DIVERGENT PATHS:
STRUCTURAL CHANGE, ECONOMIC RANK, AND THE EVOLUTION OF
BLACK-WHITE EARNINGS DIFFERENCES, 1940-2014

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NBER Working Paper No. 22797
November 2016
JEL No. J15,J31,J71,K42,N32,N92

<u>ABSTRACT</u>

Studying working and non-working men, we find that, after closing substantially from 1940 to
the mid-1970s, the median black-white earnings gap has since returned to its 1950 level, while
the positional rank the median black man would hold in the white distribution has remained little
changed since 1940. By contrast, higher quantile black men have experienced substantial gains in
both relative earnings levels and their positional rank in the white earnings distribution. Using a
new decomposition method that extends existing approaches to account for non-participation, we
show that the gains of black men at higher quantiles have been driven primarily by positional
gains within education level due to forces like improved access to quality schools and declining
occupational exclusion. At the median and below, strong racial convergence in educational
attainment has been counteracted by the rising returns to education in the labor market, which
have disproportionately disadvantaged the shrinking but still substantial share of blacks with
lower education.

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1 Introduction

The economic fortunes of black Americans relative to those of whites have improved greatly since the end of the Civil War, but convergence has been both glacial and imperfect.[1] Substantial racial differences in wealth, income, and numerous other economic markers remain and there are signs that the closing of some of these gaps has significantly slowed or even reversed in recent decades.[2]

In this paper, we study the evolution of black-white earnings differences among prime-aged men from 1940 through the Great Recession. The conventional picture of how these differences have changed since the middle of the 20th century comes from an extensive literature, characterized in the main by a focus on mean differences among working adults. These studies have shown that the earnings gap between the average black and white worker fell sharply from 1940-1970, with especially large declines in the 1940s and 1960s, but has remained relatively constant in a long period of stagnation since 1975.[3]

A particularly striking feature of the labor market since 1980 has been the sharp reduction in the probability of working for both black and white men due to rising rates of incarceration and declining labor force participation. A number of recent papers have assessed how non-participation affects the measured gap in labor market outcomes, showing that instead of simply stagnating, the racial

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[1] Margo (2016) provides a summary of racial differences in per capita income since the late 1800s. His analysis reveals steady but slow racial convergence in line with a much more persistent process for intergenerational racial convergence than would be expected in American society as a whole over this period.

[2] See Barsky, Bound, Charles and Lupton (2002), Shapiro and Kenty-Drane (2005), and Oliver and Shapiro (2006) for detailed description and analysis of the racial wealth gap. Altonji and Blank (1999) includes a summary of the literature on the racial earnings gap in their handbook chapter. Smith (1984) and Margo (2016) provide a comprehensive analysis or racial differences in per capita income that includes the period from the late 1800s through 1940. We provide detailed citations to the literature that has studied racial gaps in earnings and income from 1940 to the present below.

[3] The results that we present below for the racial earnings gap for working men are consistent with the long literature that has reported results for various time periods within our study period including: Smith and Welch (1977, 1989), Jaynes (1990), Bound and Freeman (1992), Card and Krueger (1992, 1993), Maloney (1994), Chay and Lee (2000), Collins (2001), and Card and DiNardo (2002).

earnings gap has actually widened substantially over the past several decades when measured in the sample of all men, not just those working.[4]

Our paper proceeds in three main parts. In the part that begins the paper, we extend the summary descriptive analysis just described in two key ways. First, we study racial earnings differences not only at the median but also at other quantiles, highlighting the distinct changes that have occurred at the top versus the middle of the distribution. The second way in which we extend standard descriptive analysis is by using two different measures to examine how the earnings of blacks relate to those of comparable whites: the racial gap in earnings level, which is the traditional measure used in the literature, and the racial gap in earnings rank. Whereas the level difference at a given quantile measures the difference in earnings between a black and white man at the same quantile of their respective earnings distributions, the rank gap asks how far below the quantile in his race's distribution a black man's earnings would rank in the white distribution. Taken together, these two measures give a more complete picture of black relative earnings than does either alone.

Estimating quantile regressions, we first report results for the earnings level gap that replicate those reported in the literature, extending estimates at the median through 2014 and reporting new results for the 75th and 90th quantiles. As expected, the median earnings gap closed sharply from 1940 through 1970 and while the median gap among working men was stagnant thereafter, the median gap among all men actually widened substantially. In fact, by the end of the Great Recession, the median earnings level gap in the sample of all men was larger than it had been in 1950. Estimates of the earnings level gap at the upper quantiles in

[4] A number of papers have characterized racial gaps in working or labor market participation and analyzed the impact on racial earnings gaps include: Butler and Heckman (1978), Brown (1984), Heckman (1989, 1991), Smith and Welch (1989), Bound and Freeman (1992), Darity and Myers (1998), Fairlie and Sundstrom (1999), Heckman, Lyon, Todd (2000), Antecol and Bedard (2002), Chandra (2000, 2003), Vigdor (2006), Ritter and Taylor (2011) and Neal and Rick (2014). Studies by Western (2002), Western and Pettit (2005) Pager (2007) Pettit (2012) and Neal and Rick (2014) focus explicitly on the role of incarceration in driving the evolution of the non-participation gap.

this same sample also reveal a re-widening since 1970, but in a more modest fashion than at the median.[5]

We next estimate comparable measures of the earnings rank gap in each time period and at each point of the distribution by simply transforming the dependent variable in these quantile regressions from log earnings to the percentile rank in the white earnings distribution.[6] These results are striking in that changes in earnings rank gaps often do not move in the same direction as changes in earnings level gaps. In the sample of all men, for example, we find that the median black man was positioned at the 24th quantile of the white earnings distribution in 1940 and that his position had risen to only the 27-28th quantile when measured either just before or after the Great Recession. In fact, there has been little change in the relative rank in the overall earnings distribution of the median black and white men over the entire 70+ years of our study. This surprising result held during the years from 1940 to 1970 when the earnings level gap closed substantially and racial differences in educational attainment fell sharply as well as in the most recent several decades when the earnings level gap has re-widened.

By contrast, we find that black men in the upper part of the earnings distribution have moved systematically closer in rank to their white counterparts. The rank of the 90th quantile black man, for example, has risen from about the median to the 75th quantile of the white earnings distribution over the study period. This new descriptive evidence, which is the basis for the analysis in the rest of the paper, shows that the experiences of high- and low-skilled black men,

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[5] Several studies have highlighted heterogeneity in the evolution of the racial earnings gaps, including differences by education and classes of occupations, that is suggestive of differential changes throughout the earnings distribution (Cotton 1990, Bound and Freeman 1992, and Grodsky and Pager 2001). More directly related to our analysis, Darity and Myers (1998) characterize changes in the racial composition of the quintiles of the income distribution from 1976-1993, highlighting the increasing intra-racial inequality that we also document here.

[6] These results, and those presented throughout the paper, are qualitatively robust to defining rank in the white male, male, or overall earnings distributions. Using rank in the white male distribution provides a tight link between the simple conceptual framework that we develop below and the empirical analysis.

relative to that of their white counterparts, have been profoundly different over the study period.

The second main part of the paper turns to a quantitative assessment of the relative importance of two broad categories of economic forces that are responsible for changes in racial differences in earnings. One set includes those factors that lead to what we call *positional* convergence or divergence – i.e., gains or losses in the relative rank of black and white men within the overall earnings distribution. This set of factors includes things like racial discrimination in the labor market or skill differences between blacks and whites at the same position in the earnings distribution of their respective races, due, for example, to racial differences in unmeasured school quality. The second set of factors includes any general economic forces that change the overall structure of the earnings distribution. These can alter the racial earnings level gap through what we call *distributional* convergence, whereby their effect on the earnings of black versus white men differs solely because these men occupy different initial positions in the earnings distribution. This set of factors includes things like skill-biased technical change, trade or tax policy, immigration, and declining unionization. Isolating the contributions of these two types of forces is of first order importance in devising optimal policy tools for addressing persistent racial earnings differences.

To formally quantify the relative importance of these two sets of forces in driving changes in racial earnings differences, we conduct a decade-by-decade decomposition using a nonparametric simulation method that we have developed. The method is in the spirit of the framework developed by Lemieux (2006), which itself builds upon and is motivated by the seminal work of Juhn, Murphy, and Pierce (1991, 1993). In the second main part of our analysis, we present an unconditional version of our simulation method which, in essence, assumes that black and white men held their initial positions in the overall earnings distribution and assigns to them the earnings associated with that position in the following decade. In this way, the simulated earnings distribution neatly isolates the impact of distributional forces on the evolution of the racial earnings gap over the decade.

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These unconditional decompositions yield a series of results concerning causes for changes in racial earnings gaps that are very consistent with the results from the quantile rank regression analysis. In particular, the decompositions imply that the relative earnings of black men around the middle of the earnings distribution have risen and fallen principally as the result of the structural changes to the earnings distribution associated with the "the Great Compression" and the rise of the middle class from 1940-1970 and the increasing dispersion in earnings since 1970.[7][8] Indeed, the strength of these structural forces has routinely overwhelmed important episodes of underlying positional gains or losses for black men at the median. In contrast to the results for the median, positional convergence has played a clear role in driving relative earnings gains for black men near the top of the earnings distribution.

As with the summary description of changes in earnings level and rank gaps, a distinguishing feature of our approach compared to the previous literature is that we present such results at different points in the distribution apart from the mean.[9] An especially attractive aspect of the nonparametric decomposition method we implement is that we can use it to isolate the impact of positional versus distributional forces in explaining the differential evolution of work status among black and white men. In line with the experience of black men near the

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[7] A large literature has documented recent changes in the earnings distribution and sought to distinguish among underlying causes for these changes including Katz and Murphy (1992), Murphy and Welch (1992), Juhn, Murphy, and Pierce (1993), DiNardo, Fortin, and Lemieux (1996), Katz and Autor (1999), Card and DiNardo (2002), Autor, Levy, and Murnane (2003), Beaudry and Green (2005), Lemieux (2006), Piketty and Saez (2003), and Autor, Katz, and Kearney (2008).

[8] Goldin and Margo (1992) provides a comprehensive analysis of the great compression in earnings in the 1940s; Margo (1995) characterizes the sharp decline in the racial earnings gap during this same period. Estimates of the racial gap in per capita income from 1900-1940 provided by Margo (2016) are also consistent with a substantial role for the compression of the earnings distribution in the early Twentieth Century, as documented in Goldin and Katz (2009) in driving racial convergence in this period.

[9] A number of studies have used decomposition methods in the spirit of Juhn, Murphy and Pierce (1991, 1993) to assess whether changes in the racial earnings gap can be attributed to the broader structural changes in the economy. These studies have analyzed the racial gap in earnings or wages at the mean or median among those with positive earnings and have typically used parametric decomposition methods. See Maloney (1994) for the period 1940-60, Card and Lemieux (1996) for the 1980s, and Mason (1999) for the period 1967-88.

middle of the earnings distribution, the results indicate that the especially rapid increase from 1970-2014 in the fraction of black men with zero earnings has been primarily driven by the deteriorating labor market prospects of all low skilled men. That is, black men have been over-represented in the set of men increasingly swept into the zero earnings category precisely because they were significantly over-represented in the lowest rungs of the labor market several decades ago.

The lack of significant positional gains for black men in the middle and lower parts of the skill distribution presents an important puzzle: Given the strong existing evidence on racial convergence in educational attainment and school quality over the study period, why has there been so little change in the relative position of the median black man in earnings distribution?[10] [11] The third main part of our analysis takes up this question by exploring the multi-faceted role of education in driving positional and distribution convergence from 1940-2014. The primary tool for this portion of the analysis is a version of our nonparametric simulation that conditions on education.

This analysis reveals several key findings. First, the increase in returns to education over the latter half of the study period has been principally responsible for the lack of positional gains for low-skilled black men since 1970. In fact, racial convergence in educational attainment would have led to strong positional gains for black men at the median and below, except that these men faced strong structural headwinds from the simultaneously increasing rising returns to

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[10] Collins and Margo (2006) and Neal (2006) provide a detailed analysis of the evolution of the racial gap in educational attainment over our study period. Recent contributions to this literature include Donohue, Heckman and Todd (2002) and Turner and Bound (2003).

[11] Several papers have directly assessed the role of improved school quality, especially for blacks in the South following *Brown v. Board of Education*, 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 review of this literature. More generally, Neal and Johnson (1996), Black et al. (2006), Carruthers and Wannamaker (2014) and Hilger (2015) highlight the role of unobserved differences in skills (conditional on education) in explaining the racial earnings gap from 1940-1990. Arcidiacono, Bayer and Hizmo (2010) and Lang and Manove (2011) provide evidence that the racial skills gap (conditional on education) is driven by statistical discrimination in the low-skilled labor market, which compels equally skilled black men to acquire more education (especially a college degree) than their white counterparts.

education, both in terms of wages and in the probability of employment. In essence, the relative gains that low-skilled black men have made through the acquisition of more education have been directly countered by the increase in the labor market returns associated with the racial differences in education that remain.[12] Taken as a whole, our results imply that the progressively worse economic outcomes of black men in the lower and middle parts of the earnings distribution in recent decades have been primarily the result of structural changes to the economy that have devastated the working lives of low-skilled men more generally, especially the strengthened relationship between education and economic rank.

Second, in sharp contrast to the median, the positional gains of high-skilled black men have been largely due to improvements in relative position within education categories, especially among those with some college and a college degree. The vast majority of the relative gains of black college-educated men occurred in the 1960s and 1970s and these gains have held through the end of the study period as an increasing share of men have attended college. These results suggest that much of the decline in racial earnings differences among high-skilled men has been the result of more equal access to quality higher education and high-skilled occupations and professions.

The rest of the paper is organized as follows. Section 2 describes the data, including basic trends in incarceration, labor force participation, unemployment, and earnings. Section 3 presents a simple theoretical framework that described the two measures of racial earnings differences, and outlines broad mechanisms that might contribute to changes in the racial earnings gap. Section 4 presents the first part of our main analysis, providing empirical estimates of the evolution of the racial earnings and rank gaps throughout the skill. We formally describe our decomposition method and present results from an unconditional version of it in Section 5. The third part of our main analysis is presented in Section 6, which examines the multi-faceted role of education in driving changes in the

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[12] This "swimming upstream" result is very reminiscent of the main explanation of Blau and Kahn (1997) for the lack of decline in the gender wage in the 1980s.

racial earnings gaps over the study period. Section 7 concludes with a discussion of the broader implications of our findings.

2 Trends in Work Status and Earnings

Before beginning our formal analysis of racial earnings differences, we briefly summarize the data that will be used in the paper and present some summary results about trends in earnings and work status among men. These trends are of independent interest and help frame the main analyses conducted in the paper.

Data

Throughout the work to follow, we use decennial US Census data from 1940-2000, and data from the annual American Community Survey (ACS) from 2005-2014. We construct ten samples in all, one for each of the Census decades and three ACS samples: '2007' includes data from 2005-2007, '2010' uses just the 2010 sample, and '2014' covers 2013-2014. We include the 2007 and 2014 samples to provide a snapshot before and after the Great Recession.

Our primary sample is restricted to men aged 25-54. We focus on men in this age range to avoid several complications related to the decision to participate in the labor force including ongoing education for young adults, possible retirement for those 55 and older, and the more heterogeneous labor force participation decisions of females over the study period. We divide men into three categories of race and ethnicity: non-Hispanic black (black), non-Hispanic white (white), and all others. All of the earnings, labor force participation, and education differentials reported throughout the paper compare black and white outcomes while controlling for those of other races and ethnicities.

Given the large fraction of the workforce in agriculture in the earliest years we study, the main measure of earnings used throughout the paper is labor market earnings plus business and farm income.[13] We have also conducted all

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[13] Because a measure of business and farm income is not available in the 1940 Census, 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

analyses presented in the paper using the narrower measure of labor earning alone, and find throughout qualitatively similar results.[14]

Non-Work: Incarceration, Labor Force Participation, and Unemployment

Table 1 reports the fraction of black and white men who are not working in each sample year. The first several rows break the overall rate of not working into three mutually exclusive components: whether the individual (i) is incarcerated, (ii) is not incarcerated and out of the labor force, or (iii) in the labor force but unemployed.

The numbers in the table highlight noteworthy features of the series for each of these three dimensions of non-work, for both whites and blacks, over the past several decades. Perhaps the most dramatic pattern is the change over time in incarceration. Rates of incarceration have skyrocketed since 1980, rising five-fold for white men from 0.3 percent to 1.5 percent by 2010 and more than tripling for black men from 2.6 percent to a staggering 8.3 percent in 2010. Strikingly, the black-white difference incarceration rates rose from approximately 2 percent in 1960-1980 to 7.6 percent in 2000 and remains between 6.5-7.0 percent in the 2007-2014 samples. [15]

There have also been massive changes in labor force participation rates, which have fallen sharply for both black and white men since the middle of the 20th Century. While 8.6 percent of black men were out of the labor force (and not in prison) in 1960, this figure peaked at 19.4 percent in 2010 and remains above 16

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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] The Appendix provides a series of results based on this more narrow measure of earnings.

[15] Neal and Rick (2014) provides 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.

percent in the 2007-14 samples. The increase in the share of white men out of the labor force has been similarly dramatic, albeit from lower initial levels, rising from 4.2 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 3.4 percent in 1970 to a peak of 10.4 percent in 2000 and remains above 6 percent in the 2007, 2010, and 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 noteworthy aspect of unemployment pattern 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.

These three aspects of non-work have combined to produce striking changes in the work experience of prime-aged men in the United States since the middle of the Twentieth Century. Perhaps most notable is how substantially rates of not working have increased for both black and white men, rising from 18.0 percent in 1960 to 37.8 percent for black men in 2010. Though starting from a lower basis, the comparable rise for white men has also exceeded 100 percent, from 7.9 to 18.6 percent.

Another interesting fact is that, as the overall incidence of non-work among men has grown, there has also been an expansion in the large racial "working gap". In fact, the racial difference in the probability of working grew by 9.1 percentage points between 1960 and 2010. Each of the three component gaps (incarceration, labor force participation and unemployment) has contributed to this sharp rise. Twenty-two percent of the change is due to the increasing unemployment gap, 51 percent to the expanding incarceration gap, and 27

percent to the growing labor force participation gap.[16] It is important to note that the incarceration measure reflects only those in prison at the time of the survey and does not measure the number of men who have ever been incarcerated and may have difficulty finding work upon release. 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]

The measure of earnings provided in the Census and ACS represents a second source of information on individuals' work status. There is an important difference in timing between the measures related to work status (i.e., incarceration, out of the labor force, and unemployed) and earnings. In particular, earnings are measured for the full year prior to the survey, while the variables associated with not working are measured at the time of the survey. The final row of Table 1 reports the fraction of black and white men, respectively, with zero earnings in the previous year (we discuss the measure of earnings below). Figure 1 depicts the racial gap for each of the two summary measures 'Not Working for Any Reason' and 'Zero-Earnings'. Both measures show a sharp rise in the black-white 'working' gap over the study period.

Earnings

The rising share of men with zero earnings, and the growth in the racial difference in non-work, have important implications for changes in the earnings distribution among all men, and separately by race. Table 2 reports summary statistics that show the distribution of the measure of earnings used in the paper - labor market earnings plus business and farm income – for black and white men, respectively. The first set of rows in each panel report the mean and median earnings for the sample of men with positive earnings, while the second pair of

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[16] Comparing the figures for 1960 and 2010 in the lower panel of Table 3 reveals that the incarceration gap has increased by 3.8 percentage points, the out-of-the-labor-force gap by 7.2 percentage points and the unemployment gap by 1.8 percentage points.
[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.

rows reports the median, 75th and 90th percentiles of earnings for the full sample of all men, including those not working for any reason.

While the level of earnings has been clearly higher for white men throughout the entire sample period, the evolution of the shape of the distribution over the study period has been very similar for white and black men. Figure 2 plots median earnings in the sample of working men and in the sample of all men, separately by race. At the median, real earnings rose sharply for both black and white men through 1970 followed by a period of stagnation or decline depending on whether the median is calculated just among working men or among all men. In fact, the median real earnings of both black and white men have fallen considerably since 1970, declining by 19 percent for the median white man (from $18,200 to $14,700 in 2014) and 32 percent for the median black man (from $10,700 to $7,300 in 2014) when all men are included in the sample.

There has been a similar pattern at the 75th quantile, where earnings increased through 1970 then stagnated, with little change, through the end of the study period. In fact, only at the highest points in the earnings distribution have there been sustained increases for both white and black men since 1970. Real earnings have risen by 18 percent for the 90th percentile black man (from $20,730 to $24,000 in 2014) and 16 percent for the 90th percentile white man (from $34,100 to $39,700) since 1970.

The work status and earnings trends summarized in Tables 1 and 2 highlight two key issues that guide our main empirical analysis. First, the summary numbers suggest that obtaining an accurate picture of changes in relative earnings outcomes of black versus white men over time necessitates careful treatment of the work/non-work margin. The racial working gap is not only of increasing importance in its own right, but accounting for the growing fraction of black and white men not working will likely affect conclusions about how, and why, racial earnings differences have evolved over time.

The growing prevalence of zero-earner men also explains why we choose to focus on the racial gap in annual earnings rather than hourly wages for describing how the relative labor market fortunes of black men compared to whites have evolved over time. Annual earnings provide a summary, holistic measure of an

individual's labor market prospects, naturally capturing variation due to differences in both wages and attachment to the labor market. By focusing on earnings, our analysis accounts explicitly for not only the growing fraction of men that do not work at all during a calendar year, but also any impact on earnings resulting from working sporadically throughout the year or less than full time.

A second consideration implied by the summary patterns in Tables 1 and 2 is that racial difference in earnings outcomes appear to have evolved differently throughout of the skill distribution. For example, men lower and middle part of the distribution experienced declining real earnings in recent decades, while those at the top have continued to gain ground, with both effects differing across race. Besides attempting throughout to account for non-work, another feature of all the work that follows is that we will show results for the entire distribution, and not only the median or mean.

3   Earnings Gaps: Theoretical Overview and Empirical Specification

In this section, we give the formulation of the earnings process used in the paper. We describe the two summary constructs of racial earnings differences that flow naturally from that formulation: the gap in earnings level and in earnings rank. We then present the quantile regression specifications used to estimate these two constructs.

The Earning Process

We represent log earnings *log(E)* in each period as a function of an individual's level of skill *q*: *log(E) = f(q)*. We use white men as the reference group and normalize white skill in each period to be distributed uniformly on the unit interval.[18] This normalization is without loss of generality and convenient

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[18] In the analysis that follows, we use the white earnings distribution as the reference distribution and examine shifts the black earnings distribution relative to it. 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 overall earnings distribution or the overall earnings distribution for men as the reference distribution.

because *f* then simply maps each quantile *q* of the white skill distribution to the corresponding level of earnings. For expositional ease, we assume that the black and white skill distributions have the same support.

Consider a black man with skill at the qth quantile of the black skill distribution. Our central organizing idea is that this man's skill can be mapped to the $q_w{}^{th}$ quantile of the white distribution as a result of the operation of two functions:

$$(1)\ q_w = h(q) - \pi(q)$$

The first, *h(q)*, translates the *actual* skill of the qth ranked black man to the comparable quantile of the white skill distribution. One obvious reason why the skill of the qth black man might be less than the qth quantile of the distribution of white skill is likely difference in the quality of schools that black and white children have historically attended.

The second function, *π(q),* captures another reason why the qth −ranked black man might have lower effective skill (and thus lower earnings) than that q^{th} −ranked white: any race-specific penalty in the returns to skill that affects only black men, as might arise because of discrimination against blacks due to either racial animus or statistical discrimination.[19] Because, as in the famous formulation of Becker (1967), we represent earnings as the product of price and skill, a race-specific price penalty in position captures the idea that black men are paid *as if* their skills were than they actually are.

It is worth emphasizing that this paper is not concerned with teasing apart the separate importance of *h* and *π.* For some of what we do later, we will be interested in the total influence of race-specific effective skill shifters, like poorer

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[19] Another possibility, besides differential treatment that black men face directly in the labor market, 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.

quality schools for blacks children or discrimination, and so will be interested in the *combined* effect of h and π.[20]

Given the characterization of the earnings process, the difference in the level of earnings between a black man at given quantile q in the black earnings distribution and the earnings of a white man at the same quantile position in the white distribution, which we call the racial gap in earnings level at quantile q, $G^q(E)$, can be written as:

$$(2)\ \ G^q(E) = f\big(h(q) - \pi(q)\big) - f(q).$$

Another summary measure of racial earnings difference that flows naturally from the framework is the difference between a black man's quantile position in the black earnings distribution and the quantile position of his earnings would occupy in the white earnings distribution, or $q_w - q$. We call this second measure of racial earnings differences at a quantile, the positional rank gap, $G^q(rank)$.

$$(3)\ \ G^q(rank) = h(q) - \pi(q) - q.$$

Figure 3 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 quantile, 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 positional rank that the qth ranked black man would hold in the white distribution, q_w, is the position on the $y-$axis where the earnings of the qth black

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[20] The distinction between h and π has been the focus of many important studies based on data sources that include some direct measures of skill (see, for example, Neal and Johnson (1996), Arcidiacono et al. (2009), Lang and Manove (2011), Black et al. (2011), and Hilger (2016)). The absence of any such measure in the Census and ACS precludes this type of analysis. Conceptually, the positional gaps that we measure at each point in time capture the combination of any contemporaneous labor market discrimination and contemporaneous skill differences. The latter are a function, of course, of the complete history of differential access to educational opportunities and school quality across generations.

hits the white cdf. The positional rank, $G^q(rank)$, is the vertical difference between q and this value.

Regression Specifications for Estimating Rank Gaps

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

$$(4) \ \log(E_i) = \alpha(q) + \beta(q)r_i + \varepsilon_i(q)$$

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 qth ranked white man is given by: $\alpha(q) = f(q)$. The estimated parameter $\beta(q)$ exactly measures the racial earnings gap at the qth quantile from (2), or:

$$(5) \ \beta(q) = f\big(h(q) - \pi(q)\big) - f(q) = G^q(E).$$

Besides its tight link to the theoretical formulation of the earnings process, using quantile regressions to measure racial earnings gaps has several attractive features relative to measuring the gap at the mean. As we have noted at length, a significant fraction of both black and white men have zero earnings in each period, creating an important selection problem in studying the evolution of racial earnings inequality. The primary strategy that has been 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 the evolution of the earnings. By construction, this is a valid descriptive approach for studying the evolution of the racial gap in actual earnings at the median. And, as discussed in Darity and Myers (1998), Johnson, Kitamura, and Neal (2000), Neal (2004) and Vigdor (2006), this is also a valid method for studying the evolution of the gap in earnings *potential* at the median under the maintained assumption that anyone

not working would have earned less than the median earnings – that is, that being employed is sufficiently positively selected.[21]

The second issue is that the general price of skill and the race-specific price penalty may vary throughout the skill distribution. By estimating (3) at quantiles above the median, we are able to study the evolution of the racial earnings gap in the upper tail of the earnings distribution. As we will see below, this flexibility reveals a different picture of the relative economic performance of black workers near the top versus the median of the earnings distribution over the past 75 years.[22]

To measure the positional rank gap at a quantile at a point in time, we estimate quantile regressions of the form:

$$(6) \ rank(E_i) = a(q) + b(q)r_i + u_i(q)$$

where the dependent variable is an individual's rank in the white earnings distribution. In this regression, $a(q)$ is simply the identity function, $a(q) = q$, and parameter $b(q)$ measures the rank gap at a given quantile, $G^q(rank)$, or:

$$(7) \ b(q) = h(q) - \pi(q) - q = q_w - q$$

This parameter therefore directly measures the *earnings rank gap* at a given quantile, $G^q(rank)$: how many percentile points the qth ranked black man in the black distribution sits below the qth ranked white man in the white earnings distribution.

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[21] As discussed in Neal (2004) and Mulligan and Rubinstein (2004), while this assumption is likely to be reasonable for men, it is clearly unreasonable for women, as female labor force participation is not so clearly positively selected during much of our study period. For this reason, we limit the analysis presented in this paper to men. See Blau and Beller (1992) and Anderson and Shapiro (1996) for descriptive analyses of trends in the female racial earnings gap. We intend to return to a study of the evolution of the racial earning gap for women in a second paper that of necessity must deal more carefully with the possibility of non-positive selection into the labor market.

[22] As highlighted above, we also estimate the evolution of the racial gap in working versus not working, revealing important changes that have occurred over this period in the lower tail of the skill distribution.

4 Racial Earnings Gaps

We present estimates of the two racial earnings gaps in each sample year from 1940-2014 from quantile regressions specifications shown in (4) and (6). Throughout our analysis, we condition on six age categories capturing each five-year increment from age 25-54, which has only a modest impact on the actual estimates. Since we condition only on age, we call these estimates the "unconditional" earnings gaps.

Throughout the paper, we are chiefly interested in describing and understanding the evolution of unconditional earnings gaps as these characterize how the relative labor market experiences of black and white men have changed throughout the skill distribution. In Section 6 below, we examine the multi-faceted role of education in driving these changes.

Earnings Level Gaps Since 1940

The panels of Table 3 report two sets of log earnings regressions estimated at the 50th, 75th and 90th quantiles. The upper panel reports results for the sample of working men (those men with positive earnings in the sample year), while the lower panel reports results for the full sample of men. Figures 4A-C shows the estimated black-white gap for each sample at the 50th, 75th, and 90th quantiles, respectively.

At the median, the results for the sample of working men reveal a pattern that has been reported extensively in the existing literature. The median earnings gap fell by almost 60 percent from 1940 to 1980 (with large decreases in the 1940s and 1960s) but has been essentially flat ever since, remaining in the 35-40 percent range in every sample from 1980-2014.

Focusing on working men, however, ignores the important trends in the racial gaps in incarceration, labor force participation and unemployment shown in Table 1. Not surprisingly, the results shown in the lower panel reveal a starkly different pattern for the median earnings gap when all men are included in the sample, especially in the more recent portion of the study period. In particular, while the results shown in the upper panel show almost no change in the median

racial earnings gap from 1980 through 2010, the results in the lower panel reveal a substantial re-widening of the black-white earnings gap over this period.

In fact, by 2014, the estimated median racial earnings gap among all men was larger than the 1950 gap, having increased from 51 log points in 1980 to over 68 in 2014. The gap had already expanded somewhat to 56 log points in the period just before the Great Recession, but the Great Recession had especially deleterious effects for the median black man versus his white counterpart. There is also little indication that these effects have tempered so far in the recovery, as the racial earnings gap remains almost as high in 2014 as in 2010. The contrasting results captured in the panels of Table 3 illustrate the sensitivity of conclusions about the evolution of the median earnings gap since 1980 (whether it has been flat or has substantially re-widened) to whether one accounts for the declining number of men with positive earnings.

The results in Table 3 also reveal a number of important differences in the evolution of the racial earnings gaps in the upper portion of the earnings distribution relative to the median. For expositional brevity, we focus on the sample of all men presented in the lower panel. In this sample, while the estimated racial earnings gaps for all three quantiles show a similar U-shape, with the gap first declining prior to 1980 and then re-widening through 2014, the extent of the measured increase since 1980 varies markedly across quantiles. As described above, the re-widening at the median was substantial enough to completely reverse the decline in the racial wage gap that had occurred from 1950-1980. In contrast, the re-widening measured in the upper portion of the earnings distribution has not been nearly as extreme. At the 90th quantile, for example, the racial earnings gap fell from 59 percent in 1960 to 37 percent in 1980 and subsequently re-widened to 47-49 percent in 2010-2014. These results imply that about half of the relative earnings gains for black men near the top of the income distribution from 1960 to 1980 have held in recent decades in contrast to the complete reversal at the median.

The contrast between the estimated earnings gaps at the median and upper quantiles is especially striking for the period surrounding the Great Recession. While the racial earnings gap at the median increased by over 15 percentage

points at the median from 2007 to 2010, the gap at the 90th quantile increased by only about 2 percent over the same time period, highlighting the vastly different ways that black men near the top versus the middle of the earnings distribution have experienced the impact of the Great Recession.

Earnings Ranks Gaps Since 1940

Table 4 presents estimates of rank gaps based on quantile regressions of the form (6). The dependent variable in these regressions is the percentile rank in the white earnings distribution associated with an individual's earnings level. All of the results presented here are qualitatively robust to using percentile rank in the male earnings distribution or the overall earnings distribution.

The results in the table paint a very different picture of how racial earnings have evolved compared to the results for earning level gaps shown in Table 3. Looking first at results for working men in the upper panel, the results indicate that the positional rank the median black working man would have had in the earnings distribution for white working men has moved consistently closer to the median. In 1970, for example, the earnings of the median working black man equaled the earnings of the 21st quantile working white man. By 2014, the median working black man earned as much as the 33rd percentile working white man. This closing of the positional rank at the median among working men contrasts starkly with the fact that, over the same period, there was no narrowing in the gap in earnings levels over the same period among working men.

When the rank analysis is conducted in the sample of all men, including non-workers, the results in the lower panel of Table 4 show that the rank gap for the median black man, in fact, barely changed at all over the entire interval from 1980 through 2014, remaining essentially constant at around 22-24 percentile points. Recall from Table 3 that this was a period during which the gap in earnings levels at the median grew substantially. Interestingly, estimated rank gaps in the sample of all men during the earlier period, 1940-1970, also differed from changes in the earnings level gap. In particular, while the median gap in earnings levels among all men closed substantially over this period, declining by nearly 50 percent from 1940-1970, changes in the rank gap over the same period

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showed relative worsening for the median black man, whose position in the white earnings distribution fell from the 23rd percentile to the 18th percentile of white men.

The results in Table 4 for rank gaps at higher quantiles are quite different from the results at lower parts of the distribution. Focusing on the results for the sample of all men shown in the lower panel of Table 4, the rank gap has declined significantly for both the 75th and (especially) the 90th quantile since 1960. For example, the estimated rank gaps at the 90th quantile fell from 37 quantile points in 1940 to 16 quantile points in 2014. The majority of these gains occurred from 1960-1980, and the rank gap has remained essentially constant at 16 percentile points in every sample year from 2000 through 2014. Put another way, the 90th percentile man in the black earnings distribution would be ranked at about the 74th percentile of the white earnings in 2014 versus being ranked at the 53rd percentile in 1940 or 1960.

Strikingly, while the earnings rank gap was initially much larger in the upper portion of the earnings distribution, this pattern has now been completely reversed, with the smallest gaps now found at the higher quantiles, as shown in Figure 5. An important implication of this divergent pattern is the especially large increase in earnings inequality among black men over the past several decades. In particular, while the overall dispersion of the earnings distribution has led to an increase in earnings inequality for all men, the increased dispersion has been even greater for black men, as the earnings of those near the top of the distribution have slipped more modestly compared to similarly-placed whites, while those at the median or below have fallen much further behind their white counterparts.[23]

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[23] In the Appendix, we present results of an extensive set of robustness analyses for the results presented in this section. A set of comparable results to the lower panels of Tables 3 and 4 is shown for a narrower measure of earnings that excludes business and farm income in Appendix Table 1. Appendix Table 2 provides estimates of the median earnings and earnings rank regressions for a number of additional specifications including (i) broadening the age range of the study from 25-54 to 19-64, (ii) considering only native-born white and black men, and (ii) alternative treatments of WPA income in 1940. These imply that the qualitative

The estimated racial gaps in earnings level and in earnings rank, at different quantiles, in the sample of both workers and non-workers, provide a substantially richer and more nuanced picture of blacks men's relative earnings outcomes over the past several decades compared to the evidence in the previous literature on the mean gap in the level of earnings estimated on a sample of workers. These unconditional descriptive results constitute new basic facts about blacks' relative earnings that have not previously appeared in the literature. They are of independent interest and also are the foundation of the work done later in the paper.

These descriptive quantile results raise two related questions. First, what explains the changes over time in relative black earnings performance, as summarized by the two measures? The second question stems from the fact that, as we have shown, our two summary quantile measures sometimes paint qualitatively different pictures about black relative earnings, with the level gap suggesting either improvement or worsening, and the rank gap suggesting either the opposite or no change. What accounts for differences in the evolution of level and rank gap during different periods?

To answer both these questions, we decompose changes in racial earnings differences over time into two main types of forces implied by our specification of the earnings process. Extending methods that have previously been employed to study only workers, we introduce a non-decomposition method for total earnings that accounts for the large and growing number of men with zero earnings. We outline the decomposition method in the next section.

5 A Nonparametric Method For Decomposing Changes in Racial Earnings Gaps

Given the formulation of the earnings process in Section 3, the change over time in the earnings level gap at a given quantile can be written:

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pattern of results shown in Tables 3 and 4 are robust to these alternative specifications and provide some additional insights about the evolution of the racial earnings gap over the study period, especially during the Great Recession.

(8) $\beta'(q) - \beta(q) = \left(f'(g'(q) - \pi'(q)) - f'(q)\right) - \left(f(g(q) - \pi(q)) - f(q)\right)$

where "$'$" indicates the functions in the next time period. Adding and subtracting terms we can write this as:

$$(9) \quad \Delta\beta(q) = \left[\left(f'(g(q) - \pi(q)) - f(g(q) - \pi(q))\right) - \left(f'(q) - f(q)\right)\right] \quad [A]$$
$$+ \left[f'(g'(q) - \pi'(q)) - f'(g(q) - \pi(q))\right] \quad [B]$$

The first bracketed term [A] measures the effect on the earnings gap of changes in how skill is, in general and without regard to race, rewarded in the market. One can think of these as changes to the overall structure of the earnings distribution over time, which differentially affect white and black men given their initial positions within the skill distribution as perceived by the market.[24] 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. 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 any changes in how the market perceives and rewards a black man relative to a white man in the same initial quantile positions of their respective race's earnings distribution. Anything

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[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, a number of researchers, including 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' and 'race-specific' in a narrow sense to distinguish changes in the overall structure of the earnings distribution versus changes in the relative position of black and white men within the distribution.

producing a relative change in the actual skill of the black man compared to the white, or which changed the relative price paid to black versus white skill would thus 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 racial wage discrimination or occupation exclusion against blacks would be included in component [B].[25] We call the portion of the change in the earnings gap represented by [B] *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 6 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 call 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 close through a combination of these two forces.

The method that we develop to decompose changes in the racial earnings gap into the two broad sources of divergence or convergence described above is based on a counterfactual simulation that asks: how would racial earnings inequality have evolved between time-periods *o* and *t* if black and white men had held their relative positions in the earnings distribution at time *o*? The simulation provides a direct measure of the change due to distributional convergence, and since it is computed by holding position constant, the difference between the simulated and

[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.

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actual gap at time t captures the effect of positional convergence on the change in the racial earnings gap.

An important advantage of our approach is that it can also be used to examine how the racial composition of men not working (more specifically, with zero earnings) would have been expected to change had black and white men held their initial positions in the earnings distribution. This aspect of the simulation only works for periods in which the fraction of men not working has increased, as it has for both black and white men since 1970, since we essentially examine who would be swept into the not-working category as the earnings distribution is truncated from below at an increasing threshold.

Formally, the simulation calculates counterfactual earnings gaps under the assumption that the position of white and black men within the overall earnings distribution is fixed through time relative to some initial period 0. The primary object that we need to calculate for each period t is the counterfactual joint distribution of earnings and race: $f_t(E, r)$. With this counterfactual distribution in hand, it is straightforward, for example, to estimate quantile regressions analogous to those shown in (6) in order to simulate the counterfactual evolution of the earnings gap throughout the distribution.

To fix ideas, we begin by describing the calculation of f_t for the case when the analysis is not conditional on any control variables. We extend it below to the conditional case, which is an important focus of our empirical analysis. The calculation of the joint distribution of earnings and race in the unconditional case is based on three empirical functions and can be written:

$$(10) \quad f_t(E, r) = f_t\big(q_0(r)\big)\sigma_t(r)$$

The first component on the right hand side of this equation, $q_0(r)$, describes the distribution of percentile ranks for men of race r in the initial period 0. The second component is the earnings function $f_t(q)$, which assigns the earnings associated with percentile rank q in period t. In this way, the function $f_t(q_0(r))$ describes the earnings distribution for men of race r in time t if they had held

their relative positions within the earnings distribution at time 0. The final term, $\sigma_t(r)$, adjusts the resulting distribution to properly reflect the composition of the sample at time t.

The implementation of the simulation is straightforward and provides an easy way to see how the components of (10) work together. The procedure that we use to construct the simulated sample for each subsequent year t can be summarized as follows:

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

Step 1 ensures that the simulated sample reflects the sample composition at time t, (i.e., captures the $\sigma_t(r)$ component from (10)). Step 2 applies the rank function, $q_0(r)$, at time 0, and Step 3 then applies the earnings function at time t, $f_t(q)$. The simulated sample at time t provides a nonparametric characterization of the joint distribution of earnings and race at t had white and black men held their relative positions in the earnings distribution at time 0.

Our method essentially conducts a series of simulations that measure how the racial earnings gap would have evolved over each decade if white and black men had held their positions but the next decade's earning distribution was applied. Any changes that result from applying the next period's earnings distribution are attributed to distributional convergence and any remaining difference between the simulated and actual earnings gaps in the next period are attributed to positional convergence.

Figure 7 graphically illustrates what the decomposition does. 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 quantile q falls from AA' to BB' between the periods, as shown in the first panel.

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The second panel asks: suppose that there had been only distributional convergence and no positional convergence in the economy between period 0 and 1, what would have been the racial earnings gap in period 1? Since each person's position in the overall earning distributions (and thus what their position would be in the white distribution) remains constant under pure distributional convergence, the period 1 earnings for the qth ranked white changes from A' to B', while the earnings of the qth ranked black goes from A to whatever earnings correspond to the earnings of the q_wth ranked white person 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 quantile q would have been CB'. In fact, black earnings at quantile q in period 1 were actually B rather than C. There must therefore have been a positional loss for blacks acting against the distribution convergence they would have otherwise experienced. To see this positional force, notice that the position the black man has in the white distribution, q_w, fell between periods 0 and 1.

The illustrative example shown in Figure 7 depicts a case in which distributional convergence and positional convergence act in opposite directions. In general, positional convergence can either complement or oppose distributional convergences. [26] Our simulation method computes empirical estimates for the share and sign of overall change in the earnings gap accounted for by these two forces using exactly the logic illustrated in Figure 7.

Decomposing the Unconditional Earnings Gap

Table 5 presents decomposition results based on our nonparametric method. The first eight columns of the table show decade-by-decade results. The final three columns of the table aggregate the results over longer time periods, 1940-70, 1970-2014, and 1940-2014 by adding the corresponding columns. Figures 8A-D also show graphically how the racial earnings gaps for the 50th, 75th and 90th quantiles and the racial working gap would have evolved over the study period if only the simulated distributional changes in each decade were accumulated. The

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[26] See Appendix Figure 1 for a graphical depiction of case where positional convergence acts in the same direction as distributional forces.

difference between the actual and simulated changes in each figure, therefore, represents the portion of the evolution of the racial gaps that is attributed to gains or losses of relative position within the earnings distribution by that point in the study period.

The simulation results reveal a remarkable pattern of results, suggesting distinct experiences at the bottom, middle and top of the earnings distribution. Looking first at the median, our results imply that general distributional changes in the earnings distribution have had an enormous impact on racial earnings gaps in both the 1940-70 period, when the general compression of the overall earnings distribution was enough to reduce the median earnings gap by 64 log points, and during the 1970-2014 period, when the increase in secular inequality (especially in the Great Recession) was enough to reverse 39 log points of these gains.

Compared to these enormous swings in the median earning gap attributable to distributional convergence, the changes due to positional convergence have been much more modest. In fact, consistent with the results shown in Table 4, the median black man actually lost enough position relative to the median white man in the 1940-1970 period to result in a 17 percentage point increase in the median earnings gap. This loss of relative position is striking because it stands in direct contrast to dramatic reduction of the earnings gap itself during this period. In the 1970-2014 period, on the other hand, positional convergence has worked to keep the median earnings gap from rising as sharply as it might have, given the strong structural headwinds in this period.

The results also show the tremendously important role that distributional forces have played over the past four decades for changes at the bottom of the earnings distribution. As shown in Figure 8D and the final rows of Table 5, the especially large increase in the fraction of black men not working from 1970-2014 is exactly in line with what would have been expected given the initial positions of black and white men in the 1970 earnings distribution and the large increase in the fraction of all men not working by the end of the study period. In essence, because black men were significantly over-represented in the lowest positive earnings categories in 1970, the simulation estimates that an especially large fraction would have been expected to drop out of the labor market as the

distribution became truncated at a higher and higher point in the skill distribution. In this way, these decomposition results imply that distributional forces that so powerfully affected the middle of the earnings distribution also completely explain changes at the bottom of the labor market. Positional convergence or divergence – changes in the position of the earnings distribution of blacks relative to that of whites because of changes in things like race-specific changes in school quality or in labor market discrimination - are estimated by our method to have played essentially no role in explaining changes in earnings gaps (including the non-work gap) at the median or below.

This surprising result is not an artifact of our decomposition method. The rank gaps that we estimated using quantile regression, and which were presented earlier in Table 4, are direct measures of changes in blacks' relative positional rank in the overall earnings distribution. Unlike the decompositions, these descriptive rank estimates do not yield quantitative estimates of the importance of positional convergence. However, from the reasoning outlined earlier, the effect by which positional convergence is made evident is the exactly the extent to which there are changes in the relative rank that blacks hold in the white distribution. Our result from the quantile regression analysis showing an essentially flat rank gap at the median, even as the median gap in earning levels fell then rose again in recent years, is perfectly consistent with the very modest role we estimate for positional convergence at the median and below from our decompositions.

Taken together, these results imply that, at the median, both the sharp decline in the earnings gap over the early part of the sample period and the re-widening of the gap in the more recent period were due chiefly to changes in the shape of the overall earnings distribution. Over the nearly seventy five years spanning these two periods, the median black man's position in the overall earnings distribution compared to that of his while counterpart was essentially unchanged,

Perhaps most strikingly, the sharp increase in the racial earnings gap during the Great Recession shown in Table 3 occurred despite no corresponding decline in the relative position of white and black men in the middle of the earnings distribution. Instead, black men were especially hard hit by the Great Recession

because (i) the median black man was initially located 22-23 percentiles lower in the earnings distribution than the median white man and (ii) the recession was progressively more devastating the lower one's position within the earnings distribution.

The results at the 75th and higher quantiles are very different. The decomposition results for the 75th and 90th quantiles reflect the clear gains that black men have made in their relative position within the upper tail of the earnings distribution in recent years. Focusing on the simulation for the 90th quantile shown in Figure 8C, the actual and simulated paths follow a similar trajectory from 1940 to 1960, suggesting that the closing of the racial earnings gap during this period was due entirely to the compression of the upper tail of the overall earnings distribution in the middle of the century rather than any change in the relative position of white and black men in the upper tail of the earnings distribution.

Since 1960, however, the actual and simulated paths for the 90th quantile have increasingly diverged, beginning with a substantial change in the 1960s and especially the 1970s. The simulated path implies that the earnings of black men would have been expected to fall further and further behind that of their white counterparts from 1960 to 2014 if black men had simply held their relative positions as the upper tail of the overall earnings distribution expanded and the rewards for those in the very upper reaches of the earnings distribution grew. Instead, the actual earnings gap at the 90th quantile has remained essentially flat from 1970 to 2014 because of dramatic positional convergence at these high quantiles. Aggregating the differences in log earnings between the actual and simulated gaps across the full study period suggests that the improvement in the relative position of black men at the upper end of the earnings distribution was responsible for a 31 percentage point reduction in the earnings gap by 2014 as measured relative 1940.

The aggregate results presented in the final three columns of Table 5 highlight several general conclusions about distributional and positional convergence over the study period. First, the profoundly important role of distributional changes to the overall structure of earnings is evident throughout

the distribution, sharply decreasing the racial earnings gaps at each quantile in the early period and largely reversing these gains in the later period. Interestingly, the impact of these distributional forces has been less pronounced (at least in terms of log earnings) at the top of the distribution. Second, positional convergence has worked to close the racial earnings gaps at each quantile, but the impact has been much greater at the top of the earnings distribution. Looking at the full study period 1940-2014, positional convergence has been responsible for about 100 percent of the gains at the 90th quantile, 60 percent of the gains at the 75th quantile, but only 10 percent of the gains at the median and in the racial working gap since 1970.

6 Education and Puzzling Lack of Convergence in Economic Rank

The minimal positional gains that black men have made in the lower and middle parts of the earnings distribution over the full course of the study period are not only stark but also surprising given the well documented racial convergence in educational attainment and school quality over this time period. In the remainder of the paper, we investigate this puzzling lack of convergence in economic rank, drawing attention to the subtly complex and key role of education in shaping the relative performance of black and white men in the labor market since 1940.

We begin by using our data to highlight the two distinct ways in which education might have been expected to lead to significant convergence in economic rank: (i) racial convergence in educational attainment and (ii) positional convergence within education category due, for example, to relative improvements in school quality. We then consider a set of countervailing forces related to the increasing returns to education in labor market over the past several decades thathave served to significantly increase the consequences of the significant racial differences in educational attainment that remain. We conclude by formally decomposing the evolution of the racial earnings gap over the study period conditional on education, clarifying the distinct role of each of these education-related forces in driving overall positional convergence.

Racial Educational Convergence

A long literature in economics has documented the substantial racial convergence in education attainment that occurred in the middle of the 20th Century as well as the remaining gap that stubbornly persists to the present.[27] Table 6 reports four measures of educational attainment for black and white men, respectively: (i) the fraction with less than a high school degree, (ii) with a high school degree or more, (ii) with a college degree or more, and (iv) the number of years of education.[28] The figures show a substantial increase in education for both black and white men and a clear closing of the racial educational gap over the study period. In 1940, for example, 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. By 2014, 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.

Consistent with results reported extensively in the literature, racial gaps in educational attainment have fallen sharply over the study period – e.g., the black-white gap in years of schooling decreased by 75 percent over this period from 3.5 to 0.9. The vast majority of the relative gains for black men occurred prior to 1980 (especially from 1960-1980), although smaller gains have continued through the end of the study period.

Within-Education Positional Convergence

A second important education-related force that should naturally have led to significant positional gains for black men over the study period is the well-documented racial convergence in school quality over the study period, particularly in the decades following the landmark Brown v. Board of Education ruling by the US Supreme Court. Important changes over the study period

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[27] See Collins and Margo (2006) and Neal (2006).
[28] Specifically, the high school degree and college degree measures correspond to the completion of 12 and 16 years of schooling, respectively, as reported in the Census and ACS.

include the significant desegregation of public elementary and secondary schools especially in the South, the opening of many formerly segregated public and private universities to black students, and school finance reforms that better equalized school spending across districts.

Within the general structure of our analysis, relative improvements in the school quality diminish skill differences for black and white men with the same level of education and should, therefore, lead to positional gains *within-education categories*.[29] It is straightforward, of course, to extend the earnings rank regressions shown in Table 4 to study positional convergence within each education category. To that end, Table 7 measures the earnings rank gap for the following four education categories (Some high school or less, high school degree, some college, college degree). Results are reported in the top panel for the 50th quantile and in the bottom panel for the 90th quantile.

The median rank regressions shown in the top panel of Table 7 reveal a number of interesting results. First, in the early part of the sample period, the within-education positional differences were largest for the highest education categories. In 1940, for example, the median college-educated black man was 26.2 percentile points behind the median college-educated white man in the white earnings distribution. By contrast, the median black man with high school education or less was 8.7 percentile points behind his white counterpart.

Second, there have been clear positional gains for black men in the higher education categories over the course of the study period, while it is more difficult to detect any consistent positional gains in the lower educational categories. Among college-educated men, for example, the median earnings rank gap declined from the 23-26 percentile point range in the 1940-1960 samples to 10 percentile points in 1980, remaining relatively flat in the 8-11 percentile range ever since. The relative positional gains of the median high school-educated black man follow a similar pattern but are quantitatively less significant, with the rank gap falling from the 18-20 percentile point range in 1940-1960 to the 14-16 range by the end of the study period. Taken together, these results are suggestive

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[29] Reductions in discriminatory practices in various segments of the labor market would also lead to positional convergence in the associated education categories.

that relative improvements in school quality have been more important at the post-secondary level, while it is more difficult to detect clear within-education improvements at lower the elementary and secondary school levels.

Turning to the bottom panel, the 90th quantile gaps for men in the higher education categories follow a similar pattern to the median, falling significantly over the study period. In fact, from 1980-2014, the 90th percentile black college-educated man has ranked only 3-4 percentile points behind his white counterpart in the overall white earnings distribution. Taken together, the results presented in Table 7 reveal a clear pattern of within-education positional gains among black men in the upper part of the earnings distribution, including the 90th quantile of the lower education categories and the 50th and 90th quantiles of the higher education categories. Within-education positional gains are less obvious in the lower part of the earnings distribution – i.e., at the median of the lowest education category – suggesting more modest changes over the full study period.

The Labor Market Returns to Education

If racial convergence in education and school quality over the study period so clearly push in the direction of improving the economic rank of black men in the economy, there must be a similarly strong force pushing back in the opposite direction. An obvious candidate explanation for this opposing force is the increasing returns to education in the labor market over the study period, which have, in effect, raised the skill price of the significant racial gaps in education that persist.

To provide a sense of the scale of the changes in the returns to education over the study period, Table 8 reports results that characterize the returns to education along two important margins: the earnings of working men and the propensity of men to work (have non-zero earnings). The upper panel of Table 8 reports OLS regressions of log earnings on controls for race, age, and education categories for the sample of working men, while the lower panel reports OLS regressions of work status on these same controls for the sample of all men.

The results presented in the upper panel show that the returns to education among working men fell sharply in the 1940s, remained relatively flat although

on an upward trajectory through 1980, and increased sharply in the latter part of the study period. This pattern for the returns to education has been documented extensively in the literature.

The pattern of results for the extensive margin is perhaps less well appreciated. In this case, work status was essentially not correlated with education in 1940 and 1950, as workers within each education category had a similar propensity to work. Since the 1970s, however, work status has become increasingly and strongly selected by education. While college-educated workers were less than 1 percentage point more likely to work than those with less than a high school degree in 1940 and 1950, this difference had increased to 10 percentage points by 1980 and to 22 percentage points in the Great Recession in 2010 and 2014. The working gap between college-educated and high-school-educated workers (i.e., the difference in the college and high school coefficients in Table 8) 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.

Distributional vs. Positional Convergence – The Role of Education

To quantify the distinct role of these three key education-related forces in shaping racial positional convergence over the study period, we now extend the decomposition method developed above to explicitly account for education. We proceed in two steps designed to break out the distinct roles of (i) convergence in educational attainment, (ii) within-education positional gains (convergence in school quality), and (iii) changes in the returns to education during each decade of the study period.

Recall that the simulations that formed the basis for the unconditional decompositions shown in Table 5 held each individual's rank within the overall earnings distribution constant while applying the earnings associated with that rank in the next period. We begin here by calculating conditional decompositions that hold constant each 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. In this way, the conditional

simulations account explicitly for how the structural changes to the earnings distribution in any given period have affected the returns to education over and above the any general changes in the dispersion of earnings captured by the unconditional simulations. The results of this exercise allow us to separate the opposing forces that have left the relative position of the median black man in the earnings distribution essentially unchanged over the study period, distinguishing positional losses due to increases in the returns to education (iii) from positional gains due to a range of factors that include convergence in educational attainment and school quality.

With these conditional decompositions in hand, we conclude our empirical analysis by separating the measured conditional positional convergence into the remaining two components: (i) racial convergence in educational attainment and (ii) positional gains within education categories. As it turns out, both components have contributed to positional gains throughout the earnings distribution, although their relative role varies considerably across the lower, middle, and upper parts of the earnings distribution.

Conditional Decompositions

Because we control for education (and age) using variables that characterize a set of discrete categories, it is straightforward to extend the design of the decomposition method developed in Section 4 to condition on X. In this case, the counterfactual joint distribution of earnings, race and X can be written:

$$(11) \quad f_t(E, r, X) = f(q_0(r|X)|X)\sigma_t(r, X)$$

In essence, the same calculations made above to calculate the joint distribution for the unconditional case in (10) must now simply be made separately for each discrete age-education bin.

Analogous to (10), there are three components that must be calculated on the right hand side of (11). The first is the conditional earnings function, $f_t(q|X)$, which assigns the earnings in period t associated with rank q, where this rank is

calculated among those with attributes X. The second, q(r|X), describes the distribution of percentile ranks for men of race r in the initial period 0, calculating this within the subsample of individuals with identical attributes X. The final term, $\sigma_t(r,X)$, again simply adjusts the resulting distribution to reflect the composition of the sample at time t.[30]

Our conditional simulation procedure is, in essence, a nonparametric version of the framework developed in Lemieux (2006). There are several attractive features of this approach for decomposing the evolution of the earnings gap into the components due to race-neutral shifts in the overall structure of the earnings distribution and race-specific movements within the distribution. First, our procedure captures the impact that X 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 X, as age and (especially) education shift both the mean and variance of earnings.[31] Our approach continues to incorporate this important insight about the impact of X on higher order moments of the earnings distribution. A second advantage of our approach, and our main motivation for developing a nonparametric version of Lemieux's framework, is that it can be used to study the counterfactual evolution of the full earnings distribution, including the fraction of men not working (with zero earnings). As a result, we are able to study the simulated evolution of the racial earnings gap at each

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[30] The implementation of the simulation in the conditional case is similar to unconditional cases and can be summarized as follows:
  1. Randomly draw a large sample of observations from the sample at time *t*. Let *i(r, X)* indicate an observation in this simulated data set.
  2. For each *i*, randomly draw an individual *j(r, X)* of the same race *r* and attributes *X* in the sample at time 0. Assign *j*'s conditional rank $q_0^i(j|X)$ within the earnings distribution at time 0 – i.e., the rank of *j*'s earnings relative to all men in category X.
  3. Assign the earnings associated with this conditional percentile rank at time *t* to individual *i*: $f_t(q_0^i(j|X)|X)$. Again, it is critical that the rank is calculated using only the sample of individuals with the same *X*.

Step 1 again ensures that the simulated sample reflects the sample composition at time *t*, (i.e., captures the $\sigma_t(r,X)$ component from (11)). Step 2 applies the rank function, $q_0(r|X)$, at time 0, and Step 3 then applies the conditional earnings function at time *t*, $f_t(q|X)$.

[31] 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.

quantile q and also the evolution of the racial 'working' gap, for any period in which the fraction of men with zero-earnings is rising.

To compute the conditional decomposition, we conduct a series of simulations that measure how the racial earnings gap would have evolved over each decade if white and black men had held their positions within the given education category but the next period's earnings distribution for that education category was applied. Conditional decompositions are shown in Table 9 and Figures 9A-D, which have the same formats as Table 5 and Figures 8A-D.

The results reveal a number of important differences between the conditional and unconditional decompositions. Perhaps most strikingly, the conditional decompositions imply that there has been considerable more positional convergence throughout the distribution over the full study period, 1940-2014. The gains in conditional positional convergence are, in fact, most extensive at the bottom and middle of the earnings distribution. At the median, for example, conditional positional convergence accounts for a gain of 50.9 log points over the full study period, while the same figure for unconditional positional convergence is only 3.2 log points. By contrast, the conditional positional gains are more comparable to the unconditional gains in the 90th quantile.

The conditional results for the racial working gap are also striking, implying that the racial working gap would have increased by 16.2 percentage points had black and white men held their relative positions within each education category throughout the 1970-2014 period. That the working gap instead increased by *only* 10.5 percent reflects significant gains in the conditional position of black men at the bottom of the distribution relative to their white counterparts.

The sharp differences in the conditional and unconditional measures of distributional and positional convergence reflect the important role that changes in the returns to education have had over study period – especially in the latter portion. In particular, the conditional simulations (which account explicitly for changes in the returns to education) imply that black men would have fallen much further behind their white counterparts as the result of the structural changes to the earnings distribution over the study period than what the unconditional simulations (which only account for changes in the general

dispersion of the earnings distribution) suggest. Substantially greater gains in the relative position of black men are, in turn, needed to counterbalance the much stronger distributional forces measured in the conditional simulations.

Another implication of the conditional versus unconditional simulations is that education has played a subtle but extremely important role in the evolution of the racial earnings gap. On the one hand, black men have gained in relative position throughout the earnings distribution, due in large part, as we will see below, to racial educational convergence over the study period. But, at the same time, the returns to education have increased so much over the period, essentially raising the effective price of the remaining differences in education between black and white men, thereby decreasing the relative ranking of black men within the earnings distribution. Taken together, these forces have limited improvements in the relative position of black men over the study period as shown in Table 4, leaving the median black man, for example, only a few percentile points more highly ranked in the 2014 white earnings distribution versus the 1940 or 1980 distributions.

Decomposing Positional Convergence

The substantial conditional positional convergence throughout the earnings distribution shown in Table 9 captures the combined impact of (i) educational convergence and (ii) within-education positional convergence due, for example, to convergence in school quality. In this section, we use a final auxiliary simulation in order to formally decompose these conditional positional gains into these components (i) vs. (ii).

This calculation requires a simple change to the conditional simulations that form the basis for Table 9. In particular, the decompositions shown in Table 9 hold the share of men in each race-age-education category at the level observed in the initial time period, updating only the earnings distribution conditional on education to match that of the next decade. In order to measure the importance of educational convergence, therefore, we conduct an additional simulation that updates not only the conditional earnings distributions but also the share of men in each race-age-education cell to match that of the new decade. The resulting

difference in the earnings gap between the new simulation and the conditional distributional simulation reported in Table 9 can be attributed to educational convergence, while any remaining positional convergence can be attributed to within-education positional changes.

The decomposition of positional convergence is reported in Table 10, which follows the structure of Tables 5 and 9. The decade-by-decade results for educational convergence and within-education positional convergence shown in Table 10 map nicely to the patterns shown in Tables 6 and 7. In line with these motivating tables, the results imply that educational convergence has been the dominant factor in driving positional convergence at the bottom and middle of the earnings distribution, while within-education positional convergence has been the driving force near the top of the distribution. Over the full study period, for example, gains in position within education categories have been responsible for more than 100 percent of the positional gains at the 90th quantile (24.8 out of 20.3 log points), while convergence in educational attainment is responsible for 75 percent of the positional gains at the median (38.0 out of 50.9 log points) and well over 100 percent of the positional gains related to the working gap.

Consistent with the previous literature, the results also imply that gains due to education convergence were largest throughout the distribution in the 1970s and 1980s, with little change in relative position due to educational convergence since 1990. Strikingly, a similar pattern also holds for within-education positional convergence at each quantile, with the vast majority of gains at each quantile coming in the 1960s and 1970s with positive but less substantial gains ever since.

Taken as a whole, the results presented in Tables 6-10 imply that a great deal of progress has been made towards closing the racial earnings and working gap throughout the distribution over the study period as the result of convergence in educational attainment and the decline of within-education positional gaps. Significant differences remain in both of these dimensions, however, and, as a result, the substantial increase in the returns to education in the labor market from 1970-2014 has worked to counteract the substantial positional gains that would have otherwise occurred over the past several decades.

7 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. Focusing on the most recent 75 years, a conventional view in economics has been that 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, which provide a more complete view of racial economic convergence over this period.

First, the conventional view that we describe here is based on analysis that studies only those with positive earnings, 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 changes in the labor force participation margin sharply alters any interpretation of the evolution of the earning gap over the past thirty years, implying, in particular, that it has re-widened substantially rather than simply stagnated. In fact, measured this way, the racial earnings gap at the median had returned in 2010 to 1950 levels.

A second key feature of the evolution of the racial earning gap at the median is that it has risen and fallen largely in step with changes to the overall structure of the earnings distribution over this whole period. In particular, the sharp increase in the gap since 1980 is explained completely by structural changes to the earnings distribution and, perhaps even more surprisingly, the initial closing of the gap from 1940-70 is largely accounted for by the great compression of earnings and returns to education that occurred in this period, especially in the 1940s. Taken as a whole, the relative position of the median white and black men in the earnings distribution has changed very little over this entire 70+ year period.

Our analysis also reveals the subtly complex role that education has played in the evolution of racial earnings gaps since 1940. Interestingly, the limited positional gains for black men at the median reflect the combination of several

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 racial educational differences that remain, minimizing any real positional 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 fourth and distinct advantage of our approach is that we can also study racial differences in the lower and upper parts of earnings distribution, revealing a quite distinct pattern of results throughout the distribution. In contrast to the median, black men in the upper portion of the earnings distribution have made important positional gains. In fact, such improvements are responsible for the vast majority of the decline in the racial earnings gap from 1940-2014 at both the 75th and (especially) the 90th quantiles. Interestingly, these positional gains near the top of the distribution are largely attributable to within-education positional convergence, especially at the college level and in 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 at most colleges and universities. More recently, affirmative action in college admissions may have better equalized effective college quality for high-ability black students, shrinking racial differences in unobserved skills within the upper part of the earnings distribution, even as more men of each race have attended college.

In the lower parts of the earnings distribution, the significant increases in the racial incarceration, out of the labor force, and unemployment gaps 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. A novel advantage of the nonparametric decomposition approach that we introduce in this paper is that it provides a direct measure of the role of 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, these

structural changes – i.e., the large decline in the overall fraction of men working and the sharp 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 nontrivial 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.

The implications of our analysis for our understanding of the current state of the economy and racial inequality are threefold. First, our analysis points to the incredible lack of progress and, in many case, regress in closing the gaps in labor market outcomes for black and white men in the United States over the past seven-plus decades. Echoing the previous literature, our results are consistent with substantial positive effects of legislation from the Civil Rights Era both in closing the educational attainment gap and in reducing within-education positional differences in the earnings distribution, especially in the 1960-1980 period. But at the bottom and middle of the earnings distribution, structural changes to the labor market over the past several decades have overwhelmed these gains, causing both the racial working 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 (among workers) and extensive (work vs. not work) 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 clear 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 continuing to make clear gains within the earnings distribution, and those at the bottom being especially harmed by the era of mass incarceration and the failing job market for men with low skills. In fact, when the number of men with zero earnings is taken into account, the level of earnings inequality among black men in the United States would rank among the most unequal countries in the world.

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Appendix – Robustness of Main Findings

This appendix examines the robustness of the main findings presented in Tables 3 and 4 to a number of alternative specifications including: (i) narrowing the measure of earnings to exclude business and farm income, (ii) expanding the age range to 19-64, (iii) focusing exclusively on native born men, and (iv) the exclusion of WPA earnings in 1940. The resulting analyses reveal some interesting additional findings – e.g., the outsized impact of the Great Recession on the racial earnings gap for the very young and old – but do not change the qualitative nature of the results presented in Tables 3 and 4.

Excluding Business and Farm Income

Appendix Table 1 reports a series of quantile regressions that use a narrower definition of earnings that excludes business and farm income. For expositional simplicity, all of the robustness analyses starting with Appendix Table 1 are shown for the sample of all men, including those with zero earnings or income. The results for the earnings gap reported in the upper panel of Appendix Table 1 should be compared with the corresponding lower panel of Table 3 and those shown in the lower panel of Appendix Table 1 are comparable to the lower panel of Table 4.

Alternative Specifications

Appendix Table 2 reports a series of median earnings and earnings rank regressions for several additional alternative specifications. The first row of each panel repeats the baseline median results from the lower panels of Tables 3 and 4. The second row of each panel shows the impact of estimating the median earnings gap on a broader sample of men aged 19-64. The third row of each panel restricts attention to native-born men. The estimated regression equations include additional controls for foreign-born men in each category of race and ethnicity. The table reports the implied gap between native-born white and native-born black men.

A final robustness issue concerns the role of earnings in 1940 from various New Deal government programs designed to engage unemployed men in

meaningful work including the New Deal Civilian Conservation Corps (CCC), Works Progress Administration (WPA), and National Youth Administration (NYA). The fourth row of each panel of Appendix Table 2 reports results for an additional specifications for 1940 that exclude earnings from these government programs. We do so by setting earnings to zero for any individual who is listed as either unemployed or out of the labor force.

Table 1: Labor Market Outcomes for Non-Hispanic Black and White Men - Summary Statistics, 1940-2014

Black Men	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Not Currently Working - All Explanations	0.140	0.161	0.180	0.167	0.240	0.281	0.348	0.322	0.378	0.351
Incarcerated		0.020	0.026	0.023	0.026	0.062	0.089	0.083	0.083	0.080
Out of Labor Force	0.049	0.084	0.086	0.108	0.135	0.130	0.194	0.160	0.163	0.162
Unemployed	0.091	0.057	0.068	0.036	0.079	0.089	0.065	0.079	0.131	0.109
Fraction w/ Zero Earnings in Previous Year	0.110	0.113	0.102	0.102	0.165	0.187	0.210	0.206	0.283	0.266

White Men	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Not Currently Working - All Explanations	0.106	0.088	0.079	0.076	0.102	0.106	0.132	0.145	0.186	0.171
Incarcerated		0.004	0.004	0.003	0.003	0.010	0.013	0.013	0.015	0.015
Out of Labor Force	0.037	0.054	0.042	0.049	0.058	0.058	0.090	0.093	0.094	0.098
Unemployed	0.069	0.030	0.033	0.023	0.040	0.038	0.029	0.038	0.077	0.057
Fraction w/ Zero Earnings in Previous Year	0.076	0.070	0.045	0.039	0.055	0.061	0.073	0.081	0.119	0.116

Notes: The cells of the table report the mean for non-Hispanic black and white men aged 25-54 in 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. The measure of earnings is labor market earnings plus business and farm income.

Table 2: Real Earnings of Non-Hispanic Black and White Men - Summary Statistics, 1940-2014

	Real Earnings - including Business and Farm Income (thousands of 1980 dollars)									
Black	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2014**
Men with Positive Earnings										
Mean	3.37	6.00	8.56	12.35	12.69	13.31	14.95	14.42	14.35	13.89
Median	2.94	5.98	8.49	11.79	11.97	11.35	12.44	11.93	11.34	10.97
All Men										
Median	2.12	5.30	7.38	10.72	10.01	9.46	9.57	9.41	7.56	7.31
75th Percentile	3.88	7.69	11.27	15.61	16.01	16.39	16.75	16.36	15.12	14.73
90th Percentile	5.91	10.43	14.34	20.28	22.01	23.33	24.88	25.05	24.56	24.02
White	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2014**
Men with Positive Earnings										
Mean	7.16	11.17	16.43	21.22	19.43	21.27	23.95	23.74	22.48	22.50
Median	6.12	10.43	14.61	18.79	17.51	17.65	18.18	17.90	17.00	16.74
All Men										
Median	5.86	9.81	14.06	18.16	16.91	16.71	16.80	16.47	15.12	14.66
75th Percentile	9.18	13.51	19.35	24.64	23.51	25.22	26.32	26.59	24.94	25.06
90th Percentile	13.38	17.64	26.03	34.09	32.01	36.57	40.53	40.90	38.92	39.68

Notes: The cells of the table report the mean for non-Hispanic black and white men aged 25-54 in 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. Real earnings are measured in thousands of 1980 dollars and include labor market earnings plus business and farm income.

Table 3: Black-White Differences in Log Earnings - 50th, 75th and 90th Quantile Regressions - 1940-2014

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Men with Positive Earnings										
50th Quantile	-0.913	-0.555	-0.584	-0.446	-0.387	-0.382	-0.358	-0.385	-0.357	-0.394
	(0.009)	(0.034)	(0.008)	(0.003)	(0.001)	(0.004)	(0.002)	(0.003)	(0.006)	(0.005)
75th Quantile	-0.827	-0.509	-0.506	-0.425	-0.310	-0.341	-0.347	-0.385	-0.375	-0.389
	(0.005)	(0.004)	(0.004)	(0.003)	(0.002)	(0.005)	(0.004)	(0.003)	(0.006)	(0.004)
90th Quantile	-0.773	-0.534	-0.583	-0.455	-0.336	-0.378	-0.372	-0.405	-0.394	-0.416
	(0.008)	(0.025)	(0.005)	(0.016)	(0.001)	(0.006)	(0.003)	(0.004)	(0.007)	(0.005)
Number of Observations	252,682	84,815	313,864	326,734	1,943,928	474,109	2,682,870	1,593,014	509,038	1,993,642
All Men										
50th Quantile	-0.999	-0.677	-0.663	-0.523	-0.511	-0.553	-0.528	-0.560	-0.715	-0.684
	(0.008)	(0.019)	(0.007)	(0.008)	(0.003)	(0.007)	(0.010)	(0.004)	(0.013)	(0.004)
75th Quantile	-0.871	-0.503	-0.525	-0.444	-0.368	-0.405	-0.426	-0.442	-0.493	-0.493
	(0.009)	(0.017)	(0.002)	(0.004)	(0.006)	(0.004)	(0.001)	(0.003)	(0.006)	(0.003)
90th Quantile	-0.797	-0.551	-0.594	-0.491	-0.368	-0.424	-0.442	-0.449	-0.470	-0.485
	(0.006)	(0.004)	(0.007)	(0.003)	(0.002)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)
Number of Observations	274,760	91,741	330,694	342,759	2,089,550	513,806	2,975,183	1,752,969	590,373	2,340,588

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 from 50th (median), 75th, and 90th quantile regressions of the individual's log earnings on race/ethnicity and controls for age categories. The specifications shown in the upper panel use the sample of men with positive earnings while those shown in the lower panel 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 4: Black-White Differences in Rank in White Earnings Distribution - 50th, 75th and 90th Quantile Regressions - 1940-2014

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Men with Positive Earnings										
50th Quantile	-27.22	-28.73	-31.24	-29.41	-20.60	-19.25	-18.68	-18.18	-15.65	-16.55
	(0.16)	(0.33)	(0.12)	(0.24)	(0.08)	(0.17)	(0.13)	(0.13)	(0.23)	(0.09)
75th Quantile	-38.04	-37.95	-40.62	-35.26	-21.52	-20.11	-18.66	-18.13	-16.39	-16.92
	(0.20)	(0.16)	(0.20)	(0.24)	(0.08)	(0.18)	(0.15)	(0.17)	(0.28)	(0.09)
90th Quantile	-35.57	-33.73	-35.65	-27.68	-15.62	-14.76	-12.98	-13.31	-11.06	-12.11
	(0.34)	(0.83)	(0.89)	(0.24)	(0.13)	(0.33)	(0.14)	(0.20)	(0.25)	(0.17)
Number of Observations	252,682	84,815	313,864	326,734	1,943,928	474,109	2,682,870	1,593,014	509,038	1,993,642
All Men										
50th Quantile	-26.58	-29.31	-32.46	-30.03	-24.17	-23.79	-24.02	-22.77	-22.00	-22.10
	(0.08)	(0.18)	(0.14)	(0.11)	(0.06)	(0.19)	(0.05)	(0.12)	(0.20)	(0.12)
75th Quantile	-38.63	-37.98	-41.78	-35.98	-25.16	-23.83	-23.50	-22.76	-22.28	-22.51
	(0.11)	(0.35)	(0.19)	(0.18)	(0.10)	(0.27)	(0.05)	(0.15)	(0.22)	(0.13)
90th Quantile	-36.72	-36.12	-37.38	-28.42	-18.41	-17.70	-15.91	-16.20	-15.10	-15.76
	(0.31)	(0.72)	(0.36)	(0.52)	(0.21)	(0.27)	(0.11)	(0.17)	(0.30)	(0.15)
Number of Observations	274,760	91,741	330,694	342,759	2,089,550	513,806	2,975,183	1,752,969	590,373	2,340,588

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 from 50th (median), 75th, and 90th quantile regressions of the individual's percentile rank inteh white earnings distribution on race/ethnicity and controls for age categories. The specifications shown in the upper panel use the sample of men with positive earnings while those shown in the lower panel 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 5: Unconditional Decomposition of Changes in Black-White Earnings Differences, 1940-2014

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	2007-2014	1940-1970	1970-2014	1940-2014
50th Quantile											
Total Change	0.322	0.014	0.141	0.012	-0.043	0.025	-0.032	-0.156	0.476	-0.193	0.283
(A) Distributional Convergence	0.417	0.134	0.092	-0.134	-0.064	-0.014	-0.056	-0.124	0.643	-0.392	0.251
(B) Positional Convergence	-0.096	-0.120	0.049	0.146	0.021	0.040	0.024	-0.031	-0.167	0.199	0.032
75th Quantile											
Total Change	0.369	-0.023	0.081	0.076	-0.037	-0.021	-0.016	-0.051	0.427	-0.049	0.378
(A) Distributional Convergence	0.340	0.030	0.018	-0.047	-0.054	-0.047	-0.040	-0.047	0.388	-0.236	0.152
(B) Positional Convergence	0.029	-0.053	0.063	0.123	0.017	0.026	0.024	-0.004	0.039	0.187	0.226
90th Quantile											
Total Change	0.246	-0.043	0.103	0.123	-0.056	-0.018	-0.007	-0.022	0.306	0.019	0.325
(A) Distributional Convergence	0.217	-0.033	0.008	-0.006	-0.058	-0.068	-0.018	-0.027	0.192	-0.177	0.015
(B) Positional Convergence	0.029	-0.011	0.095	0.128	0.002	0.050	0.011	0.004	0.114	0.196	0.310
Positive Earnings											
Total Change				-0.050	-0.024	-0.008	0.016	-0.039		-0.105	
(A) Distributional Convergence				-0.031	-0.015	-0.013	-0.003	-0.034		-0.095	
(B) Positional Convergence				-0.019	-0.009	0.005	0.019	-0.005		-0.010	

Notes: The four panels of this table describe a series of decompositions of the change in the racial zero-earnings gap and the racial earnings gap at the 50th, 75th, 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 zero-earnings and the 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 6: Educational Attainment of Non-Hispanic Black and White Men, 1940-2014

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Black Men										
Eight Years or fewer	0.846	0.711	0.565	0.342	0.158	0.059	0.035	0.029	0.028	0.025
HS Degree or more	0.072	0.139	0.223	0.378	0.624	0.788	0.845	0.860	0.866	0.881
College Degree or more	0.016	0.021	0.033	0.051	0.102	0.124	0.140	0.159	0.159	0.172
Years of Education	5.60	6.75	7.99	9.62	11.39	12.34	12.52	12.71	12.78	12.88
White Men										
Eight Years or fewer	0.539	0.386	0.274	0.160	0.079	0.031	0.019	0.017	0.016	0.016
HS Degree or more	0.281	0.410	0.514	0.658	0.810	0.898	0.926	0.930	0.934	0.939
College Degree or more	0.068	0.091	0.127	0.181	0.263	0.289	0.313	0.317	0.323	0.337
Years of Education	9.13	10.08	10.90	11.84	12.90	13.49	13.57	13.60	13.66	13.73

Notes: The cells of the table report the mean for non-Hispanic black and white men aged 25-54 in 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. The category *HS Degree or more* is equivalent to 12+ years of education, while *College Degree or more* is equivalent to 16+ years of education.

Table 7: Black-White Differences in Rank in White Earnings Distribution by Education Category - 50th and 90th Quantile Regressions - 1940-2014

Sample of All Men; Conditional on Age and Sub-Education Categories

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
50th Quantile										
College Degree or More	-26.20	-26.23	-23.07	-17.00	-10.37	-10.32	-9.26	-11.12	-9.68	-11.19
	(1.63)	(2.21)	(0.59)	(0.83)	(0.18)	(0.54)	(0.15)	(0.26)	(0.31)	(0.30)
Some College	-24.95	-23.46	-22.48	-18.12	-12.88	-12.80	-11.41	-11.04	-10.97	-12.05
	(1.09)	(1.22)	(0.72)	(0.84)	(0.18)	(0.31)	(0.16)	(0.23)	(0.42)	(0.22)
HS Degree	-19.95	-18.24	-20.20	-16.62	-15.61	-15.28	-15.95	-14.00	-14.85	-15.58
	(0.66)	(1.09)	(0.44)	(0.39)	(0.13)	(0.26)	(0.16)	(0.16)	(0.30)	(0.20)
Less than HS	-8.70	-8.88	-12.63	-13.95	-13.06	-13.20	-15.03	-13.83	-17.39	-14.05
	(0.19)	(0.31)	(0.19)	(0.18)	(0.13)	(0.34)	(0.26)	(0.38)	(0.41)	(0.24)
90th Quantile										
College Degree or More	-9.14	-10.89	-10.05	-3.98	-3.83	-4.22	-3.81	-4.47	-3.47	-4.35
	(0.80)	(2.71)	(1.14)	(0.30)	(0.10)	(0.25)	(0.07)	(0.14)	(0.20)	(0.16)
Some College	-18.44	-18.85	-17.49	-10.66	-7.61	-8.00	-6.25	-7.39	-7.08	-8.15
	(2.47)	(1.86)	(0.85)	(0.62)	(0.13)	(0.19)	(0.14)	(0.20)	(0.22)	(0.19)
HS Degree	-16.39	-13.27	-18.45	-12.58	-9.82	-9.62	-9.82	-10.73	-10.32	-11.49
	(4.01)	(1.91)	(0.50)	(0.86)	(0.21)	(0.24)	(0.24)	(0.20)	(0.38)	(0.16)
Less than HS	-21.33	-17.61	-18.73	-17.94	-12.75	-14.08	-14.24	-16.23	-14.72	-16.52
	(0.12)	(0.42)	(0.22)	(0.25)	(0.14)	(0.57)	(0.28)	(0.46)	(0.65)	(0.47)

Notes: Each main cell of the table reports the coefficient that characterizes the differences between non-Hispanic black and non-Hispanic white menaged 25-54 in the education category shown in the row heading from 50th (median) and 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 8: Impact of Education on the Earnings of Workers and Likelihood of Working - 1940-2014

	Dependent Variable: Log Earnings					Sample: Men with Positive Earnings				
	1940	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2014**
College Degree or more	0.915	0.515	0.630	0.618	0.625	0.893	0.923	1.019	1.091	1.073
	(0.006)	(0.010)	(0.005)	(0.004)	(0.002)	(0.005)	(0.002)	(0.004)	(0.006)	(0.004)
Some College	0.630	0.315	0.399	0.366	0.399	0.538	0.519	0.557	0.566	0.547
	(0.007)	(0.010)	(0.005)	(0.004)	(0.002)	(0.005)	(0.002)	(0.004)	(0.007)	(0.004)
HS Degree	0.519	0.300	0.307	0.276	0.323	0.377	0.329	0.331	0.313	0.312
	(0.005)	(0.010)	(0.003)	(0.003)	(0.002)	(0.005)	(0.002)	(0.004)	(0.006)	(0.004)
# Observations	252,682	84,815	313,864	326,734	1,943,928	474,109	2,682,870	1,593,014	509,038	1,993,642

	Dependent Variable: Indicator for Positive Earnings					Sample: All Men				
	1940	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2014**
College Degree or more	0.007	0.006	0.036	0.051	0.099	0.155	0.182	0.176	0.222	0.218
	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Some College	0.017	0.001	0.031	0.043	0.083	0.133	0.157	0.146	0.168	0.165
	(0.002)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
HS Degree	0.022	0.028	0.034	0.044	0.077	0.107	0.114	0.105	0.108	0.105
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
# Observations	274,760	91,741	330,694	342,759	2,089,550	513,806	2,975,183	1,752,969	590,373	2,340,588

Notes: The table reports coefficients for three education categories (some high school or less is excluded) from OLS regressions of log earnings (upper panel) and and indicator for positive earnings (lower panel) that include controls for race/ethnicity and age categories. The log ernings regressionsl use the sample of men with positive earnings while the positive-earnings regressionsl 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 9: Decomposition of Changes in Black-White Earnings Differences - Conditional on Education - 1940-2014

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	2007-2014	1940-1970	1970-2014	1940-2014
50th Quantile											
Total Change	0.322	0.014	0.141	0.012	-0.043	0.025	-0.032	-0.156	0.476	-0.193	0.283
(A) Conditional Distributional Convergence	0.338	0.014	0.056	-0.238	-0.193	-0.007	-0.036	-0.160	0.407	-0.634	-0.226
(B) Conditional Positional Convergence	-0.016	0.000	0.084	0.251	0.150	0.033	0.004	0.004	0.069	0.441	0.509
75th Quantile											
Total Change	0.369	-0.023	0.081	0.076	-0.037	-0.021	-0.016	-0.051	0.427	-0.049	0.378
(A) Conditional Distributional Convergence	0.298	0.014	-0.006	-0.106	-0.105	-0.044	-0.031	-0.045	0.306	-0.331	-0.026
(B) Conditional Positional Convergence	0.070	-0.036	0.088	0.182	0.068	0.023	0.015	-0.007	0.122	0.282	0.404
90th Quantile											
Total Change	0.246	-0.043	0.103	0.123	-0.056	-0.018	-0.007	-0.022	0.306	0.019	0.325
(A) Conditional Distributional Convergence	0.252	0.016	0.034	-0.008	-0.067	-0.053	-0.019	-0.033	0.302	-0.180	0.122
(B) Conditional Positional Convergence	-0.006	-0.059	0.069	0.130	0.011	0.036	0.012	0.010	0.004	0.199	0.203
Positive Earnings											
Total Change				-0.050	-0.024	-0.008	0.016	-0.039		-0.105	
(A) Conditional Distributional Convergence				-0.052	-0.042	-0.022	-0.003	-0.043		-0.162	
(B) Conditional Positional Convergence				0.002	0.018	0.014	0.019	0.004		0.057	

Notes: The four panels of this table describe a series of decompositions of the change in the racial zero-earnings gap and the racial earnings gap at the 50th, 75th, 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 and education. The total change in the racial zero-earnings and the 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 *conditional on education* and (B) shifts in the relative position of black and white men within the earnings distribution *conditional on education*.

Table 10: Decomposition of Positional Convergence - Conditional on Education - 1940-2014

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	2007-2014	1940-1970	1970-2014	1940-2014
50th Quantile											
Total Change	0.322	0.014	0.141	0.012	-0.043	0.025	-0.032	-0.156	0.476	-0.193	0.283
(A) Conditional Distributional Convergence	0.338	0.014	0.056	-0.238	-0.193	-0.007	-0.036	-0.160	0.407	-0.634	-0.226
(B) Conditional Positional Convergence	-0.016	0.000	0.084	0.251	0.150	0.033	0.004	0.004	0.069	0.441	0.509
(i) Convergence in Educational Attainment	0.026	0.083	0.024	0.100	0.123	-0.008	-0.009	0.041	0.133	0.247	0.380
(ii) Within-Education Positional Convergence	-0.042	-0.083	0.061	0.151	0.026	0.040	0.013	-0.037	-0.065	0.194	0.129
75th Quantile											
Total Change	0.369	-0.023	0.081	0.076	-0.037	-0.021	-0.016	-0.051	0.427	-0.049	0.378
(A) Conditional Distributional Convergence	0.298	0.014	-0.006	-0.106	-0.105	-0.044	-0.031	-0.045	0.306	-0.331	-0.026
(B) Conditional Positional Convergence	0.070	-0.036	0.088	0.182	0.068	0.023	0.015	-0.007	0.122	0.282	0.404
(i) Convergence in Educational Attainment	0.045	0.003	0.038	0.051	0.052	0.010	0.011	0.000	0.086	0.124	0.210
(ii) Within-Education Positional Convergence	0.025	-0.039	0.050	0.131	0.016	0.014	0.004	-0.007	0.036	0.158	0.194
90th Quantile											
Total Change	0.246	-0.043	0.103	0.123	-0.056	-0.018	-0.007	-0.022	0.306	0.019	0.325
(A) Conditional Distributional Convergence	0.252	0.016	0.034	-0.008	-0.067	-0.053	-0.019	-0.033	0.302	-0.180	0.122
(B) Conditional Positional Convergence	-0.006	-0.059	0.069	0.130	0.011	0.036	0.012	0.010	0.004	0.199	0.203
(i) Convergence in Educational Attainment	-0.040	-0.037	-0.020	0.042	-0.002	-0.006	0.015	0.003	-0.097	0.052	-0.045
(ii) Within-Education Positional Convergence	0.034	-0.022	0.089	0.089	0.013	0.042	-0.004	0.007	0.101	0.147	0.248
Positive Earnings											
Total Change				-0.050	-0.024	-0.008	0.016	-0.039		-0.105	
(A) Conditional Distributional Convergence				-0.052	-0.042	-0.022	-0.003	-0.043		-0.162	
(B) Conditional Positional Convergence				0.002	0.018	0.014	0.019	0.004		0.057	
(i) Convergence in Educational Attainment				0.013	0.022	0.005	0.001	0.040		0.081	
(ii) Within-Education Positional Convergence				-0.011	-0.004	0.009	0.018	-0.036		-0.024	

Notes: The four panels of this table describe a series of decompositions of the change in the racial positive-earnings gap and the racial earnings gap at the 50th, 75th, 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 and education. The total change in the racial zero-earnings and the 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 *conditional on education* and (B) shifts in the relative position of black and white men within the earnings distribution *conditional on education*. Conditional Positional Convergence (B) is then further decomposed into portions due to (i) racial convergence in educational attainment and (ii) positional convergence within education categories.

Appendix Table 1: Black-White Differences in Log Earnings and Earnings Rank - Labor Market Earnings Only - 1940-2014

Sample of All Men; Earnings-; Conditional on Age

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Log Earnings										
50th Quantile	-0.973	-0.603	-0.645	-0.491	-0.485	-0.545	-0.520	-0.543	-0.731	-0.707
	(0.014)	(0.016)	(0.012)	(0.003)	(0.002)	(0.008)	(0.004)	(0.005)	(0.013)	(0.008)
75th Quantile	-0.866	-0.456	-0.465	-0.421	-0.339	-0.373	-0.393	-0.429	-0.470	-0.480
	(0.007)	(0.012)	(0.003)	(0.005)	(0.008)	(0.006)	(0.003)	(0.003)	(0.007)	(0.004)
90th Quantile	-0.792	-0.468	-0.478	-0.431	-0.318	-0.373	-0.413	-0.425	-0.438	-0.461
	(0.003)	(0.007)	(0.005)	(0.013)	(0.006)	(0.005)	(0.002)	(0.004)	(0.007)	(0.005)
Number of Observations	252,682	84,815	313,864	326,734	1,943,928	474,109	2,682,870	1,593,014	509,038	2,340,588
Eanings Rank										
50th Quantile	-17.07	-17.03	-22.15	-24.57	-19.53	-20.25	-20.96	-19.64	-20.00	-21.52
	(0.13)	(0.20)	(0.13)	(0.20)	(0.06)	(0.16)	(0.06)	(0.12)	(0.13)	(0.16)
75th Quantile	-30.27	-29.47	-34.16	-31.69	-21.79	-21.09	-20.99	-20.78	-20.75	-18.95
	(0.19)	(0.45)	(0.20)	(0.28)	(0.17)	(0.25)	(0.12)	(0.15)	(0.17)	(0.16)
90th Quantile	-31.85	-29.09	-31.45	-26.75	-16.00	-15.97	-15.03	-15.06	-12.73	-15.08
	(0.22)	(0.26)	(0.28)	(0.36)	(0.11)	(0.27)	(0.14)	(0.20)	(0.13)	(0.17)
Number of Observations	274,760	91,741	330,694	342,759	2,089,550	513,806	2,975,183	1,752,969	2,340,588	2,340,588

Notes: Each main cell of the table reports the coefficient that characterizes the differences between non-Hispanic black and non-Hispanic white males aged 25-54 from 50th (median), 75th, and 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 and education, using an alternative measure of earnings based on labor market earnings only (i.e., not including business and farm income). All specifications include all men in the sample, 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. The corresponding standard error is in parentheses.

Appendix Table 2: Black-White Differences in Log Earnings and Earnings Rank - 50th Quantile - Alternative Specificatoons - 1940-2014

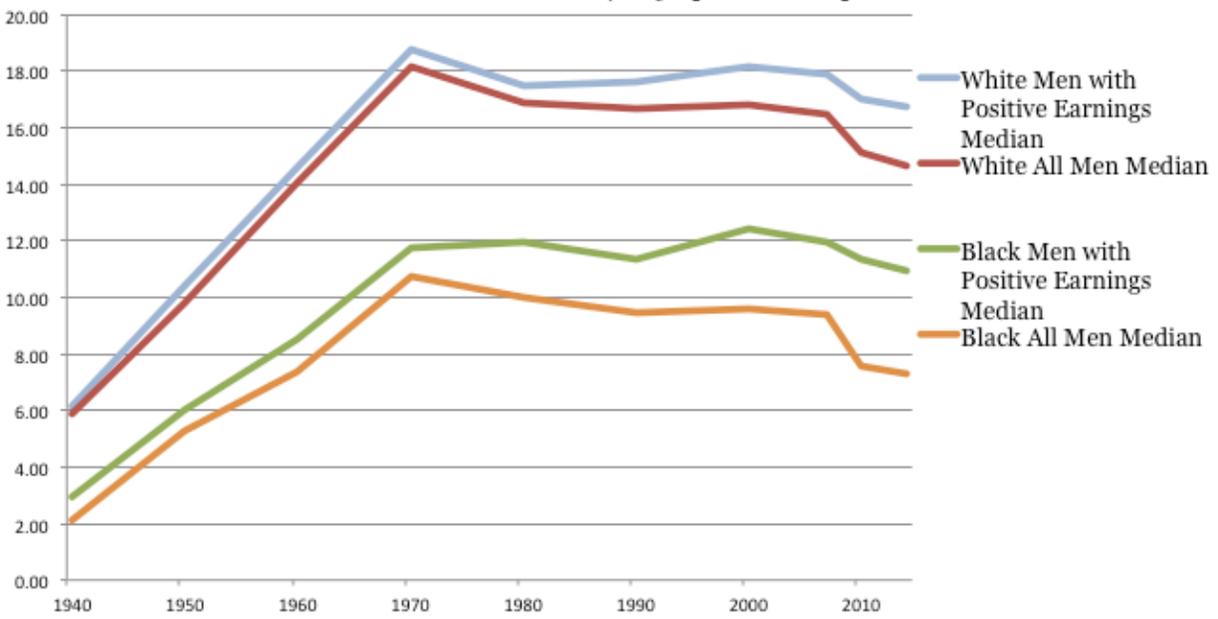*Sample of All Men; Conditional on Age; 50th Quantile*

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2014
Log Earnings										
Baseline	-0.999	-0.677	-0.663	-0.523	-0.511	-0.553	-0.528	-0.560	-0.715	-0.684
	(0.008)	(0.019)	(0.007)	(0.008)	(0.003)	(0.007)	(0.010)	(0.004)	(0.013)	(0.004)
Age 19-64	-0.960	-0.676	-0.682	-0.533	-0.571	-0.588	-0.588	-0.614	-0.822	-0.846
	(0.009)	(0.025)	(0.004)	(0.006)	(0.004)	(0.009)	(0.003)	(0.005)	(0.011)	(0.008)
Native-Born men	-0.990	-0.677	-0.665	-0.515	-0.502	-0.575	-0.552	-0.591	-0.770	-0.762
	(0.008)	(0.016)	(0.007)	(0.010)	(0.002)	(0.007)	(0.003)	(0.005)	(0.013)	(0.009)
WPA excluded	-1.041	-0.677	-0.663	-0.523	-0.511	-0.553	-0.528	-0.560	-0.715	-0.684
	(0.009)	(0.019)	(0.007)	(0.008)	(0.003)	(0.007)	(0.010)	(0.004)	(0.013)	(0.004)
Eanings Rank										
Baseline	-26.58	-29.31	-32.46	-30.03	-24.17	-23.79	-24.02	-22.77	-22.00	-22.10
	(0.08)	(0.18)	(0.14)	(0.11)	(0.06)	(0.19)	(0.05)	(0.12)	(0.20)	(0.12)
Age 19-64	-23.76	-23.47	-24.97	-18.86	-17.19	-15.83	-17.24	-16.39	-17.05	-20.06
	(0.12)	(0.27)	(0.17)	(0.07)	(0.04)	(0.18)	(0.05)	(0.11)	(0.22)	(0.15)
Native-Born men	-25.19	-28.72	-32.46	-30.24	-24.57	-24.25	-24.66	-23.38	-23.48	-25.24
	(0.17)	(0.20)	(0.14)	(0.14)	(0.06)	(0.16)	(0.09)	(0.13)	(0.28)	(0.19)
WPA excluded	-28.00	-29.31	-32.46	-30.03	-24.17	-23.79	-24.02	-22.77	-22.00	-22.10
	(0.19)	(0.18)	(0.14)	(0.11)	(0.06)	(0.19)	(0.05)	(0.12)	(0.20)	(0.12)

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 (median) quantile regressions of the individual's log earnings (top panel) or percentile rank of earnings (lower panel) on race/ethnicity and controls for age and education. All specifications include all men in the sample, including those with zero earnings. The rows in each panel report results for four alternative specifications:(i) baseline results, (ii) expanding the age range to 19-64 from 25-54, (iii) restricting the sample to native-born men for each race/ethnicity and (iv) excluding earnings from WPA and other government programs in 1940. 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.
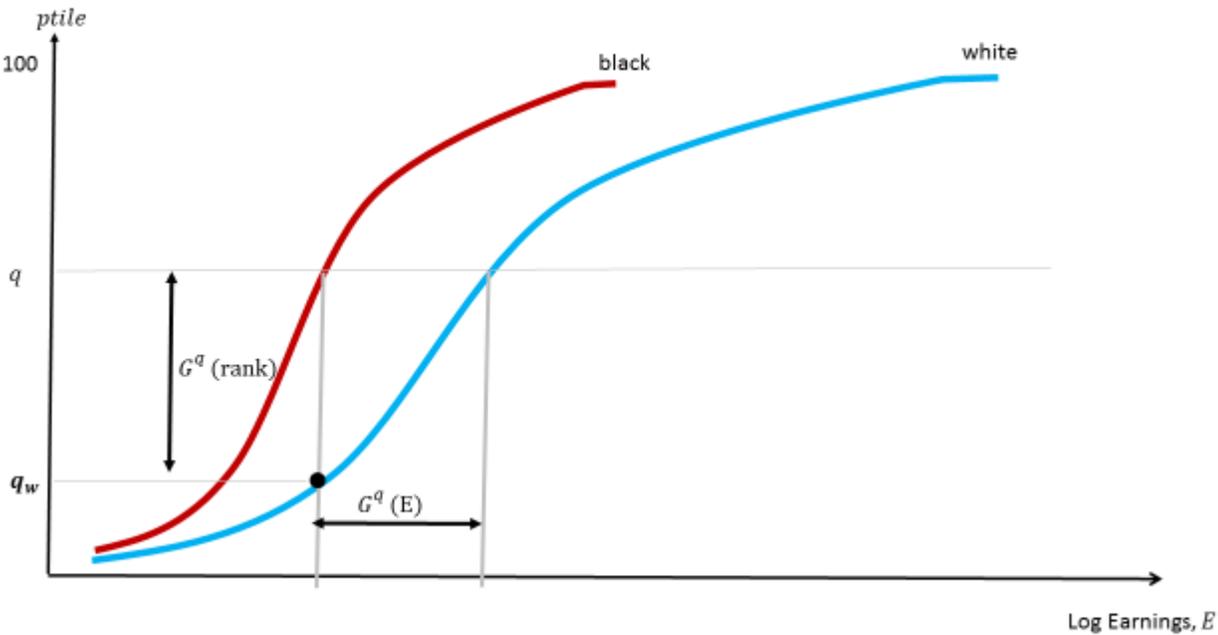
Figure 1: Racial Gap in Work Status, 1940-2014

Not Currently Working

Zero Earnings in Previous Year
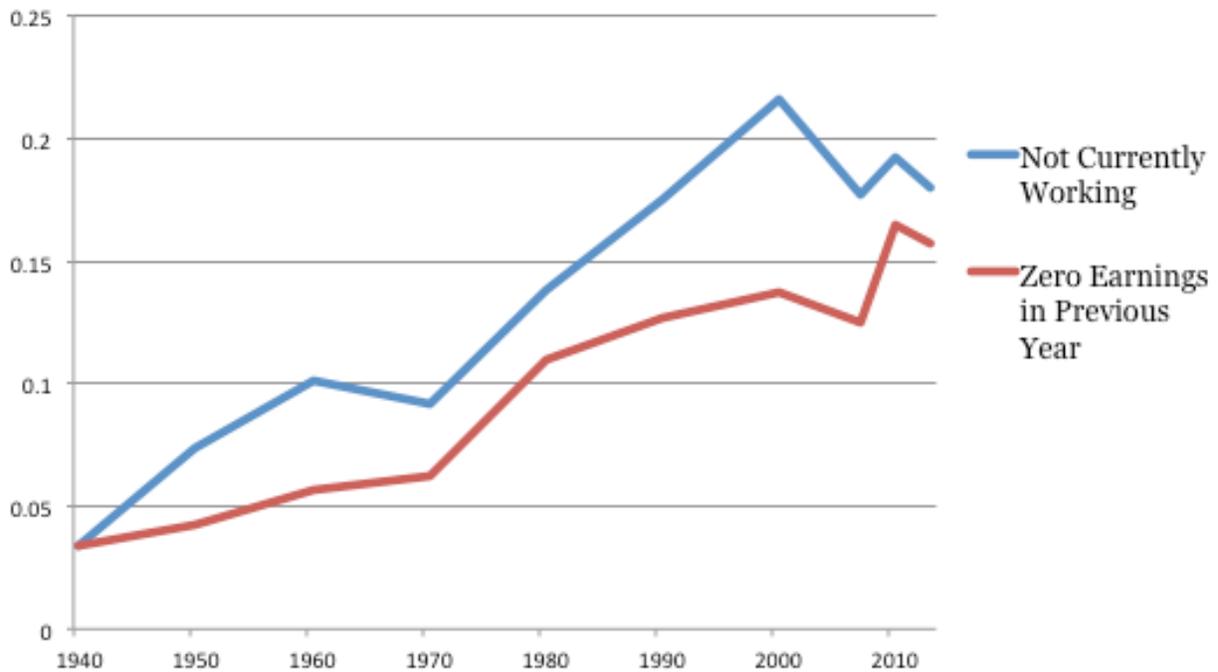
Figure 2: Median Real Earnings of Black and White Men, 1940-2014

White Men with Positive Earnings Median

White All Men Median

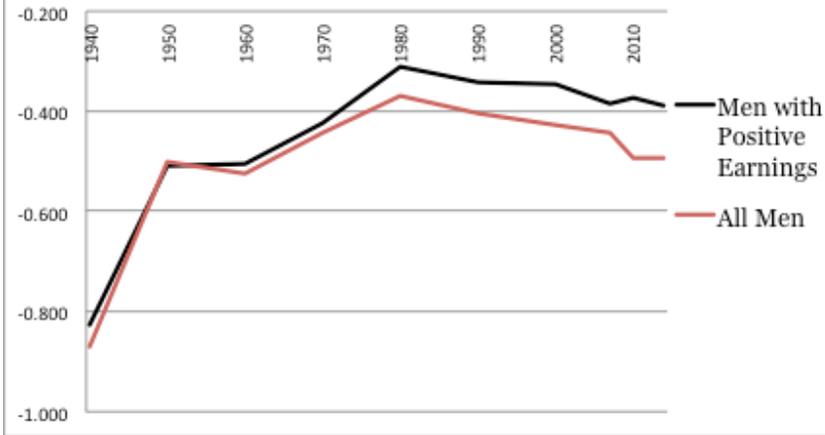Black Men with Positive Earnings Median

Black All Men Median

Figure 3: Racial Earnings Level and Earning Rank Gaps

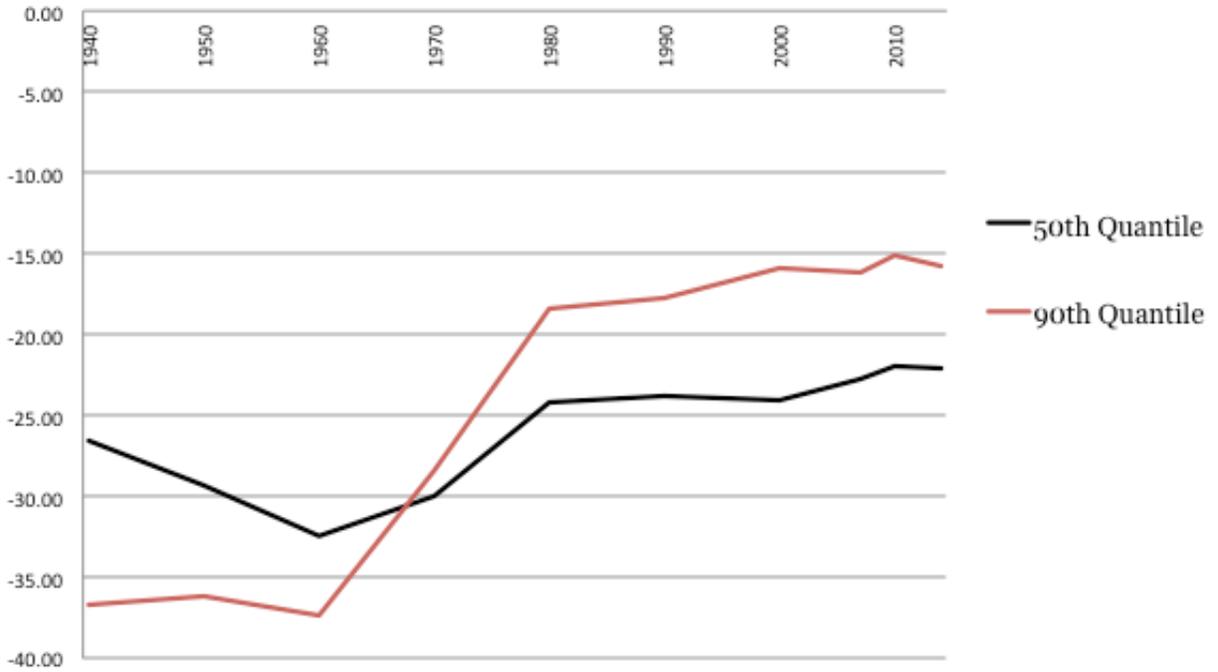**Figure 4A: Racial Earnings Gap, 1940-2014 - *50th Quantiles***
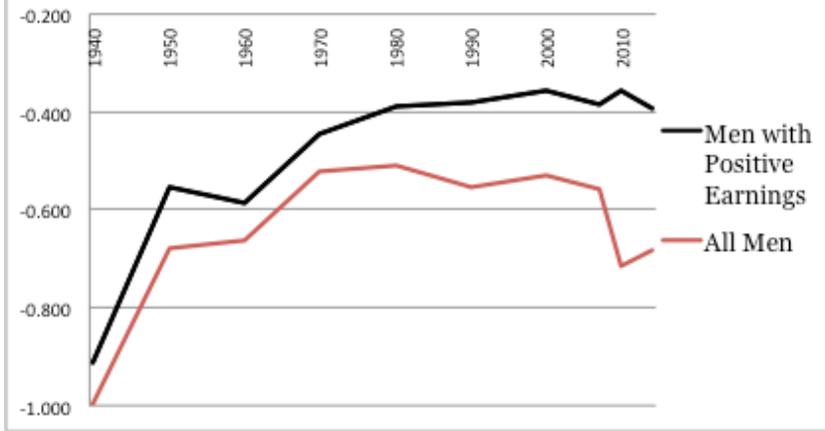
Figure 4B: Racial Earnings Gap, 1940-2014 - *75th Quantiles*

Figure 4C: Racial Earnings Gap, 1940-2014 - *90th Quantiles*
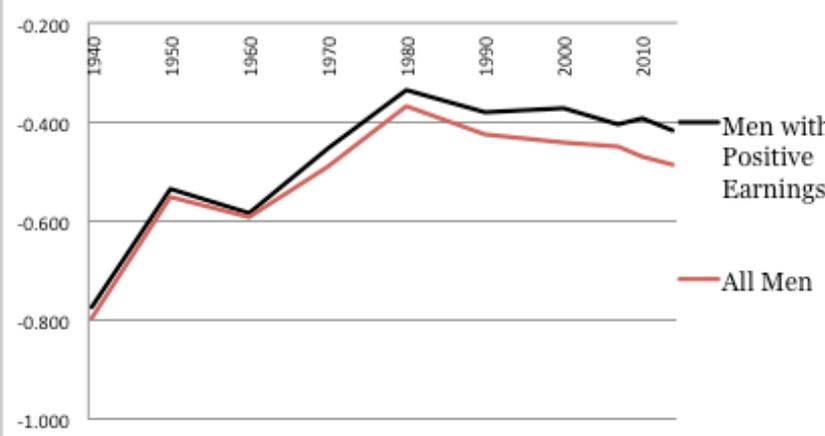
Figure 5: Racial Earnings Rank Gap, 1940-2014
50th and 90th Quantiles - All Men

Figure 6: Two Sources of Changes in Racial Earnings Gaps

A. Distributional Convergence
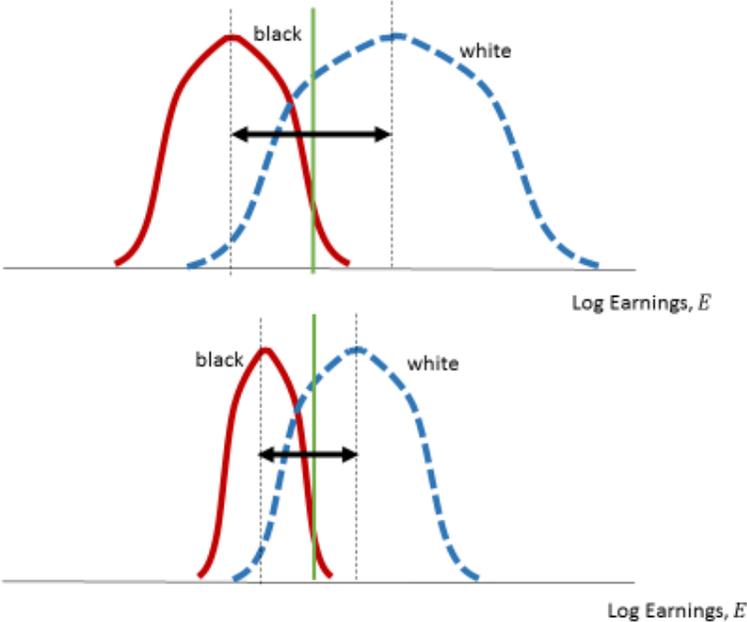
B. Positional Convergence
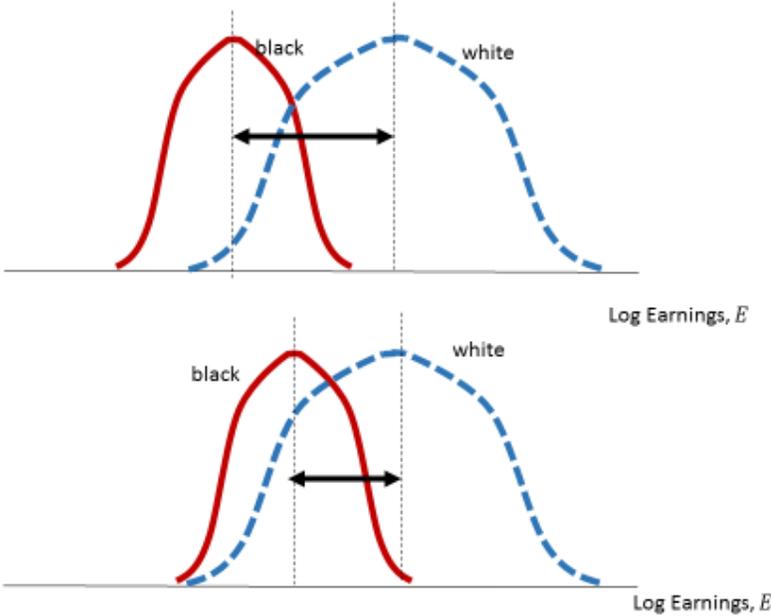
Figure 7: Illustrating Decomposition Method

I.
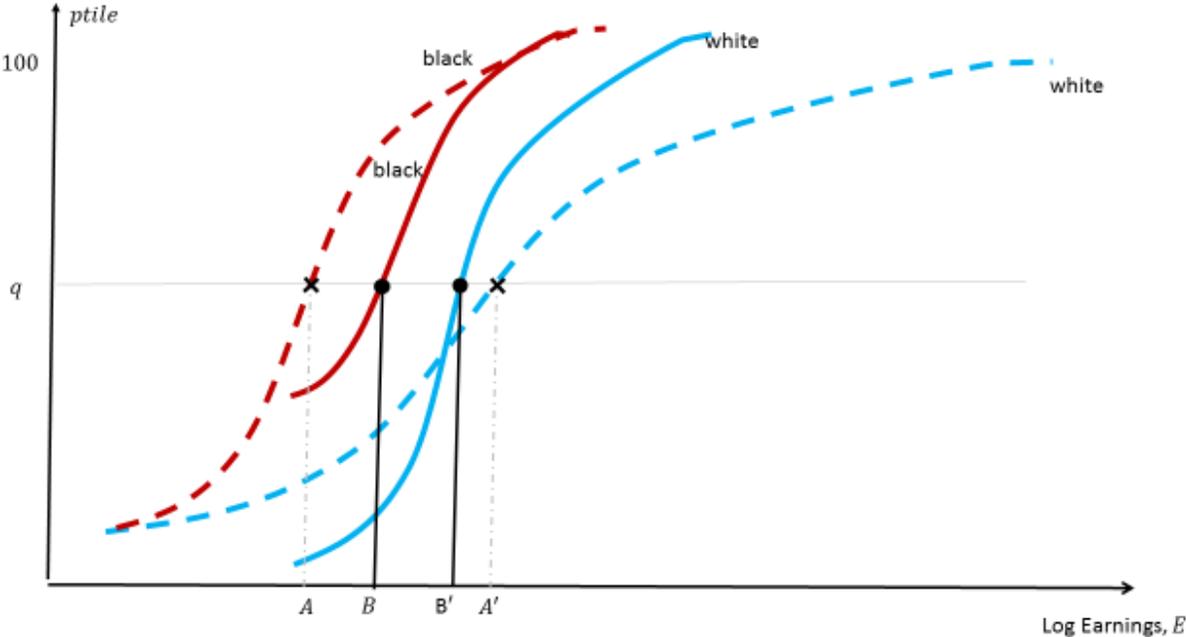
II.
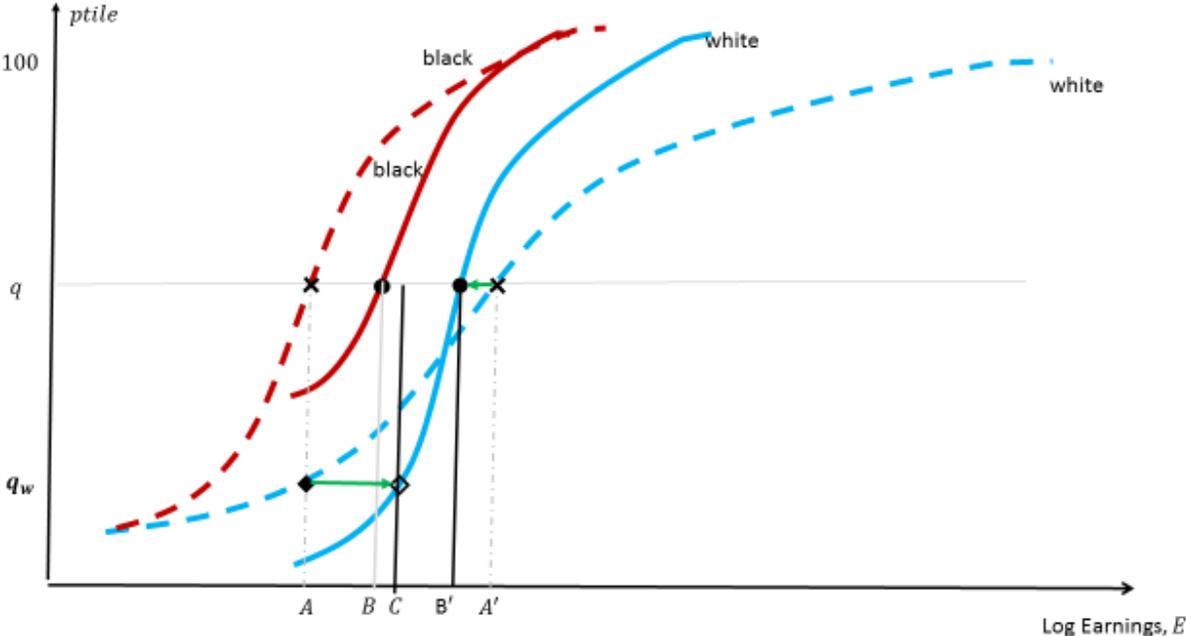
Figure 7 (cont): Illustrating Decomposition Method

III.
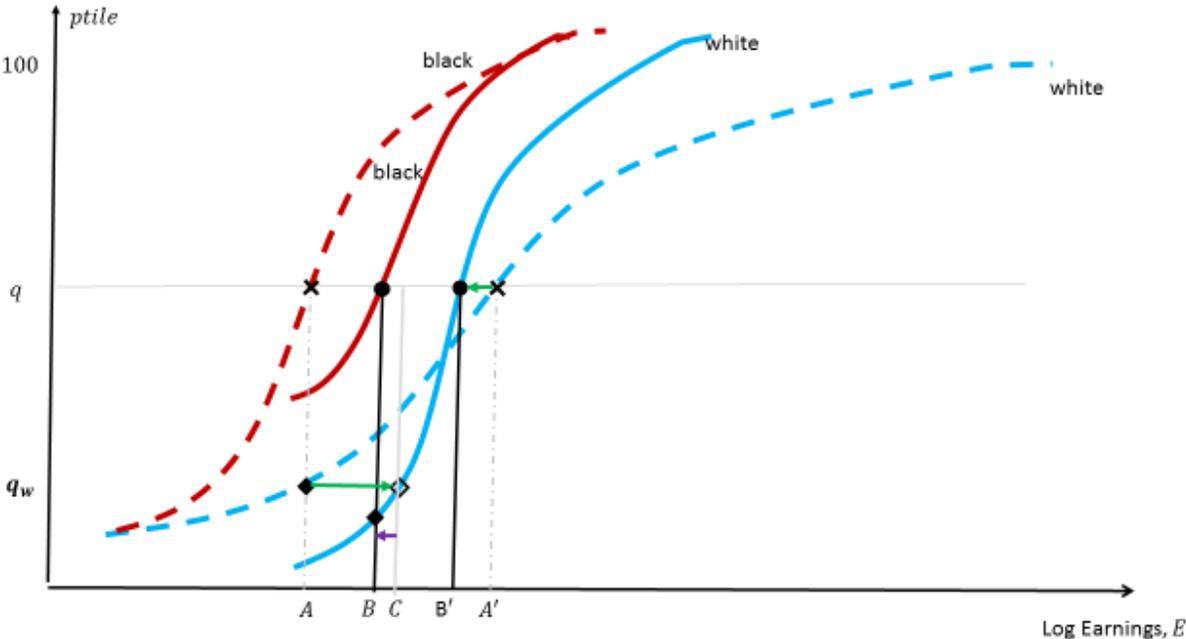
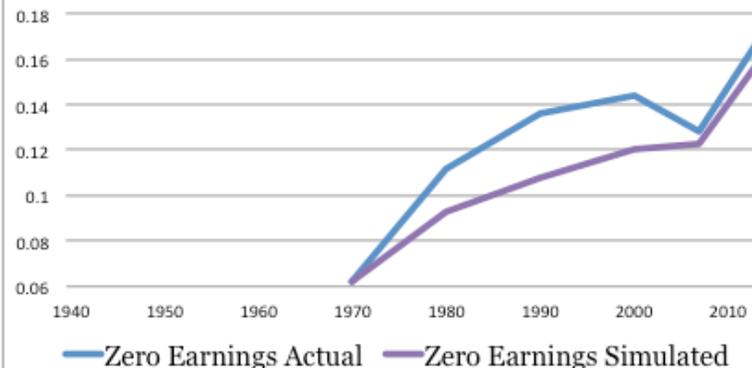**Figure 8A: Actual vs Simulated Racial Earnings Gap - 50th Quantile**

50th Quantile Actual — 50th Quantile Simulated
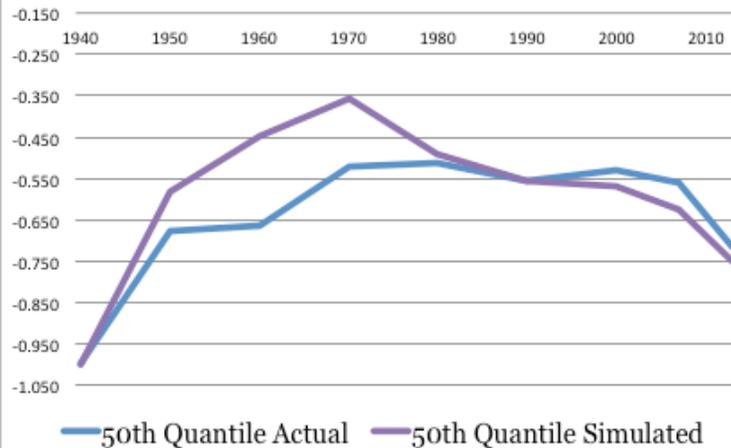
Figure 8B: Actual vs Simulated Racial Earnings Gap - 75th Quantile

75th Quantile Actual — 75th Quantile Simulated
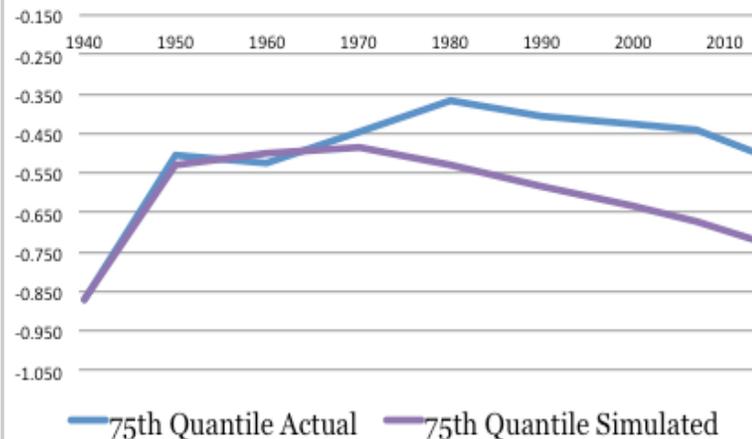
Figure 8C: Actual vs Simulated Racial Earnings Gap - 90th Quantile

90th Quantile Actual — 90th Quantile Simulated
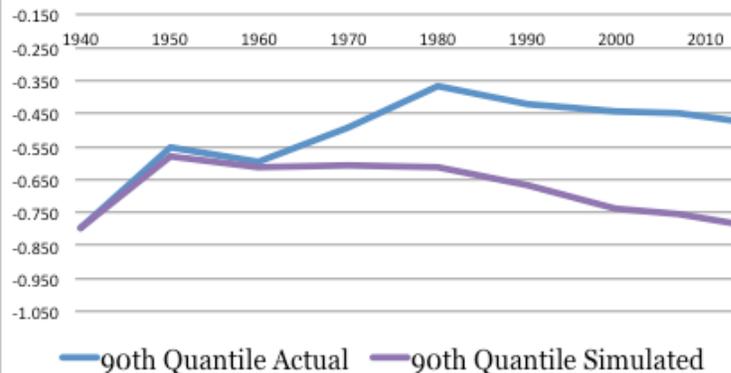
Figure 8D: Actual vs Simulated Racial Earnings Gap: Zero Earnings

Zero Earnings Actual — Zero Earnings Simulated

Figure 9A: Actual vs Simulated Racial Earnings Gap - 50th Quantile

50th Quantile Actual · 50th Quantile Simulated
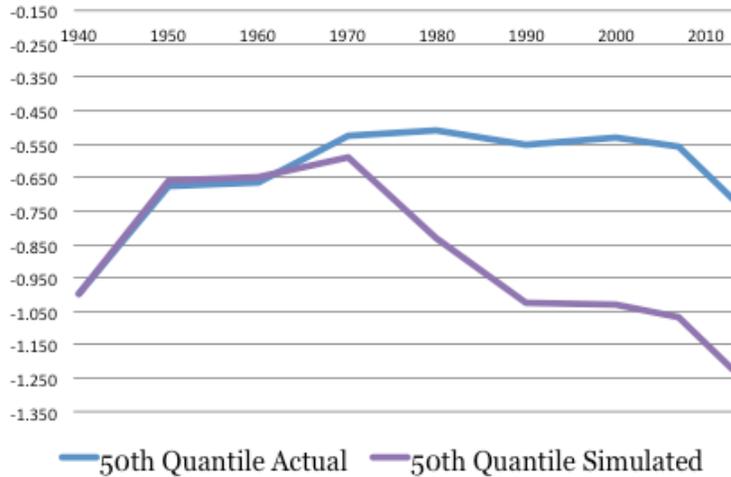
Figure 9B: Actual vs Simulated Racial Earnings Gap - 75th Quantile

75th Quantile Actual · 75th Quantile Simulated
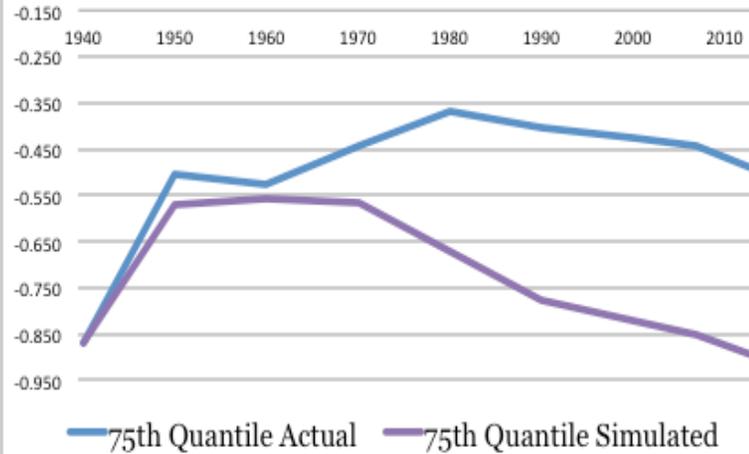
Figure 9C: Actual vs Simulated Racial Earnings Gap - 90th Quantile

90th Quantile Actual · 90th Quantile Simulated
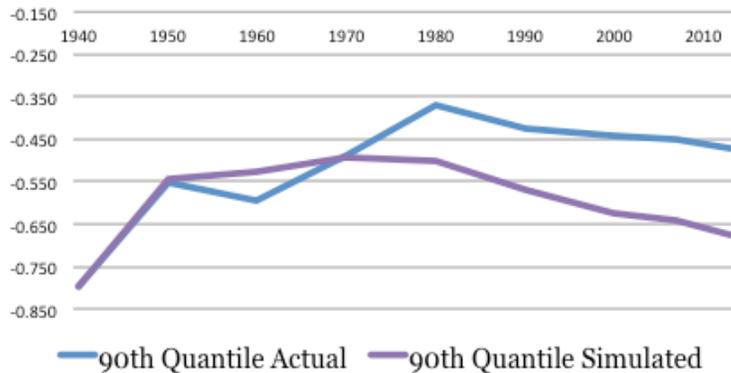
Figure 9D: Actual vs Simulated Racial Earnings Gap: Zero Earnings

Zero Earnings Actual · Zero Earnings Simulated
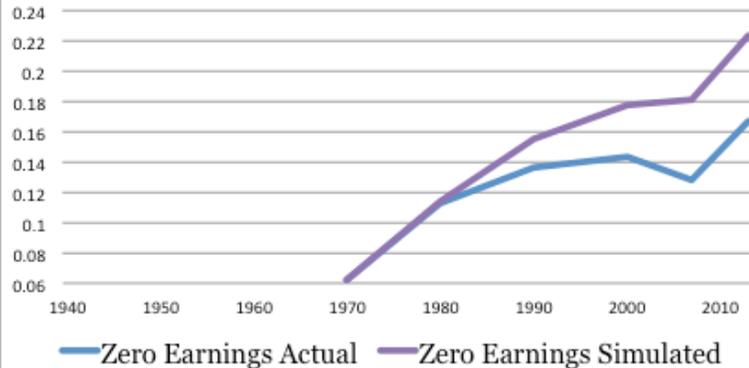
Appendix Figure 1: Positional and Distributional Convergence Acting in Same Direction