentiles lower in the earnings distribution than the median white man and (ii) the recession was progressively more devastating for all men the lower their position within the earnings distribution.

The actual and simulated earnings gap at the 90th percentile plotted in Figure IX.B closely track each other from 1940 to 1960, indicating that the closing of the racial earnings gap at higher percentiles during this period was due entirely to the compression of the upper tail of the overall earnings distribution rather than to positional factors. Since 1960, however, the actual and simulated 90th percentile earnings gaps have increasingly diverged, as positional forces have been the dominant force driving relative earnings changes for black in the upper tail of the earnings distribution. Indeed, had the earnings gap at the 90th been driven only by distribution forces, with blacks simply holding their relative positions in the earnings distribution as the upper reaches of the earnings distribution re-widened in recent decades, there would have been a 75 log point earnings gap by the end of the study period. Instead, because the position of the 90th percentile black man has moved significantly upwards within the upper part of the earnings distribution – especially from 1960-1980 - the earnings gap at the 90th remained around 40 log points in 2014.

Distributional divergence has also been overwhelmingly important for changes in the employment gap since 1970 (the interval over which we can conduct our decomposition for this outcome). Figure IX.C shows that the large increase in the racial employment gap since 1970 was chiefly the result of blacks' and whites' initial relative positions in the earnings distributions in 1970. Significantly over-represented in the lowest positive earnings percentiles in 1970, blacks were disproportionately likely to become zero-earners as the threshold for working moved ever-higher in earnings distribution.

Table II summarizes the decomposition results. Distributional forces acted to decrease the earnings gap during the 1940-1970 period, and to widen gaps over 1970-2014 at both the median and 90th quantile, although this effect was smaller at the top of the distribution. Positional forces have acted to close the racial earnings gaps throughout the distribution, but the effect of these forces was much larger at the top of the earnings distribution. Over the entire 1940-2014 period, positional convergence has been responsible for nearly all of the gains at the 90th percentile, but only 10 percent of the gains at the median and in the racial employment gap since 1970.

VI. SCHOOLING AND RACIAL EARNINGS GAPS

Both scholars and policy-makers have historically emphasized the importance of schooling for racial differences in economic outcomes. In this section, we examine the subtly complex role of education in shaping the relative labor market performance of black men in the U.S. We assess the degree to which the various results we document for positional versus distributional convergence are related to key education-related changes in the economy over the study period.

VI.A. Three Important Education-Related Changes in the Economy

There have been at least three major changes related to education that one would have expected to affect racial earnings differences over the past 70 years. The first of these was the large racial convergence in educational attainment, which a large literature documents. [28] In our sample of prime-aged men, the racial gap in years of schooling decreased by 75 percent from 3.5 to 0.9, with most of the convergence occurring between 1960 and 1980. Perhaps more striking than changes in years of schooling was how racial gaps in specific levels of education evolved. In 1940, only 7.2 percent of black men had completed high school, and just 1.6 percent had completed college, while comparable figures for white men were 28.1 and 6.8 percent, respectively. As late as 1960, nearly 60 percent of black men in our sample had no more than an 8th grade education (compared to 27% for whites); only 20 percent were high school graduates (compared to 50% for whites); and only 3% had a college degree (compared to about 13% for whites). By 1980,

[28] See Collins and Margo (2006), Neal (2006) and Goldin and Katz (2008).

blacks had made such large relative schooling gains, especially in the middle of the education distribution, that fully 60% of black men (compared to 81% of whites) were high school graduates. By 2014, only a tiny set of men, of either race, had an 8th-grade education or less; high school completion rates were near 90 percent for each race; and college completion rates had increased to 17.2 and 33.7 percent for black and white men, respectively.

The second major set of education-related changes over our study period was the implementation of various desegregation and anti-discrimination policies that should have improved the relative quality of the education received by blacks. Following the landmark Supreme Court *Brown v. Board of Education* ruling, public elementary and secondary schools, especially in the South, were forced to desegregate. As a result, many formerly segregated public and private universities opened their doors to black students, and school finance reforms reduced school spending differences across districts. Also, as a result of broader Civil Rights legislation and policies, various higher paying occupations opened up that had long excluded blacks.

Although it is difficult to measure directly either improvement in relative school quality following Brown, or falling occupational exclusion because of Civil Rights policies, these policies should have improved the relative labor market prospects of blacks relative to whites with the same level of schooling. Table III presents evidence about this by examining changes in earnings rank within education categories. For three education categories - (i) less than a HS degree, (ii) exactly a HS degree, and (iii) college degree or more – the table reports within-education rank gap estimates: where a black man at the median (and 90th) among black men with a given level of schooling ranks in the earnings distribution of white men with the same schooling.

As the upper panel shows, median within-education rank gaps were larger among the more highly educated in the earliest years of our study period. In 1940, for example, the median college-educated black man was 26.2 percentile points behind the median white college-educated men. The median black man with less than a high school degree, on the other hand, was 8.7 percentile points behind his white counterpart in 1940. After 1940, higher educated blacks enjoyed strong within-education rank gains at the median, while gains were much smaller for those with only for those with only elementary or secondary schooling. Among college-educated men the median earnings rank gap declined from the

23-26 percentile point range during 1940-1960 to only ten percentile points in 1980 and has remained at roughly this size ever since. Over the same period, the within-education rank gap for the median high school-educated black man fell from around 19 percentile points to roughly 15 points in 2014. Unlike changes in relative attainment, which seem to have been largest at the bottom and middle of the distribution, improvements in relative school quality and labor market access were particularly pronounced at the upper end of the education distribution.

Racial convergence in both the amount and quality of schooling should have improved the economic rank of black men. Yet, we have shown that there has been minimal positional improvement for the median black man over the past seventy years. This puzzling pattern suggests the presence of another major change related to education that pushed in the opposite direction from the two factors already mentioned. An obvious candidate explanation for this opposing force is what we consider the third major education-related change in the economy: the sharply rising return to education in the labor market which has disproportionately hurt black relative earnings because of the significant remaining racial gaps in education and school quality.

It is well known that the returns to education in the earnings of workers have increased sharply in recent decades. Figure X highlights perhaps less-appreciated estimates of the effect of additional schooling on the probability of working in the population.[29] These extensive margin results show that in 1940 and 1950, the more highly educated were, if anything, slightly less likely to work than their less-educated counterparts. In the 1960's and 1970's a man's schooling was essentially uncorrelated with whether he worked. Since the 1970s, however, work status has become increasingly strongly selected by education. In 1980 college-educated men were 10 percentage points more likely to work than men with less than a high school degree, and the gap had grown to 22 percentage points by the end of the Great Recession and remains at that level today. The difference in work probability between college-educated and high-school-educated workers has also increased sharply in recent decades, rising from less than 1 percentage point in 1970 and 2 percentage points in 1980 to over 11 percentage points in 2010 and 2014.

[29] The figure plots points esimates from linear probability models of likelihood of working on controls for race, age and education category. Appendix Table X reports similar estimates from OLS log annual earnings regressions.

VI.B. Positional Convergence – The Role of Education

To assess the quantitative importance of each of the mechanisms by which schooling shapes racial positional convergence, we extend the decomposition method developed above to account for education. We use two simulations to decompose the overall positional gains or losses shown in Table II into the three aspects of education-related changes we have discussed: (i) convergence in educational attainment, (ii) within-education rank gains and (iii) positional losses due to the rising return labor market returns to schooling.

Recall that the benchmark simulations presented earlier held each individual's rank within the overall earnings distribution constant and applied the earnings associated with that rank in the next period. We begin here by calculating conditional decompositions that hold constant an individual's initial position within the earnings distribution *conditional on education* and apply the new earnings distribution for that education level from the next period. Simulations that come from this procedure account explicitly for how the changes to the earnings distribution in any given period have affected the returns to education over and above any general changes in the dispersion of earnings captured by our initial simulations.

It is straightforward to construct the decomposition conditional on education, X, simply by simply by making all of the same calculations made for the unconditional case separately for each discrete education bin – i.e., re-writing the component [A] of equation (4) as:

$$\left[\left(f_t^w(q_0^w(q|X)|X) - f_0^w(q_0^w(q|X)|X)\right) - \left(f_t^w(q|X) - f_0^w(q|X)\right)\right]$$

This procedure is a nonparametric version of the framework developed in Lemieux (2006) and essentially extends the single-dimensional model of skill to two dimensions – educational attainment and residual skill. A particularly attractive feature of the method is that it captures the impact that education has on the earnings distribution in a fully nonparametric way. As Lemieux (2006) makes clear, it is not enough to model how mean wages vary with educational attainment, as it shifts both the mean and variance of

earnings.[30] Our approach extends this important insight about the impact of education to higher order moments of the earnings distribution and, most importantly, incorporates the increasing role of education in driving the likelihood of working.

We use a second auxiliary simulation to further separate the relative importance of gains due to convergence in educational attainment versus within-education positional convergence. This calculation requires a simple change to the conditional simulations: rather than hold the share of men in each race-age-education category at the level observed in the initial time period, the auxiliary simulation adjusts the share of men in each race-age-education cell to match that of period *t*. The resulting difference in the earnings gap between the two new simulations is attributed to educational convergence, while any remaining unexplained positional convergence is attributed to within-education positional changes.

Table IV summarizes the results from these two simulations. Rows (A) and (B) repeat the overall decomposition into distributional and positional convergence shown in Table II. The rows labeled (i)-(iii) report the further decomposition of overall positional convergence into the three education-related forces. The results show that convergence in educational attainment has been relatively much more important than within-education positional gains in driving positional convergence at the bottom and middle of the earnings distribution, while the relative importance of these two forces is reversed for positional convergence at the top of the distribution. Over the full study period, for example, gains in position within education categories – row (ii) – accounted for the majority of the positional gains at the 90th percentile (24.8 log points) compared to the very small role played by convergence in attainment. For overall positional convergence at the median, by contrast, convergence in educational attainment - 38.0 log points, from row (i) – was much more important than within-education positonal gains. In terms of employment differences, convergence in educational attainment was the only one of the three education-related forces that acted in the direction of closing the racial gap (by 8.1 percentage points).[31]

[30] Lemieux (2006) demonstrates, in particular, that the increase in education from 1980-2000 explains most of the rise in residual wage variance over this period.

[31] Decade by decade results for Table IV are shown in Appendix Table XI. Consistent with the previous literature, the results imply that gains due to education convergence were largest throughout the distribution in the 1970s and 1980s, but have been quite small since 1990. A similar pattern holds for

The results in row (iii), which we label "Returns to Education," show why the median black man's position in the white earnings distribution has not appreciably advanced from 1940-2014, despite the substantial gains that should have come from convergence in educational attainment.[32] These results, which come from contrasting the decomposition conditional on education with the baseline decomposition, imply that education-related changes in the earnings distribution – over and above the general compression and expansion of the earnings distribution – have been especially harmful to black men at the middle and bottom of the distribution. In particular, the increasing importance of education for wages and, especially, for the likelihood of working would have widened the median earnings gap by 47.7 log points. This amount almost perfectly counterbalances the positional gains that would have otherwise been the result of convergence in educational attainment, school quality, and labor market access. The growing importance of education for work has also played an important role in the racial employment gap, again counteracting – much like at the median – any positional gains that black men should have made due to convergence in educational attainment.

The results in Table IV show that convergence in educational attainment and the decline of within-education positional gaps have indeed helped to close racial earnings and employment gaps throughout the distribution over our study period. Because significant educational differences remain, however, the substantial increase in the returns to education in the labor market from 1970-2014 has largely thwarted the large positional gains that would have otherwise occurred over the past several decades.

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within-education positional convergence at each percentile, with the vast majority of gains at each percentile coming in the 1960s and 1970s with positive but less substantial gains ever since. It is important to note that any contemporaneous changes in educational attainment and school quality take several decades to be fully reflected in the distributional and positional convergence of the population of prime-aged men.

[32] At first glance, the simulations results showing that changes in the returns to education in the 1940s would have increased the racial gap at the median may seem at odds with the decreasing returns to college and high school in the same period for working men (shown in Appendix Table X). However, overall education levels were so low at the beginning of our study period - 85% (54%) of black (white) men had 8 years or fewer of education in 1940 - the returns to high school and college are not relevant for the overall median racial earnings gap in that period. The returns to education did, in fact, increase for men with low levels of education in the 1940s on the extensive margin. In particular, men with 5-8 years of education were 5.4 percentage points more likely to work (have positive earnings) in 1950 compared to those with 4 or fewer years of education. The same gap was only 1.5 percentage points in 1940.

VII. CONCLUSION

A large gap in the relative earnings of black and white men has been a stubbornly persistent feature of the US labor market since the end of slavery. A conventional view in economics has been that, over the last 75 years, the racial earnings gap initially converged quite sharply through the mid-1970s, due in large part to racial convergence in educational attainment and the Civil Rights legislation of the 1960s, and has stagnated ever since. In this paper, we argue that this perspective misses several key aspects of the dynamics of the earnings gap.

First, the conventional understanding is based on studies using samples of employed persons, thereby ignoring the growing fraction of both white and black men that are not working, including those affected by the sharp increase in incarceration in the US since 1980. Incorporating non-work sharply alters the picture of the evolution of the earning gap over the past thirty years. In particular, measured this way, the median earnings gap has re-widened substantially rather than simply stagnated as is now as large as in 1950.

A second key feature of the median earnings gap is that it has risen and fallen largely in step with changes to the overall structure of the earnings distribution over the period studied. In particular, the sharply growing gap since 1980 is explained completely by the stretching of the earnings distribution, and perhaps even more surprisingly, the initial closing of the gap from 1940-70 is largely accounted for by the compression of earnings and returns to education that occurred in this period, especially in the 1940s. Indeed, the relative position of the median white and black men in the earnings distribution has changed very little since 1940.

We find that education has played a subtly complex role in the evolution of racial earnings gaps at the median. The limited rank gains for black men at the median reflect the combination of strong but opposing forces related to education. On the one hand, there has been considerable racial convergence in educational attainment. But sharp increases in the returns to education on both the intensive (among workers) and extensive (the propensity to work) margins have had the effect of magnifying the impact of the remaining educational differences by race, minimizing any real positional rank convergence at the median.

While the existing literature has focused almost exclusively on the evolution of the earnings gap at the mean or median, a key feature of our work is that we separately study

the lower and upper parts of the earnings distribution. In contrast to the median, black men at the 90th percentile have had important positional gains. In fact, these gains accounted for the vast majority of the decline in the earnings gap from 1940-2014 at the 90th percentiles. Positional gains at the top of the distribution were largely attributable to within-education positional convergence, especially at the college level during the 1960s and 1970s. Potential explanations for these improvements include the elimination of the exclusionary practices that existed at the beginning of the study period in many professions and occupations and most colleges and universities. More recently, affirmative action in college admissions may have better equalized effective college quality for high-achieving black students, shrinking racial differences in unobserved skills within the upper part of the earnings distribution.

At the bottom of the earnings distribution, sharp increases in incarceration, labor force non-participation, and unemployment since 1970 have especially devastated the working lives of poor black men. In the heart of the Great Recession, for example, fully 37.8 percent of prime aged black men were not working compared to 18.6 percent of white men. An advantage of the nonparametric decomposition approach this paper employs is that it directly measures the role structural changes in the labor market in driving this large increase in the racial working gap. Strikingly, given the relative position of black men in the education and earnings distributions in 1970, the large decline in the overall fraction of men working and the sharp economy-wide increase in the role of education on the propensity to work would have been expected to have had an even greater impact on the racial working gap. In fact, a non-trivial amount of racial educational convergence in the lower portion of the skill distribution has prevented the working gap from increasing even further in the 1970-2014 period.

There are three main implications of the analysis for understanding racial earnings inequality. First, our results highlight the lack of progress made in closing the gaps in labor market outcomes for black and white men in the United States over the past seventy years. Consistent with previous work, our results illustrate the success Civil Rights Era legislation in closing the racial gap in both attainment and school quality, especially during 1960-1980. But at the bottom and middle of the earnings distribution, structural changes to the labor market have overwhelmed these gains, causing both the racial employment gap and median earnings gap to widen significantly since 1970.

Second, our analysis demonstrates how race-neutral changes in the structure of earnings can powerfully and differentially affect the labor market prospects of black and white men. The rise of the middle class and the great compression of the earnings distribution in the middle of the 20th Century, for example, greatly benefitted black male workers precisely because they were over-represented in the middle and lower portions of the earnings distribution at the time. Similarly, the more recent secular growth in overall earnings inequality, and especially, the sharp increase in the returns to education on both the intensive and extensive margins has disproportionately harmed black men, eliminating the gains that would have naturally come from educational and skill convergence. Conversely, race-neutral economic changes and related public policy decisions that improve the prospects of all workers in the lower and middle portions of the earnings distributions will have the side effect of reducing racial economic inequality.

Finally, our results draw attention to the divergence in the labor market prospects of black men over the past several decades. While the entire economy has experienced a marked increase in earnings inequality, this increase has been even more dramatic for black men, with those at the top making gains within the earnings distribution, and those at the bottom badly affected by mass incarceration and declining labor market options for the less-skilled. In fact, when the number of men with zero earnings is taken into account, the Gini index of earnings inequality among black men in the United States is 63.4 in our 2014 sample. While it is difficult to make exact international comparisons based on earnings, this is as high as the level of income inequality in the most unequal countries in the world.

DUKE UNIVERSITY, UNIVERSITY OF CHICAGO, NBER

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Figure I: Racial Earnings Level and Earning Rank Gaps.

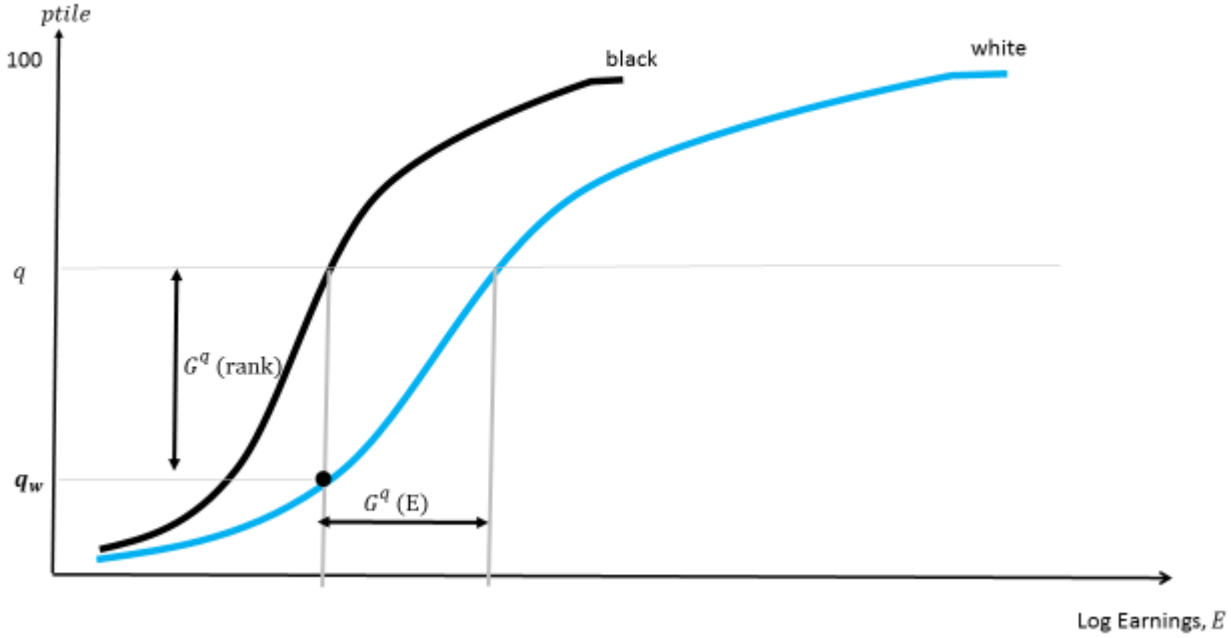
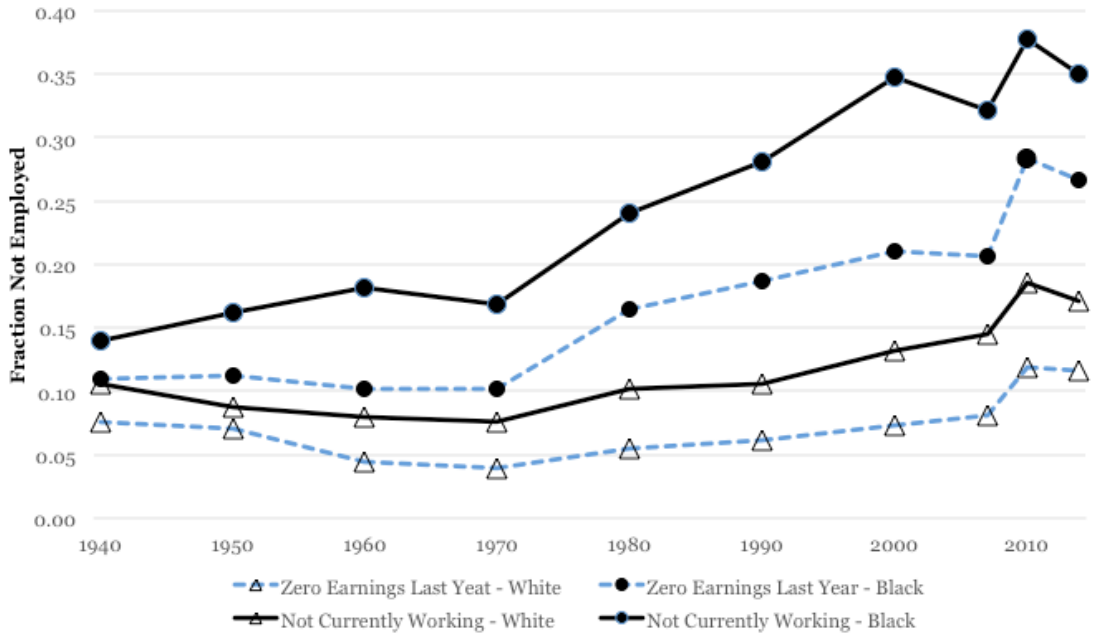
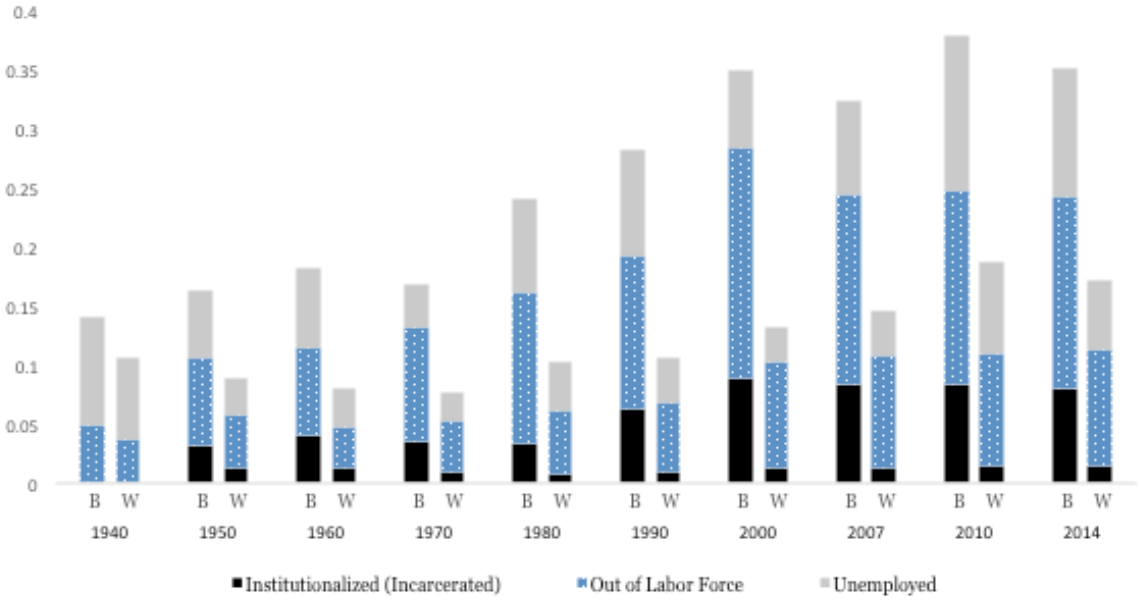


Figure II.A: Fraction of Men Not Employed, by Alternative Measure and Race

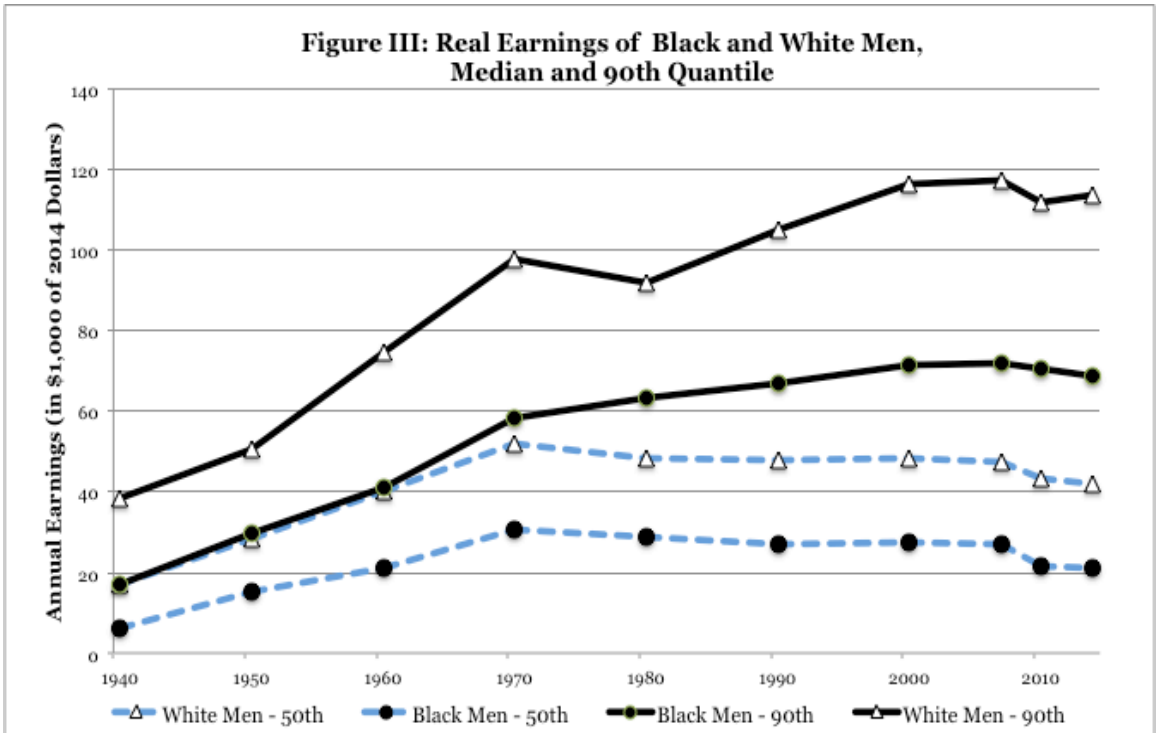


Note: Figure displays fraction of non-Hispanic black and white men aged 25-54 not working according to two measures: not currently working and zero annual earnings in the previous year. The measure of earnings is labor market earnings plus business and farm income. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

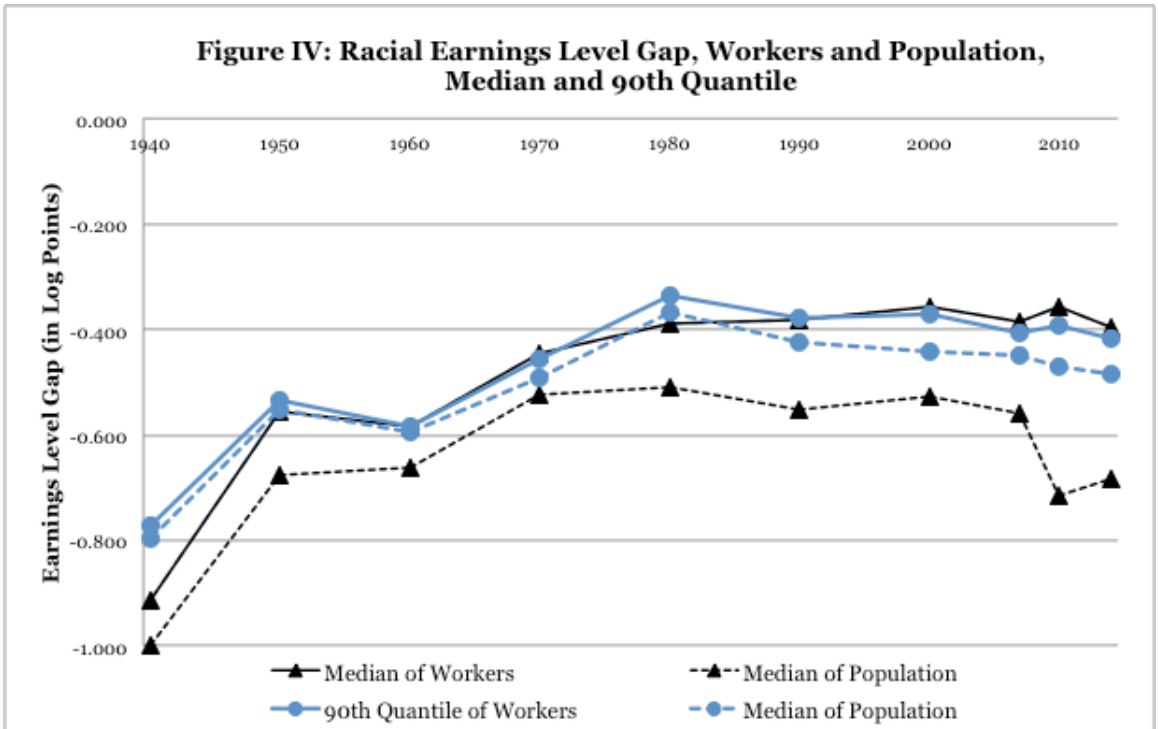
Figure II.B: Fraction of Men Not Currently Working, by Explanation and Race



Note: Figure displays fraction of non-Hispanic black and white men aged 25-54 not currently working for three mutually exclusive reasons: institutionalized, not institutionalized but out of the labor force, in the labor force but unemployed. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

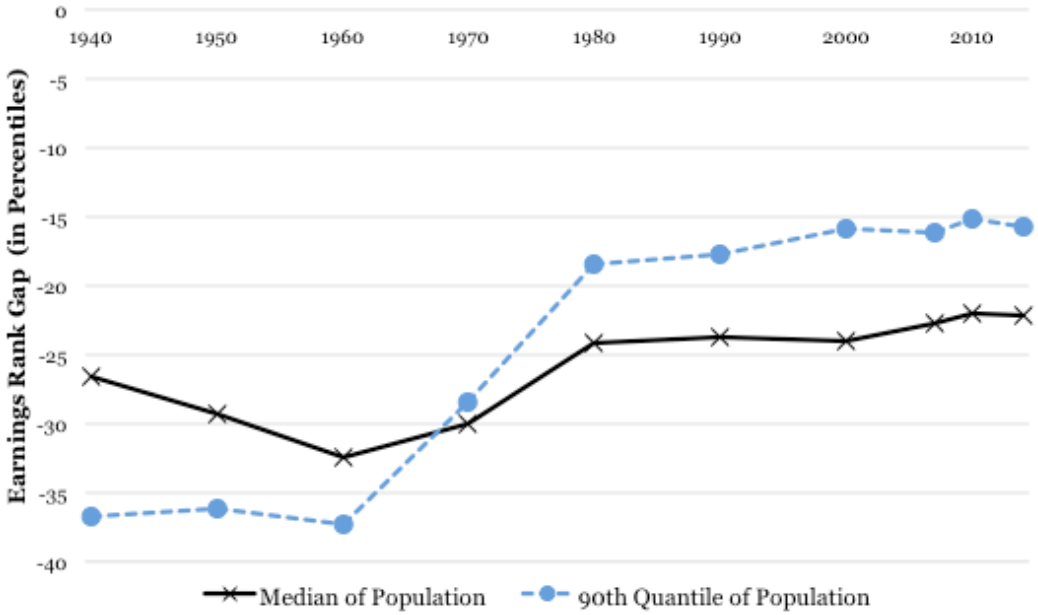


Note: Figure displays earnings of the median and 90th quantile non-Hispanic black and white men measured in the population of all men aged 25-54. Earnings are converted to constant 2014 dollars using the CPI-U price deflator and are measured in thousands of dollars. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07, '2014' combines those from 2013-14.



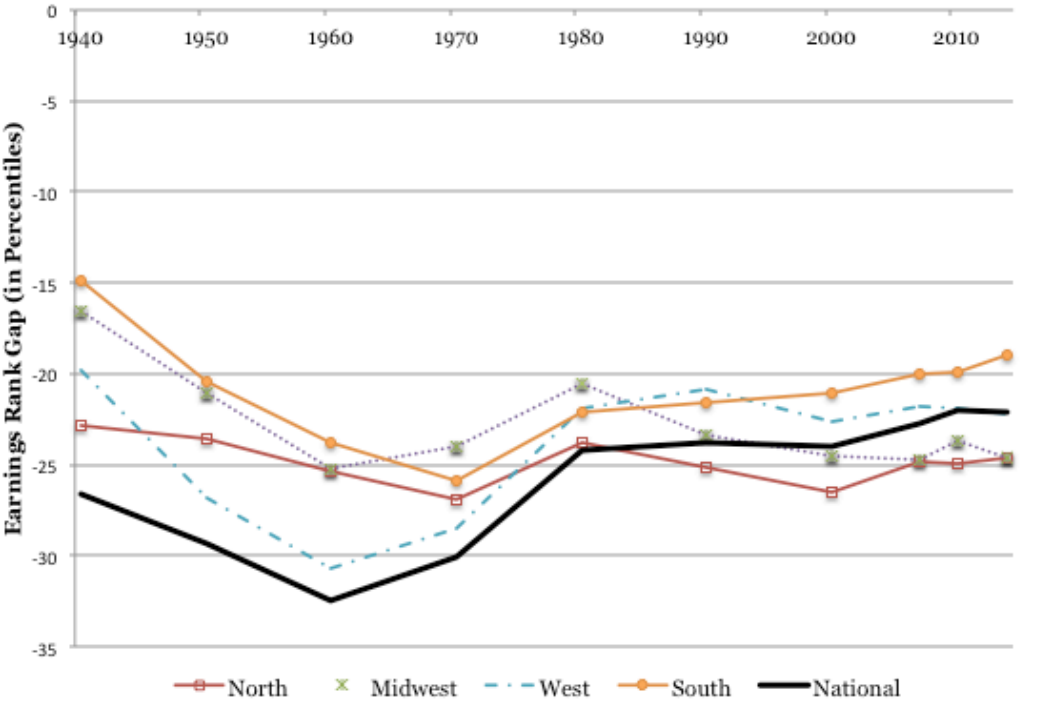
Note: Figure displays earnings level gap, measured in log points, for the median and 90th quantile for non-Hispanic black and white men aged 25-54. Gaps are reported for the sample of workers and the population of all men, including non-workers. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014 .The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

Figure V: Racial Earnings Rank Gaps, Median and 90th Quantiles



Note: Figure displays earnings rank gap, measured in percentiles, for the median and 90th quantile in the population of all non-Hispanic black and white men aged 25-54, including non-workers. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014 .The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

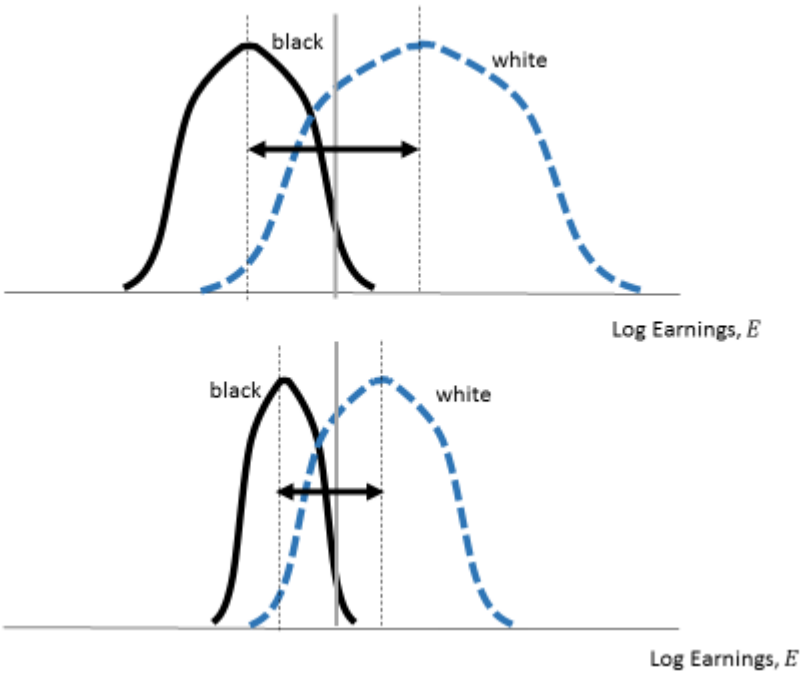
Figure VI: Median Earnings Rank Gaps, by Region



Note: Figure displays median earnings rank gap, measured in percentiles, for the population of all non-Hispanic black and white men aged 25-54, including non-workers. Gaps are shown for the four major Census regions as well as the U.S. as a whole. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' those from 2013-14.

Figure VII: Two Sources of Changes in Racial Earnings Gaps

A. Distributional Convergence



B. Positional Convergence

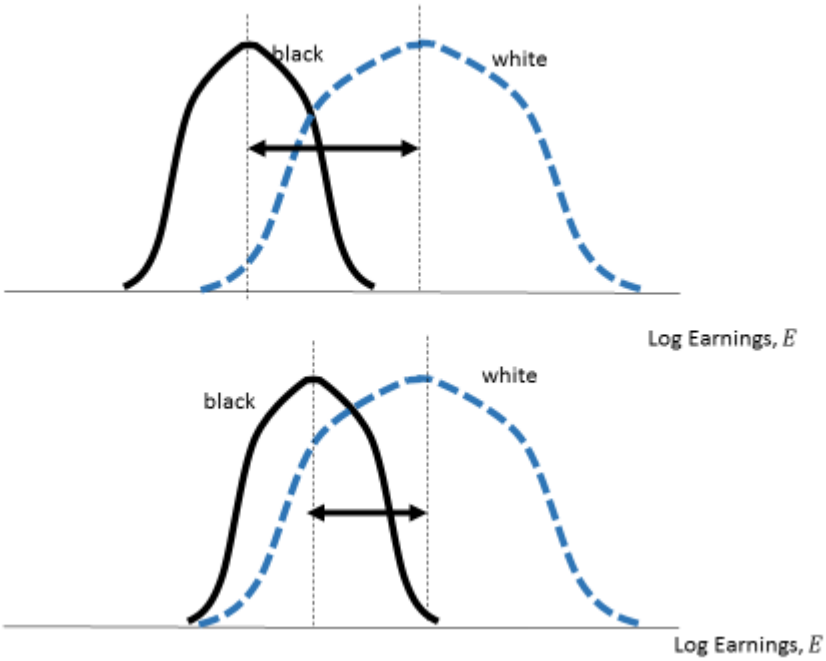
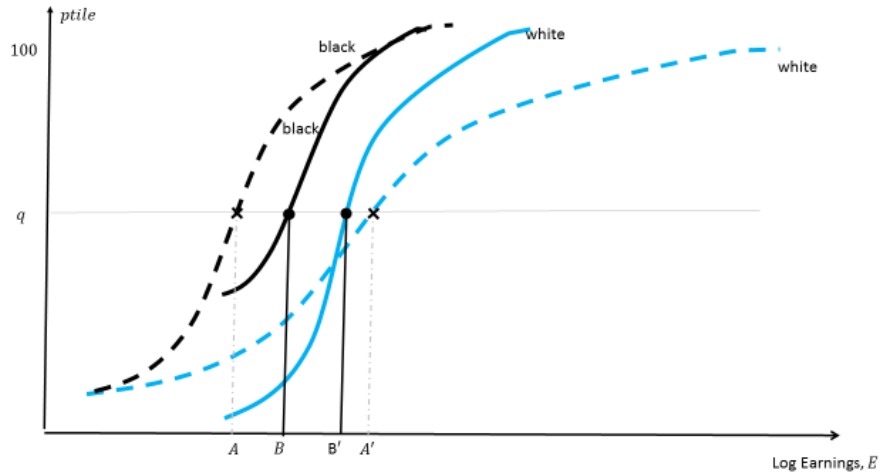
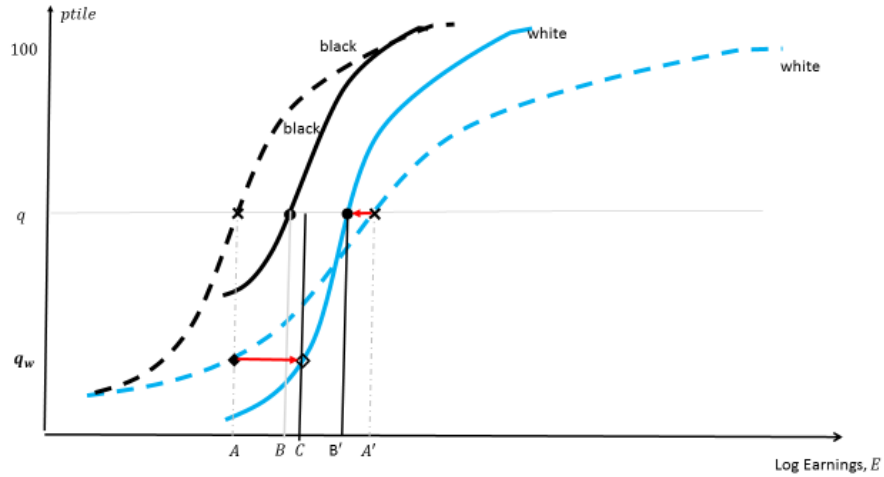


Figure VIII: Illustrating Decomposition Method

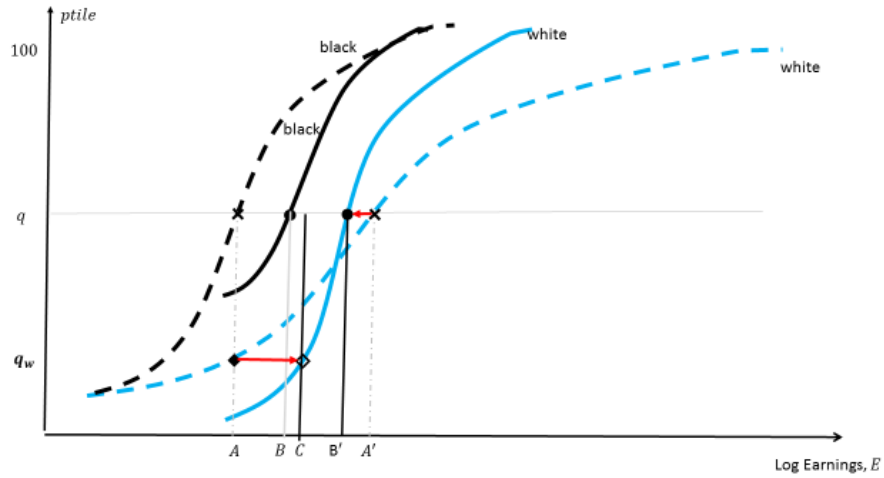
A.

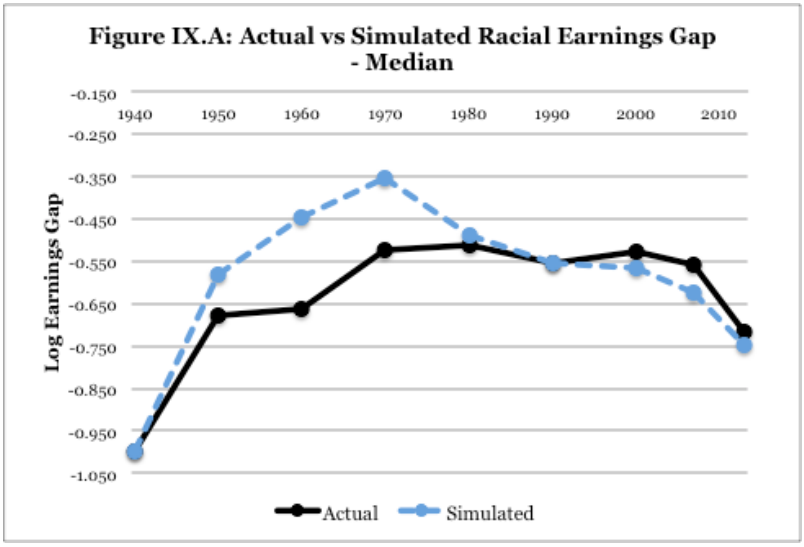


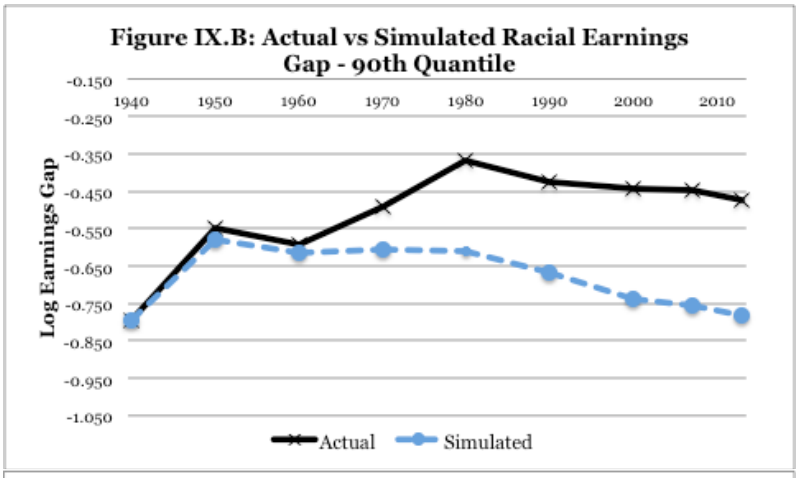
B.

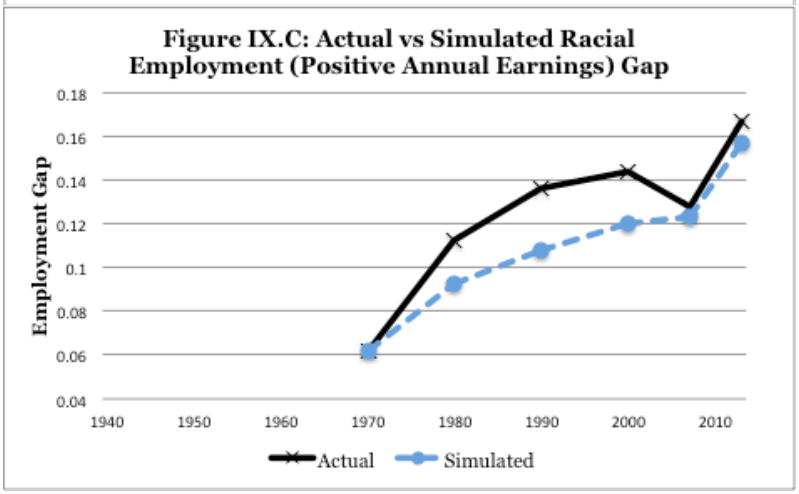


C.



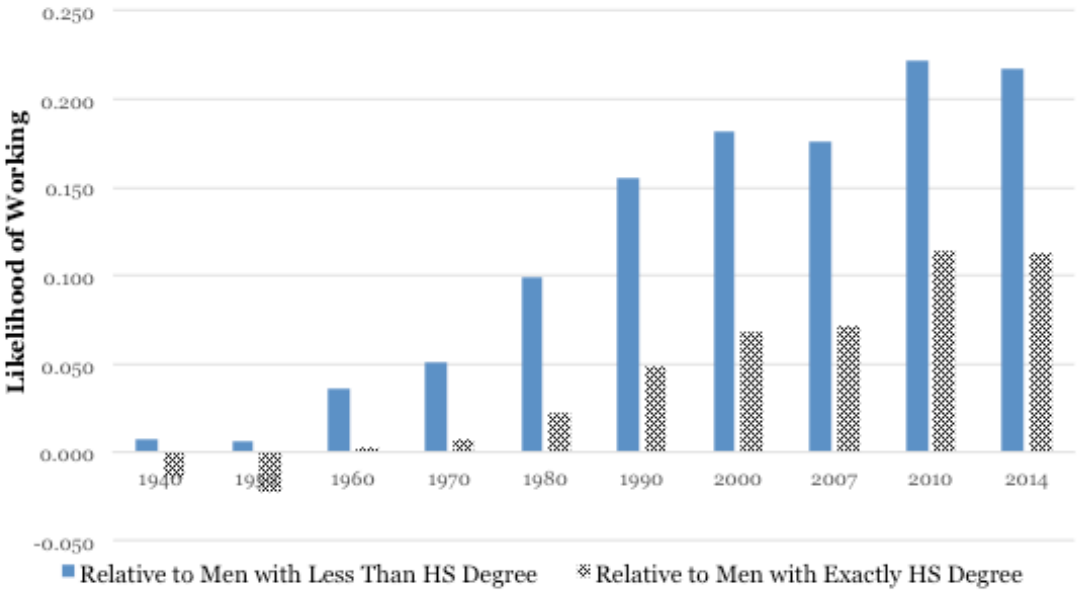






Note: Figures 9a-c display actual and simulated racial employment gaps and median and 90th quantile earnings level gaps. *Sources:* Simulated - Author's calculations. Actual - Census, 1940-2000; American Community Survey, 2005-2014 .The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

Figure X: Additional Likelihood of Working for College Educated Men, Relative to Other Education Categories



Note: Figure displays estimates from linear probability regression of employment on education and age. Increased likelihood of working for college-educated workers versus those with less than and exactly a HS degree, respectively, are shown. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07, '2014' combines those from 2013-14.

Table I.A: Median Earnings Level and Rank Gaps, Under Alternative Sample and Data Specifications

	1940	1970	2000	2007	2014
Earnings Level Gap					
Baseline	-0.999	-0.523	-0.528	-0.560	-0.684
	(0.008)	(0.008)	(0.010)	(0.004)	(0.004)
Age 19-64	-0.960	-0.531	-0.584	-0.614	-0.734
	(0.009)	(0.006)	(0.010)	(0.005)	(0.011)
Native-Born men	-0.990	-0.515	-0.552	-0.591	-0.762
	(0.008)	(0.008)	(0.011)	(0.005)	(0.005)
Weekly Earnings	-0.827	-0.466	-0.466	-0.489	-0.602
	(0.006)	(0.005)	(0.004)	(0.004)	(0.005)
Only Labor Mkt. Earnings	-0.973	-0.491	-0.520	-0.543	-0.707
	(0.014)	(0.003)	(0.004)	(0.005)	(0.008)
Earnings Rank Gap					
Baseline	-26.58	-30.03	-24.02	-22.77	-22.10
	(0.08)	(0.11)	(0.05)	(0.12)	(0.12)
Age 19-64	-25.02	-19.99	-17.71	-16.39	-18.95
	(0.14)	(0.14)	(0.08)	(0.11)	(0.22)
Native-Born men	-25.19	-30.24	-24.66	-23.38	-25.24
	(0.08)	(0.12)	(0.06)	(0.13)	(0.13)
Weekly Earnings	-27.34	-30.98	-23.02	-22.34	-22.00
	(0.14)	(0.34)	(0.04)	(0.13)	(0.16)
Only Labor Mkt. Earnings	-17.07	-24.57	-20.96	-19.64	-21.52
	(0.13)	(0.20)	(0.06)	(0.12)	(0.16)

Notes: Each main cell of the table reports the coefficient that characterizes the differences between non-Hispanic black and non-Hispanic white men from 50th quantile (median) regressions of the individual's log earnings (top panel) or percentile rank of earnings (lower panel) on race/ethnicity and controls for age. All specifications include the population all men, including those with zero earnings. The rows in each panel report results for five alternative specifications: (i) baseline results using the dependent variable - annual labor market earnings plus business and farm income, (ii) expanding the age range to 19-64 from 25-54, (iii) restricting the sample to native-born men for each race/ethnicity, (iv) an alternative dependent variable - weekly earnings (i.e., annual earnings divided by weeks worked), and (v) an alternative dependent variable - only labor market earnings. The columns report results for the sample of the Census or American Community Survey described in the column heading. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14. Standard errors are in parentheses.

Table I.B: 90th Quantile Earnings Level and Rank Gaps, Under Alternative Sample and Data Specifications

	1940	1970	2000	2007	2014
Earnings Level Gap					
Baseline	-0.797	-0.491	-0.442	-0.449	-0.485
	(0.006)	(0.003)	(0.003)	(0.004)	(0.003)
Age 19-64	-0.757	-0.441	-0.405	-0.437	-0.485
	(0.007)	(0.004)	(0.001)	(0.003)	(0.005)
Native-Born men	-0.799	-0.491	-0.442	-0.435	-0.499
	(0.006)	(0.003)	(0.003)	(0.004)	(0.003)
Weekly Earnings	-0.719	-0.444	-0.405	-0.428	-0.459
	(0.007)	(0.004)	(0.001)	(0.005)	(0.002)
Only Labor Mkt. Earnings	-0.792	-0.431	-0.413	-0.425	-0.461
	(0.003)	(0.013)	(0.002)	(0.004)	(0.005)
Earnings Rank Gap					
Baseline	-36.72	-28.42	-15.91	-16.20	-15.76
	(0.31)	(0.52)	(0.11)	(0.17)	(0.15)
Age 19-64	-25.90	-19.95	-11.58	-11.51	-11.71
	(0.23)	(0.15)	(0.05)	(0.10)	(0.16)
Native-Born men	-36.72	-28.57	-16.44	-16.40	-16.52
	(0.31)	(0.53)	(0.12)	(0.17)	(0.16)
Weekly Earnings	-37.26	-25.38	-13.46	-14.55	-14.98
	(0.44)	(0.36)	(0.13)	(0.20)	(0.17)
Only Labor Mkt. Earnings	-31.85	-26.75	-15.03	-15.06	-15.08
	(0.22)	(0.36)	(0.14)	(0.20)	(0.17)

Notes: Each main cell of the table reports the coefficient that characterizes the differences between non-Hispanic black and non-Hispanic white men from 90th quantile regressions of the individual's log earnings (top panel) or percentile rank of earnings (lower panel) on race/ethnicity and controls for age. All specifications include the population all men, including those with zero earnings. The rows in each panel report results for five alternative specifications: (i) baseline results using the dependent variable - annual labor market earnings plus business and farm income, (ii) expanding the age range to 19-64 from 25-54, (iii) restricting the sample to native-born men for each race/ethnicity, (iv) an alternative dependent variable - weekly earnings (i.e., annual earnings divided by weeks worked), and (v) an alternative dependent variable - only labor market earnings. The columns report results for the sample of the Census or American Community Survey described in the column heading. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14. Standard errors are in parentheses.

Table II: Decomposition of Changes in Racial Earnings and Employment Gaps - Positional Vs. Distributional Convergence

	1940-1970	1970-2014	1940-2014
Median Earnings Level Gap			
Total Change	0.476	-0.193	0.283
(A) Distributional Convergence	0.643	-0.392	0.251
(B) Positional Convergence	-0.167	0.199	0.032
90th Quantile Earnings Level Gap			
Total Change	0.306	0.019	0.325
(A) Distributional Convergence	0.192	-0.177	0.015
(B) Positional Convergence	0.114	0.196	0.310
Employment Gap			
Total Change		-0.105	
(A) Distributional Convergence		-0.095	
(B) Positional Convergence		-0.010	

Notes: The three panels of this table describe a series of decompositions of the change in the racial employment gap and earnings gaps at the 50th and 90th quantiles, respectively, for the time horizon shown in the column heading. All estimates use the sample of all men including those with zero earnings, conditioning on age. The total change in the racial employment and earnings gap at each quantile is decomposed into two components: the portion due to (A) distributional shifts in the overall structure of the earnings distribution and (B) shifts in the relative position of black and white men within the earnings distribution.

Table III: Racial Earnings Rank Gaps within Education Category - 1940-2014

	1940	1970	2000	2007	2014
Median					
College Degree or More	-26.20	-17.00	-9.26	-11.12	-11.19
	(1.63)	(0.83)	(0.15)	(0.26)	(0.30)
HS Degree	-19.95	-16.62	-15.95	-14.00	-15.58
	(0.66)	(0.39)	(0.16)	(0.16)	(0.20)
Less than HS	-8.70	-13.95	-15.03	-13.83	-14.05
	(0.19)	(0.18)	(0.26)	(0.38)	(0.24)
90th Quantile					
College Degree or More	-9.14	-3.98	-3.81	-4.47	-4.35
	(0.80)	(0.30)	(0.07)	(0.14)	(0.16)
HS Degree	-16.39	-12.58	-9.82	-10.73	-11.49
	(4.01)	(0.86)	(0.24)	(0.20)	(0.16)
Less than HS	-21.33	-17.94	-14.24	-16.23	-16.52
	(0.12)	(0.25)	(0.28)	(0.46)	(0.47)

Notes: Each main cell of the table reports the coefficient that characterizes the differences between non-Hispanic black and non-Hispanic white men aged 25-54 in the education category shown in the row heading from 90th quantile regressions of the individual's percentile rank in the white earnings distribution on race/ethnicity and controls for age categories. All specifications use the sample of all men, including those with zero earnings. The columns report results for the sample of the Census or American Community Survey described in the column heading. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14. Standard errors are in parentheses.

Table IV: Decomposition of Changes in Racial Earnings and Employment Gaps - The Role of Education

	1940-1970	1970-2014	1940-2014
Median Earnings Level Gap			
Total Change	0.476	-0.193	0.283
(A) Distributional Convergence	0.643	-0.392	0.251
(B) Positional Convergence	-0.167	0.199	0.032
(i) Convergence in Educational Attainment	0.133	0.247	0.380
(ii) Within-Education Positional Convergence	-0.065	0.194	0.129
(iii) Returns to Education	-0.236	-0.242	-0.477
90th Quantile Earnings Level Gap			
Total Change	0.306	0.019	0.325
(A) Distributional Convergence	0.192	-0.177	0.015
(B) Positional Convergence	0.114	0.196	0.310
(i) Convergence in Educational Attainment	-0.097	0.052	-0.045
(ii) Within-Education Positional Convergence	0.101	0.147	0.248
(iii) Returns to Education	0.110	-0.003	0.107
Employment Gap			
Total Change		-0.105	
(A) Distributional Convergence		-0.095	
(B) Positional Convergence		-0.010	
(i) Convergence in Educational Attainment		0.081	
(ii) Within-Education Positional Convergence		-0.024	
(iii) Returns to Education		-0.067	

Notes: The three panels of this table describe a series of decompositions of the change in the racial employment gap and earnings gaps at the 50th and 90th quantiles, respectively, for the time horizon shown in the column heading. All estimates use the sample of all men including those with zero earnings, conditioning on age. The total change in the racial employment and earnings gap at each quantile is first decomposed into two components: the portion due to (A) distributional shifts in the overall structure of the earnings distribution and (B) shifts in the relative position of black and white men within the earnings distribution Shifts in relative position are then further decomposed into components due to (i) racial convergence in educational attainment, (ii) within-education category positional convergence, and (iii) changes in the relative position of black and white men due to education-related changes in the earnings distribution.