Divergent Paths: Structural Change, Economic Rank, and the Evolution of Racial Earnings Differences, 1940-2013[*]

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Abstract

We present new evidence about the evolution of the earnings gap between all black and white men, including non-workers, at different quantiles. At the median, we show that after closing substantially from 1940 to the mid-1970s, the earnings gap has widened considerably thereafter, reaching levels today not seen since WW2. This same basic pattern of improvement then re-widening is evident in the upper portions of the earnings distribution, but the more recent reversal of earlier gains has been much more modest. We argue that changes in racial gaps can be understood as arising from a combination of two forces: (i) positional changes that shift blacks' relative percentile rank in the overall earnings distribution and (ii) changes in the general structure of earnings that affect how positions in the skills distribution are compensated. We present new decomposition methods which show that, at the median and below, virtually all of the changes in black relative earnings since 1940, including changes in work propensity, have been overwhelmingly driven by structural forces, such as the 1940-1970 compression in earnings and the recent secular increase in earnings inequality. By contrast, black men at higher quantiles have experienced a clear increase in their relative position within the earnings distribution consistent with greater educational and professional inclusion and reductions in discrimination for these men.

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

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

1 Introduction

Among the most important features of American society over the past century and a half has been the glacial speed of racial economic convergence since the end of the Civil War.[1] While significant progress is evident when viewed over long horizons, substantial racial differences remain today in wealth, earnings, and numerous other economic markers and there are clear signs that convergence along many of these dimensions has significantly slowed or even reversed in recent decades.[2]

This paper provides new estimates of how black-white earnings differences among prime-aged men have evolved since 1940 along with a series of new analyses designed to distinguish among a broad set of forces driving these changes. Our work builds on an extensive literature that has measured the evolution of racial earnings inequality and adjudicated among alternative explanations for these changes. Our approach complements the existing literature and re-affirms many of its findings, but we also present new results that enrich our understanding of how and why racial earnings gaps have evolved throughout the study period.

The starting point for the paper is a new set of results about changes in the difference in mean earnings between prime-aged blacks and whites from 1940 through the Great Recession. Focusing on samples of working men, many previous studies have shown that average earnings differences between black and white workers fell sharply from 1940-1970, with especially large declines in the 1940s and 1960s, but have remained relatively constant in a long period of

[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 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.

stagnation since 1975.[3] This stagnation, which persists to the present day after decades of steady improvement, is what led Bound and Freeman (1992) to famously ask "What Went Wrong?" about progress in black earnings starting in the 1980s.

A number of recent papers have emphasized that this conventional picture is significantly altered when one adjusts for the declining propensity for both black and white men to work due to rising rates of incarceration and labor market non-participation in recent decades.[4] Our initial empirical analysis builds upon this recent work. Using the full sample of prime-aged men, including those with zero earnings, we use quantile regressions to reproduce and extend results about the evolution of the earnings gap at the median among all men, including those with zero earnings. We show that the gap in earnings at the median closed from 1940 up through at least 1970. However, while the mean or 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 racial earnings gap at the median in a sample including working and non-working men was larger than it had been in 1950.

Previous work accounting for non-participation has focused on the impact on the estimated earnings gap at the median. We extend this analysis by considering changes in the upper portions of the earnings distribution, using quantile regressions to examine changes at the 75th and 90th quantiles.[5] This set of

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[3] Our results for the racial earnings gap for working men are very much consistent with the long literature that have 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).

[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), 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), 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.

[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

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estimates, which to our knowledge are new to the literature, indicate that the gap in earnings between a white and black man, each at a same quantile point above the median in the earnings distribution of his own race, has also widened since the 1970, but in a more modest fashion than at the median. The re-widening of the gaps at the 90th quantile since 1970, for example, has reversed about a half of the gains that were made from 1950-1980, compared to the full reversal of these gains at the median.

These results about changes at different quantiles are the foundation for the main empirical analyses presented in the paper, in which we investigate what forces best explain the changes in racial earnings inequality over the past several decades. We present a simple framework which shows that, at any quantile point, convergence in the racial earnings gap depend on two distinct sets of factors. One set of factors generate what we call *positional convergence*, leading to changes in the relative rank of black men in the overall earnings distribution compared to their white counterparts. This set of forces arises from things like racial discrimination in the market, which creates a wedge between the potential earnings of similarly qualified white and black men, and differences in skills related to differences in educational attainment and school quality.

The second set of factors includes any general economic forces that change the *structure* of the overall earnings distribution. These can alter the racial 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.

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 widening intraracial inequality that we also document here.

The main analysis presented in the paper is divided into two main parts. In the first, we use two complementary approaches to assess the overall importance of positional and distributional convergence in the evolution of racial earnings gaps. Our first approach is to simply measure positional differences directly, characterizing, for example, where the median black man would fall in terms of percentile rank within the white earning distribution at each point in time. More generally, this analysis uses a comparable quantile regression approach to the one described above to measure the racial earnings rank gap at various quantiles (median, 75th, or 90th) throughout the earnings distribution.

The results from this analysis are striking. We find, for example, that the median black man was positioned at the 24th percentile of the white earnings distribution in 1940 and that his position had risen to only the 27-28th percentile 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 has held during the years from 1940 to 1970 when the earnings gap closed substantially and racial differences in educational attainment fell sharply as well as in the most recent several decades as the median earnings gap has re-widened. By contrast, we find that black men in the upper part of the earnings distribution have moved systematically closer to the economic position of their white counterparts. This direct evidence about positional rank suggests that the experiences of high- and low-skilled black men have been driven by different forces over the study period.

Our second method for distinguishing the effect of positional from distributional convergence is motivated by the approach of Juhn, Murphy, and Pierce (1993). In particular, we develop a nonparametric simulation approach in the spirit of the framework developed by Lemieux (2006) to explicitly decompose the decade-by-decade changes in the racial earnings gap at each quantile into these two components. We begin by presenting an unconditional version of this simulation approach 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

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simulated earnings distribution neatly isolates the impact of distributional forces on the evolution of the racial earnings gap over the decade.

These unconditional decompositions yield a series of results for the causes of changes in racial earnings gaps that are very much in line with the quantile rank regressions. 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.[6] [7] 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 the level of earnings 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.[8] An especially attractive aspect of the nonparametric decomposition method we implement is that we can use it to isolate the impact of positional

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[6] 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).

[7] 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.

[8] A number of studies have used decomposition methods in the spirit of Juhn, Murphy and Pierce (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.

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 middle of the earnings distribution, the results indicate that the especially rapid increase from 1970-2013 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 entirely because they were significantly over-represented in the lowest rungs of the labor market several decades ago.

The second main part of our analysis takes up the multi-faceted role of education in driving positional and distribution convergence among high- and low-skilled men throughout the study period. We begin by presenting a version of the nonparametric simulations that conditions the exercise on education. In this case, the simulation holds constant each individual's relative position within the earnings distribution associated with his education level and assigns the earnings associated with that conditional position from the next decade's earnings distribution. While the unconditional simulations only account for changes in the overall dispersion of earnings, these conditional simulations explicitly account for changes in the relative returns to education and how these changes would have been expected to differentially affect the earnings of black and white men differentially given initial racial educational differences.

Using this conditional framework, we then explore the role of education in positional convergence in more detail, distinguishing the effects of (i) racial convergence in educational attainment versus (ii) within-education positional gains or losses. And we conclude our analysis by further decomposing overall distributional convergence in a way that allows us to explicitly examine the role of changes in the returns to education on both the intensive (earnings of workers) and extensive (likelihood of working) margins in driving these structural changes.

This second portion of our analysis reveals a number of key findings. First, the increase in the 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, strong structural headwinds due to the sharply

increasing importance of education on the earnings of workers and (especially) the likelihood of working have masked what would have been substantial positional gains for low-skilled black men, due primarily to racial convergence in education levels.[9] 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. Taken as a whole, the results of our analysis 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.

Second, the positional gains of high-skilled black men have been largely due to gains in relative position within education categories. The median college-educated black man's position has improved from a gap of over 26 percentile points behind his white counterpart at the beginning of the study period to less than 10 points by the end. And, perhaps most strikingly, the 90th percentile college-educated black man's position has closed to within 3-4 percentile points of his white counterpart. 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. Taken as a whole, these results suggest that more equal access to quality higher education, due the opening of many colleges and universities to black students in the middle of the 20th Century and affirmative action policies in more recent decades, as well as the demise of the discrimination associated with the effective exclusion of blacks from many high-skilled occupations and professions have played an important role in reducing racial differences among high-skilled men.[10]

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[9] 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).

[10] 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.

The rest of the paper is organized as follows. Section 2 develops a theoretical framework that characterizes the broad mechanisms that might contribute to changes in the racial earnings gap and describes the empirical methodology that we develop to study the evolution of the racial earnings gap and decompose it into components due to positional versus overall distributional convergence. Section 3 describes the data, basic trends in incarceration, labor force participation, and unemployment, and the evolution of the racial earnings gaps throughout the earnings distribution over the study period. The first part of our main analysis is presented in Section 4. Here we use the complementary approaches of quantile earnings rank regressions and an unconditional version of our nonparametric decomposition approach to break decade-by-decade changes in the racial earnings and working gaps into components due to distributional versus positional convergence. Sections 5-7 extend the analysis to consider the role of education in driving racial differences in earnings over the study period. We begin in Section 5 by considering a conditional version of the nonparametric decomposition that explicitly accounts for changes in the returns to education when calculating the impact of structural distributional forces. In Section 6, we further decompose positional changes into components due to convergence in educational levels versus within-education positional gains. And in Section 7, we complete our main analysis by studying the role of changing returns to education on both the intensive (earnings of workers) and extensive (likelihood of working) margins in driving the observed structural changes throughout the study period. Section 8 concludes with a discussion of the broader implications of our main findings.

2   Theoretical Framework and Empirical Methods

More generally, Neal and Johnson (1996), 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.

Before presenting our main empirical analysis, we provide a theoretical framework that describes the broad economic factors that contribute to the evolution of racial earnings inequality.

The starting point is a representation of 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. This normalization is without loss of generality and convenient 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.

Now 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:

$$(1) \quad q_w = g(q) - \pi(q)$$

The first, *g(q)*, translates the *actual* skill of the qth ranked black man to the comparable quantile of the white skill distribution. Such differences might be due, for example, to differences in educational attainment or the relative quality of the schools that black and white children attend.

The second function, *π(q),* captures a race-specific penalty in the returns to skill that affects only black men. In the context of our framework, this race-specific penalty is intended to broadly capture the effect of any differences between the earnings of white and black men with identical skills whether arising from racial animus, prejudice, or statistical discrimination.[11] This representation of the race-specific penalty follows Becker, capturing the idea that discrimination

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[11] Importantly, this price differential term captures both differential treatment that black men face directly in the labor market and any race-specific differences 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.

causes black men to be treated in the labor market *as if* their skills were lower than they actually are.

Given this characterization of the earnings of black and white men, the racial earnings gap at each quantile *q* can be written as:

$$(2) \quad \beta(q) = f\big(g(q) - \pi(q)\big) - f(q)$$

and the change in the earnings gap over time as:

$$(3) \quad \beta'(q) - \beta(q) = \big(f'(g'(q) - \pi'(q)) - f'(q)\big) - \big(f(g(q) - \pi(q)) - f(q)\big)$$

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

$$(4) \quad \Delta\beta(q) = \big[\big(f'(g(q) - \pi(q)) - f(g(q) - \pi(q))\big) - \big(f'(q) - f(q)\big)\big] \qquad [A]$$
$$+ \quad \big[f'(g'(q) - \pi'(q)) - f'(g(q) - \pi(q))\big] \qquad\qquad [B]$$

The first bracketed term [A] measures how race-neutral changes to the overall structure of the earnings distribution - changes in the general return to skill - differentially affect white and black men given their initial positions within the skill distribution as perceived by the market.[12] This component of the evolution of racial inequality, which we label *distributional convergence*, naturally captures any changes due, for example, to the general compression of earnings in the middle of the 20th Century or the secular increase in the earnings inequality in

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[12] Throughout our analysis, we use the term 'race-neutral' 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.

more recent decades, especially during the Great Recession. Importantly, such changes have no effect on the relative position of black and white men within the overall earnings distribution.

The second bracketed term [B] captures any changes in the market perception of the relative skills of white and black men. We label this *positional convergence* as it captures the component of the evolution of racial inequality due to changes the relative position of black and white men to shift within the overall earnings distribution. Such changes might arise due to changes in the relative gap in *actual* skills due, for example, to racial convergence in educational attainment as well as any changes in the intensity or severity of labor market discrimination. In the context of our empirical analysis below, for example, any improvements in the relative quality of the schools that black children attended following the *Brown v. Board of Education* ruling would be considered an improvement in unobserved skills in our framework and included in component [B].[13]

The primary goal of our empirical analysis is to understand the evolution of the earnings gap from 1940-2013 in terms of these two main components of equation (4). Our analysis can be broken into three parts. We begin by calculating the main objects of interest - racial earnings gaps at various points in the skill distribution. We then present two complementary approaches to understanding distributional versus positional convergence.

Measuring Racial Earnings Gaps

The first part of our empirical analysis concerns the estimation of racial earnings gaps in each year of our sample. Given the structural characterization of black and white earnings above, it is straightforward to measure the black-white earnings gap using quantile regressions of the form:

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[13] 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.

$$(5) \quad \log(E_i) = \alpha(q) + \beta(q)r_i + \varepsilon_i(q)$$

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: $\alpha(q) = f(q)$. And, the racial earnings gap at the qth quantile is given by:

$$(6) \quad \beta(q) = f\big(g(q) - \pi(q)\big) - f(q)$$

Equation (6) is, of course, identical to equation (2).

In addition to its tight link with the theoretical framework developed above, the use of quantile regressions to measure racial earnings gaps has several attractive features relative to attempting to estimate the gap at the mean. First, there is a significant fraction of both black and white men with zero earnings in each period because they are incarcerated, out of the labor force, or unemployed. This creates an important selection problem in studying the evolution of racial earnings inequality.[14] 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. Tautologically, this is a valid descriptive approach for studying the evolution of the racial gap in actual earnings at the median. But, as discussed in Darity and Myers (1998), 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.[15]

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[14] A sizeable portion of the previous literature studies the black-white earnings gap using the sample of men with positive earnings. Because this approach fails to account for changes in the share of men of each race that are not working, however, it potentially provides a distorted picture of the evolution of racial gap in earnings potential.

[15] 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

The second issue is that the general price of skill and the race-specific price penalty may vary throughout the skill distribution. By estimating equation (5) 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.[16] As we will see below, this flexibility reveals a somewhat 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.[17]

Racial Gaps in Earnings Rank

Having estimated the evolution of racial earnings gaps throughout the skill distribution, the final two pieces of our empirical analysis seek to distinguish changes in the racial earnings gap due to distributional versus positional convergence. An initial way to gauge the relative importance of these components is simply to study positional convergence – component [B] – directly, i.e., to measure changes in the relative position of black and white men within the earnings distribution.

To this end, we estimate a series of quantile regressions, analogous to those described in equation (5), transforming the dependent variable from an individual's log earnings to his percentile rank in the white earnings distribution:

$$(7) \quad rank(E_i) = a(q) + b(q)r_i + u_i(q)$$

Given that the dependent variable is the rank in the white earnings distribution, *a(q)* is simply the identity function, *a(q) = q*, and *b(q)* is given by:

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.

[16] This is a straightforward way to measure changes earnings potential in the upper half of the distribution under the maintained assumption that anyone not working would have earned less than the median.

[17] 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.

$$(8) \quad b(q) = [g(q) - q] - \pi(q)$$

The first bracketed term on the RHS of (8) captures the difference in rank due to actual skill, while the second term measures the effect of race-specific market discrimination. In this way, the estimated *racial earnings rank gap* provides a direct measure of how many percentile points the qth ranked black man sits below the qth ranked white man within the white earnings distribution.

The beauty of quantile earnings rank regressions is that they provide a simple and transparent way to examine how the relative position of black and white men has shifted within the earnings distribution over the study period. They do not, however, provide a direct measure of the contribution of positional convergence to the overall evolution of the racial earnings gap over the study period. The goal of the third and final part of our empirical analysis is to do just that – to formally decompose the changes in the racial earnings gap at each quantile, as well as the 'working' gap, into components due to positional and distributional convergence.

Nonparametric Decomposition of Changes in Racial Earnings Gaps

The method that we develop to decompose the changes in the racial earnings gaps into the primary components described above is based on a counterfactual simulation designed to answer the question: how would racial earnings inequality have evolved from time-period o to t if black and white men had held their relative positions in the earnings distribution at time o? In this way, the simulation provides a direct measure of the change due to distributional convergence – and any difference between the simulated and actual gap at time t can be attributed to positional convergence.

An important advantage of this 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) as 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 equation (5) 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:

$$(11) \quad f_t(E, r) = f_t\big(q_0(r)\big)\sigma_t(r)$$

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 equation (11) 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 equation (11)). 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.

The Role of Education

In the first part of our empirical analysis below, we present "unconditional" versions of the log earnings and earnings rank regressions as well as an "unconditional" version of the decomposition of changes in the earnings gap into components due to distributional versus positional convergence. We put quotation marks around the term unconditional here because our entire analysis is in fact conditional on a series of controls for age, which has little consequence for the results. This unconditional analysis provides an overview of how the racial earnings and earnings rank gaps have evolved over the past several decades at various points in the distribution and also nicely illustrates how the decomposition works in a simple context.

In the second part of our empirical analysis, we examine how accounting for a key observable dimension of skill – educational attainment – affects conclusions about the nature of distributional and positional convergence. In this portion of our analysis, we extend our nonparametric decomposition to account for distributional convergence by considering how the earnings distribution *conditional on education* has evolved over the study period.

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 simulation procedure to condition on X. In this case, the counterfactual joint distribution of earnings, race and X can be written:

$$(12) \quad f_t(E, r, X) = f(q_0(r|X)|X)\sigma_t(r, X)$$

In essence, the same calculations made above for the unconditional case must now simply be made separately for each discrete age-education bin.

Analogous to equation (11), there are three components that must be calculated on the right hand side of equation (12). 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.[18]

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

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[18] 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 equation (12)). 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, $f_t(q|X)$.

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.[19] 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 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.

3   Racial Gaps in Earnings and Work Status

The data for our analysis are drawn from the decennial US Census from 1940-2000 and the annual American Community Survey (ACS) from 2005-2013. 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 '2013' covers 2011-2013.

Our primary sample is restricted to men aged 25-54. We focus on males in this age range in order to avoid several complications related to the decision to participate in the labor force including ongoing education for the young, the possibility of retirement for those 55 and older, and the more heterogeneous labor force participation decisions of females over the study period.

Because our analysis focuses on the racial earnings gap, 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.

[19] 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.

Not Working: Incarceration, Labor Force Participation, and Unemployment

We begin our empirical analysis by studying the racial gap in work status. Table 1 characterizes the fraction of black and white men that are not working in each sample year. The first several rows break the overall rate of not working into three components defined to be mutually exclusive: whether the individual (i) is incarcerated, (ii) is not incarcerated and out of the labor force, or (iii) in the labor force but unemployed.

These figures reveal several important facts about the evolution of the propensity of black and white males to work over the study period. First, rates of incarceration have skyrocketed since 1980, quintupling for white males from 0.3 percent to 1.5 percent by 2010 and more than tripling for black males from 2.6 percent to a staggering 8.3 percent in 2010. Strikingly, the black-white gap in incarceration increased from approximately 2 percent in 1960-1980 to 7.6 percent in 2000 and remains between 6.8-7.0 percent in the 2007, 2010, and 2013 samples.[20]

Second, the rate of labor force participation for both black and white males has decreased sharply since the middle of the 20th Century. While 8.6 percent of black males 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 percent in the 2005-13 period. Comparable figures have also increased sharply for white men albeit at lower levels, rising from 4.2 percent in 1960 to over 9 percent since 2000. 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 slightly above 6 percent in the 2007, 2010, and 2013 samples.

Third, unemployment rates for black males in the labor force have consistently been at least 50 percent greater than those of comparable white males since 1950. While these numbers have risen and fallen with general labor market conditions, among the ten samples shown here, unemployment rates were highest in 2010 at

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[20]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.

7.7 and 13.1 percent for white and black men, respectively. The black-white unemployment gap has remained between 3.9-5.4 percent from 1980-2013 and remains at its highest level in the latter stages of the recovery from the Great Recession in the 2013 sample.

Adding these three measures together reveals several remarkable features about the evolution of the working lives of prime-aged males in the United States since the middle of the Twentieth Century. First, overall rates of not working have increased sharply for both black and white males, rising from 18.0 percent in 1960 to 37.8 percent for black males in 2010. Starting from a lower basis, the comparable rise for white males has also exceeded 100 percent, from 7.9 to 18.6 percent.

Second, increases in each of the three component gaps (incarceration, labor force participation and unemployment) have contributed to the sharp increase in the racial work gap. The 'working' gap has increased by 9.1 percentage points from 1960 to 2010. 22 percent of this increase is due to the increasing unemployment gap, 51 percent to the increasing incarceration gap, and 27 percent to the increasing labor force participation gap.[21] In viewing this decomposition, 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. In this way, a significant portion of the increase in the labor force participation and unemployment gaps may also be due to the effects of mass incarceration.[22]

A second approach to characterizing an individual's work status is to use the measure of earnings provided in the Census and ACS. 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

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[21] 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.

[22] 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.

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 in the next subsection). Figure 1 depicts the racial gap for each of the two summary measures, 'Not Working for Any Reason' and 'Zero-Earnings'. Both measures paint a stark picture of a sharp rise in the black-white 'working' gap over the study period.

Earnings of Black and White Men

The rise in the racial working gap has important implications for characterizing racial earnings gaps, requiring careful consideration of how to account for the increasing fraction of men with zero earnings when characterizing changes in the earnings distribution. Table 2 reports summary statistics that characterize the distribution of our primary measure of earnings - labor market earnings plus business and farm income – for black and white men, respectively.[23][24] 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 rows reports the median, 75th and 90th percentiles of earnings for the full sample of all men, including those not working for any reason.

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[23] We have also estimated all of the specifications included in the paper using a narrower measure of earnings that just included labor market earnings. Appendix Table 1 reports results comparable to those included in Table 3 and 4 using this measure. As the results of Appendix Table 1 suggest, all of the qualitative findings included throughout the paper are robust to using this alternative measure of earnings.

[24] 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 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.

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 largely similar for both white and black men. Figure 2 plots median earnings for the samples of working men and all men for each 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 20 percent for the median white man (from $18,200 to $14,700 in 2013) and 33 percent for the median black man (from $10,700 to $7,200 in 2013) when all men are included in the sample.

A similar pattern has also held at the 75th percentile, with rising earnings through 1970 followed by a long period of stagnation with minimal changes through the end of the study period. In fact, the only portion of the earnings distribution to experience sustained increases for both white and black men since 1970 is the 90th percentile. Real earnings have risen by 14 percent for both the 90th percentile black man (from $20,730 to $23,800 in 2013) and the 90th percentile white man (from $34,100 to $39,000) since 1970.

Taken together, the summary of the work status and earnings shown in Tables 1 and 2 highlights several important issues that guide our main empirical analysis. First, it is important to account explicitly for the margin of working versus not working. The racial working gap is not only of increasing importance in its own right, but accounting for the growing fraction of both black and white men not working affects the interpretation of the evolution of the earnings distribution over the study period, especially at the median. Second, the evolution of the structure of the labor market has affected men at various skill levels quite differently over the study period, with those in the lower and middle part of the distribution experiencing declining real earnings in recent decades, while those at the top have continued to gain ground.

Racial Earnings Gaps

The evolution of the racial earnings gap at various points throughout the distribution is the key object of interest that we seek to describe and understand in this paper. We begin our main empirical analysis, therefore, by characterizing earning gaps in each sample year from 1940-2013 based on the quantile regression specifications shown in equations (5):

$$(5) \quad \log(E_i) = \alpha(q) + \beta(q)r_i + \varepsilon_i(q)$$

Throughout our analysis, we also condition on six age categories capturing each five-year increment from age 25-54, which has only a modest impact on the actual estimates.

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 3A-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 35-39 percent range in every sample from 1980-2013.

Focusing on only those men with positive earnings, 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, the estimated median racial earnings gaps in the 2010 and 2013 samples of all men has returned to a levels that is greater than the 1950 gap, having increased from 51 log points in 1980 to over 71 in 2013. 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 is similar in both the 2010 and 2013 samples. The contrasting results captured in the panels of Table 3 illustrate how sensitive conclusions about the evolution of the median earnings gap since 1980 (i.e., if has been flat or has substantially re-widened) are to whether one accounts for the declining number of males with positive earnings.[25]

The results presented 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 2013, the extent of the measured increase since 1980 varies markedly across quantiles. As described above, the re-widening at the median is 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 sharp. At the 90th quantile, for example, the racial earnings gap fell from 55 percent in 1950 to 37 percent in 1980 and subsequently re-widened to 47 percent in 2013. These results imply that about half the relative earnings gains for black men near the top of the

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[25] Finally, note that the overall evolution of racial earnings gaps is similar for the broader measure of earnings plus business and farm income. The most notable difference is the estimated gap for the sample of all men at the beginning of the study period, where the broader measure of earnings results in an estimated earnings gap that is about 10 percentage points higher in 1940 and 1950. The differences in the measures in this time period are due to the role of farming in these periods. The estimated racial gaps in more recent periods are almost identical for the two measures of earnings.

income distribution from 1950 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 16 percentage points at the median from 2005-2013, the gap at the 90th quantile increased by only about 2-3 percent over the same time period, highlighting the starkly different ways that black men near the top versus the middle of the earnings distribution have experienced the impact of the Great Recession.

4 Distributional vs. Positional Convergence – Unconditional Case

Having described the racial earnings gaps in Table 3, we now present two complementary analyses designed to understand the role of distributional versus positional convergence in driving the observed changes over the study period. We begin by presenting a series of earnings rank gaps from 1940-2013 based on the quantile regression specifications shown in equation (7):

$$(7) \quad \text{rank}(E_i) = a(q) + b(q)r_i + \varepsilon_i(q)$$

Table 4 presents estimates of a set of quantile regressions that are identical to those reported in Table 3, except that each individual's rank in the white earnings distribution has replaced log earnings as the dependent variable. These rank regressions provide a straightforward way to assess relative gains or losses in the relative position of black men at each quantile. We then present the results from an unconditional version of the nonparametric decomposition described above, which explicitly breaks the changes in the earnings and working gaps in each decade into components due to distributional and positional convergence.

Earnings Rank Regressions

The results for the earnings rank gaps presented in Table 4 provide a striking contrast with the results presented in Table 3. Looking first at the upper panel

and again focusing on the median, the results reveal a continued narrowing of the gap in the relative position of the median black men relative to his white counterpart. In 1970, for example, the earnings of the median working black man were equal to those of the 21st percentile working white man. By 2013, the median working black man earned as much as the 34th percentile working white man. This improvement in relative position contrasts with the flattening of the earnings gap over the same period.

A similar contrast can be seen in the sample of all men shown in the lower panel of Table 4. In this case, the gap in the relative position of black and white men at the median has changed very little from 1980 through 2013, remaining essentially flat at 22-24 percentile points. Thus, the sharp re-widening of the median earnings gap observed for the same period in Table 3 has occurred despite a slight uptick in the relative position of the median black man within the earnings distribution, suggesting that general changes in the structure of the earnings distribution – i.e., the substantial increase in overall earnings inequality during this period – bear the primary responsibility.

Interestingly, the results for the rank regressions in the earlier period, 1940-1970, also reveal a pattern that contrasts sharply with the evolution of the earnings gap itself. In particular, while the median racial earnings gap fell by about 50 percent from 1940-1970 for the sample of all men, the position of the median black man in fact slipped during this period - from about the 24rd percentile to the 19th percentile of white men.

Taken together, these results imply that both the sharp decline in the median earnings gap over the early part of the sample period *and* the re-widening of the gap in the more recent period were due primarily to the opposing shifts in the overall earnings distribution in each period. In particular, the overall compression of the wage distribution in the middle of the century, especially in the 1940s, worked to shrink racial differences in actual earnings despite the fact that there was little change in the relative position of black and white men. And, the rise in overall earnings inequality over the past several decades has worked to reverse this earlier decline racial earnings gap despite the fact that, again, the fact

that relative position of black and white men in the earnings distribution has changed very little at the median.

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 increasingly devastating the lower one's position within the earnings distribution.

The results presented in Table 4 for the earnings rank gap reveal a starkly different pattern of positional changes in the upper part of the earnings distribution. Focusing on the results for sample of all men shown in lower panel, the earnings rank gap has declined significantly for both the 75th and (especially) the 90th quantile since 1960. The results from 90th quantile regressions, for example, imply that black men have moved substantially upwards within the earnings distribution relative to white men, reducing what was a 37 percentile-point gap in 1940 to 16 percentile points in 2013. The majority of these gains occurred from 1960-1980, and the gap has remained essentially constant at 16 percentile points in every sample year from 2000 through 2013. 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 2013 compared to the 53rd percentile in 1940 or 1960.

The sharp reduction in the earnings rank gap in the upper portion of the earning distribution since 1960 contrasts with more modest gains at the median. Strikingly, while the earnings rank gap was initially much larger in the upper portion of the earnings distribution, this pattern has now completely reversed itself and the gap is smallest at the higher quantiles, as shown in Figure 4. An important implication of this divergent pattern is the especially large increase in earnings inequality for black men over the past several decades. In particular, while the overall expansion 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.

Robustness

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 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. A short description with more details about each specification is included in an appendix.

Nonparametric Decompositions

We close the unconditional portion of our empirical analysis by decomposing the total changes in the racial gaps in zero-earnings and earnings at each quantile into the two key components described in Section 2: (A) distributional convergence - 'race-neutral' changes in the overall structure of the earnings distribution and (B) positional convergence - 'race-specific' changes in the relative position of black and white men within the earnings distribution.

To compute the 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 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.

The decade-by-decade results for the decomposition are shown for the unconditional simulation (which condition only on age) in first eight columns of

Table 5. The final three columns of the table aggregate the results over longer time periods, 1940-70, 1970-2013, and 1940-2013 by adding the corresponding columns. Figures 5A-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 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.

In line with the results presented in Tables 3 and 4, the simulations reveal a remarkable and somewhat distinct pattern of results at the bottom, middle and top of the earnings distribution. Looking first at the median, which has been the focus of much of the existing literature, the results imply that general structural 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 the 1970-2013 period, when the increase in secular inequality (especially in the Great Recession) was enough to reverse 42 log points of these gains.

Compared to these enormous swings in the median earning gap due 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 1970-2013 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.

At the bottom of the earnings distribution, the results also reveal the tremendous importance of the structural changes to the economy over the past four decades. As shown in Figure 5D and the final column of Table 5, the

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especially large increase in the fraction of black men not working from 1970-2013 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 be expected to drop out of the labor market as the distribution is truncated at a higher and higher point in the skill distribution. In this way, the structural forces that had an enormous impact in the middle of the distribution provide a complete explanation for changes at the bottom of the labor market, implying that essentially no positional convergence has occurred in this part of the earnings distribution.

By contrast, the 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. Focusing on the simulation for the 90th quantile shown in Figure 5C, 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 2013 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. In contrast, the actual earnings gap at the 90th quantile has remained essentially flat from 1970 to 2013 due to positional convergence. 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 30.9 percentage point reduction in the earnings gap by 2013 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 enormous role of structural changes to the earnings distribution 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 1940-2013, 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, 20 percent of the gains at the median, and essentially none of the change in the racial working gap since 1970.

5 Distributional vs. Positional Convergence – Conditional Case

The results presented in Tables 3 and 4 summarize the evolution of the earnings gap and the relative positions of black and white men throughout the earnings distribution over the study period in an "unconditional" specification that controls only for a set of simple age controls. And the results presented in Table 5 explicitly decompose changes in the earnings gap in each decade into components due to distributional and positional convergence in this simple unconditional setting. A limitation of this unconditional analysis is that it ignores the role of observed skill – in particular, educational attainment - in driving the structural changes to the earnings distribution over the study period.

In the second main empirical part of the paper we take up the role of education directly. We begin 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 specifically over and above the any general changes in the dispersion of earnings captured by the unconditional simulations.

With these conditional decompositions in hand, we use additional simulations and complementary empirical analyses to quantify several important dimensions of the way education has affected the evolution of the racial working and earnings gaps over the study period. We begin by further decomposing the measured positional convergence into two education-related components: gains due to (i) racial convergence in educational attainment and (ii) positional gains within education categories. As it turns out, both components will contribute to positional gains throughout the earnings distribution, although their relative role will vary considerably.

We then seek to understand the role of education in driving the structural changes to the earnings distribution over the study period. Here we further decompose conditional distributional convergence into components due to changes in (i) mean earnings by education level for working men, (ii) the standard deviation of earnings by education level for working men, and (iii) the margin or working versus not working by education level. This decomposition highlights the role that changes in the returns to education have played on both the intensive and extensive margin in distributional gains and losses.

Conditional Decompositions

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 6 and Figures 6A-D, which have the same formats as Table 5 and Figures 5A-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, 1940-2013. 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 50.8 log points over the full study period, while the same figure for unconditional positional convergence is only 10.5 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 percentage points had black and white men held their relative positions within each education category in the 1970-2013 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 2013 white earnings distribution versus the 1940 or 1980 distributions.

6 The Role of Education I: Positional Convergence

The important differences between the conditional and unconditional decompositions reported in Tables 5 and 6 imply that accounting explicitly for the changing role of education in the earnings distribution has important consequences for conclusions about distribution and positional convergence since 1940. In the next two sections of the paper, we examine the role of education in the evolution of racial earnings differences in greater detail, focusing on positional and distributional convergence in turn.

We begin by examining the role of education in the racial positional convergence measured in Table 6. Here we seek to further decompose any positional gains into two components that have been highlighted in the previous literature: (i) racial convergence in educational attainment and (ii) within-education category positional convergence. As a prelude to this further decomposition, we provide some direct evidence on related changes in our Census and ACS samples. We conclude this section by explicitly decomposing the decade-by-decade positional changes into these two components.

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.[26] Racial educational convergence is an obvious first-order potential explanation for the positional gains documented in Table 6.

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[26] See Collins and Margo (2006) and Neal (2006).

Table 7 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.[27] The figures show a substantial increase in education for both black and white males and a clear closing of the racial educational gap over the study period. In 1940, for example, only 7.2 percent of black males had completed high school and just 1.6 percent had completed college, while comparable figures for white males were 28.1 and 6.8 percent, respectively. By 2013, high school completion rates were near 90 percent for each race and college completion rates had increased to 16.5 and 29.9 percent for black and white males, 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 males 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 set of potentially important explanations for racial positional convergence relates to gains in the relative position of black men within education categories. Such within-education positional gains would follow from any relative improvements in school quality due, for example, to the desegregation of public schools, the opening of many formerly segregated public and private universities to black students, and school finance reforms that better equalized school spending across districts. Reductions in discriminatory practices in various segments of the labor market would also lead to positional convergence in the associated education categories.

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[27] 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.

It is straightforward to extend the earnings rank regressions shown in Table 4 to study positional convergence within each education category. To that end, Table 8 measures the earnings rank gap for the following five education categories (8th grade or less, some high school, 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.[28]

The median rank regressions shown in the top panel of Table 8 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 over 25 percentile points behind the median college-educated white man in the white earnings distribution. By contrast, the median black man with 8 years of education or less was 8.4 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 24-26 percentile point range in the 1940-1960 samples to 10 percentile points in 1980, remaining relatively flat in the 8-12 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 18-21 percentile point range in 1940-1960 to the 14-16 range by the end of the study period.

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 1980-2013, the 90th percentile black college-educated man has ranked only 3-4 percentile points behind his white counterpart in the overall white earnings distribution. Interestingly, and in contrast with the

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[28] It is important to note that these quantile rank regressions effectively compare the relative positions of the qth quantile black and white man within the corresponding education category. Results are reported, therefore, only for sample years in which both the qth quantile black and white man within the given education category, respectively, has positive earnings.

median, the results also show a general decline in the rank gap at the 90th quantile of the lower education categories.

Taken together, the results presented in Table 8 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 lower education categories – suggesting more modest changes over the full study period.

Decomposing Positional Convergence

The results presented in Tables 7 and 8 suggest that both convergence in educational attainment and within-education positional convergence have contributed to the overall positional convergence measured in Table 6. These results are also suggestive that the relative roles of these two mechanisms may have varied throughout the distribution given the more obvious importance of within-education positional convergence in the upper parts of the distribution.

We close this section by formally decomposing the conditional positional convergence shown in Table 6 into (i) educational convergence and (ii) within-education positional convergence. This requires a simple change to the conditional simulations that form the basis for Table 6. In particular, the decompositions shown in Table 6 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 6 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 9, which follows the structure of Tables 5 and 6. The decade-by-decade results for educational convergence and within-education positional convergence shown in Table 9 map nicely to patterns shown in Tables 7 and 8 map. In line with these motivating tables, the results imply that educational convergence has been relatively more important in driving positional convergence at the bottom and middle of the earnings distribution, while within-education positional convergence has been the dominant 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 (27 out of 22 log points), but only about 30 percent of the positional gains at the median (16 out of 51 log points) and less than 20 percent on the margin of working versus not.

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.

Overall, the results presented in Tables 6-9 suggest that a great deal of progress has been made towards closing the racial earnings and working gap throughout the distribution over the study period due to positional convergence related to both educational convergence and within-education gains. Substantial differences in both of these dimensions remain, however, and because the structural changes to the labor market from 1970-2013 have accentuated the role of education, these remaining gaps in education and school quality, for example, have had an increasing impact on the racial earnings and working gaps by the end of the study period.

7 The Role of Education II: Distributional Convergence

In this final empirical section of the paper, we now turn to a richer exploration of the role of education in driving distributional convergence. Given

the contrasting conditional and unconditional decomposition results presented in Tables 5 and 6, it is already apparent that the increasing impact of education on earnings, especially in the latter part of the study period, has important implications for our understanding of the evolution of the racial earnings and working gaps. In this section, we aim to understand these forces better by decomposing the decade-by-decade changes in the earnings distribution into three components: (i) changes in the mean earnings by education category among working men, (ii) changes in the standard deviation of earnings by education category among working men, and (iii) changes in the propensity of men to work by education category. As a prelude to this decomposition, we again start with a more direct empirical analysis of the returns to education that nicely presages the simulation results.

The Impact of Education on Work Status and the Earnings of Workers

Table 10 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 10 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 known. 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 selective in 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 over 22 percentage points in the Great Recession in 2010 and 2013. The working gap between college-educated and high-school-educated workers has also increased sharply in recent decades, rising from less than 1 percentage point in 1970 and 2 percentage points in 1980 to over 11 percentage points in 2010 and 2013.

Understanding Distributional Convergence

Table 11 presents the results of simulations that decompose the conditional distributional convergence shown in Table 6 into the three components described above. This series of simulations is again a straightforward extension of our initial conditional simulation procedure. In this case, we adjust the full nonparametric conditional earnings distribution in three steps instead of a single on. The first new simulation changes only the mean earnings by education category among working men to match those of the subsequent decade, holding everything else at their initial levels, including work status and any difference in an individual's earnings from the mean. This first simulation isolates the impact of changes in the mean returns to education among workers. The second new simulation adjusts both the mean and standard deviation of earnings for workers to match those of the subsequent decade. Any differences in earnings gaps between the first and second simulations can thus be attributed to the increasing dispersion of earnings within education categories. Finally, because this second new simulations changes only the distributions of earnings for working men, any remaining differences relative to the full conditional distributional simulation shown in Table 6 – which nonparametrically changes the earnings distribution for all men – can largely be attributed to changes in the propensity of men to work within each education category.

The results for this decomposition of distributional convergence are shown in Table 11. At the median, all three components of the structural distributional change have contributed to both the closing of the racial earning gap from 1940-1970 and the subsequent re-widening of the gap from 1970-2013. Interestingly, while the increasing mean returns to education among workers and the increasing dispersion of returns among workers have both contributed

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substantially to the rising gap since 1970, the largest single structural factor is the working vs. not working margin, which alone is responsible for a 30.9 percentage point increase in the median earnings gap since 1970. Given the size of this component, it is not a stretch to say that the diminishing rate of working among (especially less educated) men has been largely responsible for the general re-widening of the median earnings gap since 1970 and, in particular, the especially sharp increase in the median earnings gap during the Great Recession. Perhaps not surprisingly, changes to the mean and standard deviation of returns among working men have been responsible for the lion's share of the structural changes in the upper quantiles of the earnings distribution, which are less sensitive to the extensive margin.

8 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 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 as well as positional convergence among (especially college-educated) men with comparable levels of education. 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 1940-2013 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.

In the lower parts of the earnings distribution, the significant increases in the racial incarceration, labor force participation, 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 1970-2013 period.

The implications of our analysis for our understanding of the current state of the economy 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 and median earnings gaps to widen significantly since 1970.

Second, our analysis demonstrates how powerfully race-neutral changes in the structure of earnings can be in differentially affecting 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 in their position 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.

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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, 1940-2013

Black Men	1940	1950	1960	1970	1980	1990	2000	2007	2010	2013
Not Currently Working - All Explanations	0.140	0.161	0.180	0.167	0.240	0.281	0.348	0.322	0.378	0.368
Incarcerated		0.020	0.026	0.023	0.026	0.062	0.089	0.083	0.083	0.083
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	0.123
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	0.279

White Men	1940	1950	1960	1970	1980	1990	2000	2007	2010	2013
Not Currently Working - All Explanations	0.106	0.088	0.079	0.076	0.102	0.106	0.132	0.145	0.186	0.179
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	0.096
Unemployed	0.069	0.030	0.033	0.023	0.040	0.038	0.029	0.038	0.077	0.069
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	0.118

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 '2013' combines those from 2011-13. 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, 1940-2013

	Real Earnings - including Business and Farm Income (thousands of 1980 dollars)									
Black	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2013**
Men with Positive Earnings										
Mean	3.37	6.00	8.56	12.35	12.69	13.31	14.95	14.42	14.35	14.06
Median	2.94	5.98	8.49	11.79	11.97	11.35	12.44	11.93	11.34	11.34
All Men										
Median	2.12	5.30	7.38	10.72	10.01	9.46	9.57	9.41	7.56	7.18
75th Percentile	3.88	7.69	11.27	15.61	16.01	16.39	16.75	16.36	15.12	15.08
90th Percentile	5.91	10.43	14.34	20.28	22.01	23.33	24.88	25.05	24.56	23.83
White	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2013**
Men with Positive Earnings										
Mean	7.16	11.17	16.43	21.22	19.43	21.27	23.95	23.74	22.48	22.32
Median	6.12	10.43	14.61	18.79	17.51	17.65	18.18	17.90	17.00	16.79
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	25.14
90th Percentile	13.38	17.64	26.03	34.09	32.01	36.57	40.53	40.90	38.92	38.95

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 '2013' combines those from 2011-13. 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 - 1940-2013

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2013
Men with Positive Earnings										
50th Quantile	-0.913	-0.555	-0.584	-0.446	-0.387	-0.382	-0.358	-0.385	-0.357	-0.378
	(0.009)	(0.034)	(0.008)	(0.003)	(0.001)	(0.004)	(0.002)	(0.003)	(0.006)	(0.004)
75th Quantile	-0.827	-0.509	-0.506	-0.425	-0.310	-0.341	-0.347	-0.385	-0.375	-0.378
	(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	-0.398
	(0.008)	(0.025)	(0.005)	(0.016)	(0.001)	(0.006)	(0.003)	(0.004)	(0.007)	(0.003)
Number of Observations	252,682	84,815	313,864	326,734	1,943,928	474,109	2,682,870	1,593,014	509,038	1,496,365
All Men										
50th Quantile	-0.999	-0.677	-0.663	-0.523	-0.511	-0.553	-0.528	-0.560	-0.715	-0.716
	(0.008)	(0.019)	(0.007)	(0.008)	(0.003)	(0.007)	(0.010)	(0.004)	(0.013)	(0.007)
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	-0.472
	(0.006)	(0.004)	(0.007)	(0.003)	(0.002)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
Number of Observations	274,760	91,741	330,694	342,759	2,089,550	513,806	2,975,183	1,752,969	590,373	1,761,703

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 '2013' combines those from 2011-13. Standard errors are in parentheses.

Table 4: Black-White Differences in Rank in White Earnings Distribution - 50th, 75th and 90th Quantile Regressions - 1940-2013

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2013
Men with Positive Earnings										
50th Quantile	-27.22	-28.73	-31.24	-29.41	-20.60	-19.25	-18.68	-18.18	-15.65	-15.92
	(0.16)	(0.33)	(0.12)	(0.24)	(0.08)	(0.17)	(0.13)	(0.13)	(0.23)	(0.13)
75th Quantile	-38.04	-37.95	-40.62	-35.26	-21.52	-20.11	-18.66	-18.13	-16.39	-16.68
	(0.20)	(0.16)	(0.20)	(0.24)	(0.08)	(0.18)	(0.15)	(0.17)	(0.28)	(0.16)
90th Quantile	-35.57	-33.73	-35.65	-27.68	-15.62	-14.76	-12.98	-13.31	-11.06	-11.63
	(0.34)	(0.83)	(0.89)	(0.24)	(0.13)	(0.33)	(0.14)	(0.20)	(0.25)	(0.11)
Number of Observations	252,682	84,815	313,864	326,734	1,943,928	474,109	2,682,870	1,593,014	509,038	1,496,365
All Men										
50th Quantile	-26.42	-28.73	-32.18	-30.79	-24.48	-23.52	-23.90	-22.79	-21.99	-22.24
	(0.16)	(0.55)	(0.14)	(0.12)	(0.06)	(0.20)	(0.09)	(0.11)	(0.20)	(0.11)
75th Quantile	-38.63	-37.98	-41.78	-35.98	-25.16	-23.83	-23.50	-22.76	-22.28	-22.25
	(0.11)	(0.35)	(0.19)	(0.18)	(0.10)	(0.27)	(0.05)	(0.15)	(0.22)	(0.16)
90th Quantile	-36.72	-36.12	-37.38	-28.42	-18.41	-17.70	-15.91	-16.20	-15.10	-15.66
	(0.31)	(0.72)	(0.36)	(0.52)	(0.21)	(0.27)	(0.11)	(0.17)	(0.30)	(0.16)
Number of Observations	274,760	91,741	330,694	342,759	2,089,550	513,806	2,975,183	1,752,969	590,373	1,761,703

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 '2013' combines those from 2011-13. Standard errors are in parentheses.

Table 5: Unconditional Decomposition of Changes in Black-White Earnings Differences, 1940-2013

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	2007-2013	1940-1970	1970-2013	1940-2013
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	-0.153	0.643	-0.420	0.222
(B) Positional Convergence	-0.096	-0.120	0.049	0.146	0.021	0.040	0.024	-0.003	-0.167	0.228	0.060
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	-0.057	0.388	-0.245	0.143
(B) Positional Convergence	0.029	-0.053	0.063	0.123	0.017	0.026	0.024	0.005	0.039	0.196	0.235
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	-0.026	0.192	-0.176	0.016
(B) Positional Convergence	0.029	-0.011	0.095	0.128	0.002	0.050	0.011	0.003	0.114	0.195	0.309
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	-0.038		-0.099	
(B) Positional Convergence				-0.019	-0.009	0.005	0.019	-0.001		-0.006	

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: Decomposition of Changes in Black-White Earnings Differences - Conditional on Education - 1940-2013

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	2007-2013	1940-1970	1970-2013	1940-2013
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	-0.158	0.407	-0.632	-0.225
(B) Conditional Positional Convergence	-0.016	0.000	0.084	0.251	0.150	0.033	0.004	0.002	0.069	0.439	0.508
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	-0.048	0.306	-0.334	-0.028
(B) Conditional Positional Convergence	0.070	-0.036	0.088	0.182	0.068	0.023	0.015	-0.004	0.122	0.285	0.407
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	-0.031	0.302	-0.179	0.123
(B) Conditional Positional Convergence	-0.006	-0.059	0.069	0.130	0.011	0.036	0.012	0.009	0.004	0.198	0.202
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	-0.039		-0.158	
(B) Conditional Positional Convergence				0.002	0.018	0.014	0.019	0.000		0.053	

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 7: Educational Attainment of Non-Hispanic Black and White Men, 1940-2013

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2013
Black Men										
Eight Years or fewer	0.846	0.711	0.565	0.342	0.158	0.059	0.035	0.029	0.028	0.027
HS Degree or more	0.072	0.139	0.223	0.378	0.624	0.788	0.845	0.860	0.866	0.873
College Degree or more	0.016	0.021	0.033	0.051	0.102	0.124	0.140	0.159	0.159	0.165
Years of Education	5.60	6.75	7.99	9.62	11.39	12.34	12.52	12.71	12.78	12.83
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	0.936
College Degree or more	0.068	0.091	0.127	0.181	0.263	0.289	0.313	0.317	0.323	0.328
Years of Education	9.13	10.08	10.90	11.84	12.90	13.49	13.57	13.60	13.66	13.69

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 '2013' combines those from 2011-13. 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 8: Black-White Differences in Rank in White Earnings Distribution by Education Category - 50th and 90th Quantile Regressions - 1940-2013

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

	1940	1950	1960	1970	1980	1990	2000	2007	2010	2013
50th Quantile										
College Degree or More	-26.20	-26.23	-23.07	-17.00	-10.37	-10.32	-9.26	-11.12	-9.68	-9.79
	(1.63)	(2.21)	(0.59)	(0.83)	(0.18)	(0.54)	(0.15)	(0.26)	(0.31)	(0.22)
Some College	-24.95	-23.46	-22.48	-18.12	-12.88	-12.80	-11.41	-11.04	-10.97	-10.83
	(1.09)	(1.22)	(0.72)	(0.84)	(0.18)	(0.31)	(0.16)	(0.23)	(0.42)	(0.23)
HS Degree	-19.95	-18.24	-20.20	-16.62	-15.61	-15.28	-15.95	-14.00	-14.85	-14.72
	(0.66)	(1.09)	(0.44)	(0.39)	(0.13)	(0.26)	(0.16)	(0.16)	(0.30)	(0.18)
Some High School	-14.70	-13.89	-19.13	-18.71	-15.46	-15.34	-16.58	---	---	---
	(0.51)	(0.63)	(0.29)	(0.24)	(0.18)	(0.46)	(0.24)	---	---	---
Eight years or less	-7.90	-7.80	-10.14	-10.42	-9.05	-7.37	---	---	---	---
	(0.21)	(0.39)	(0.20)	(0.29)	(0.18)	(0.90)	---	---	---	---
90th Quantile										
College Degree or More	-9.14	-10.89	-10.05	-3.98	-3.83	-4.22	-3.81	-4.47	-3.47	-3.56
	(0.80)	(2.71)	(1.14)	(0.30)	(0.10)	(0.25)	(0.07)	(0.14)	(0.20)	(0.13)
Some College	-18.44	-18.85	-17.49	-10.66	-7.61	-8.00	-6.25	-7.39	-7.08	-7.14
	(2.47)	(1.86)	(0.85)	(0.62)	(0.13)	(0.19)	(0.14)	(0.20)	(0.22)	(0.14)
HS Degree	-16.39	-13.27	-18.45	-12.58	-9.82	-9.62	-9.82	-10.73	-10.32	-10.31
	(4.01)	(1.91)	(0.50)	(0.86)	(0.21)	(0.24)	(0.24)	(0.20)	(0.38)	(0.18)
Some High School	-21.40	-15.81	-19.28	-17.68	-12.82	-14.64	-15.21	-16.97	-15.61	-15.53
	(0.61)	(1.02)	(0.50)	(0.43)	(0.17)	(0.66)	(0.31)	(0.49)	(0.70)	(0.46)
Eight years or less	-21.31	-19.50	-18.94	-17.92	-13.31	-13.14	-10.84	-13.31	-12.04	-12.55
	(0.18)	(0.42)	(0.29)	(0.51)	(0.31)	(1.31)	(0.74)	(1.02)	(1.51)	(0.81)

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 '2013' combines those from 2011-13. Standard errors are in parentheses.

Table 9: Decomposition of Positional Convergence - Conditional on Education - 1940-2013

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2007	2007-2013	1940-1970	1970-2013	1940-2013
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	-0.158	0.407	-0.632	-0.225
(B) Conditional Positional Convergence	-0.016	0.000	0.084	0.251	0.150	0.033	0.004	0.002	0.069	0.439	0.508
(i) Education Convergence	0.026	0.083	0.024	0.100	0.123	-0.008	-0.009	0.007	0.133	0.214	0.347
(ii) Within-Education Positional Convergence	-0.042	-0.083	0.061	0.151	0.026	0.040	0.013	-0.005	-0.065	0.226	0.161
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	-0.048	0.306	-0.334	-0.028
(B) Conditional Positional Convergence	0.070	-0.036	0.088	0.182	0.068	0.023	0.015	-0.004	0.122	0.285	0.407
(i) Education Convergence	0.045	0.003	0.038	0.051	0.052	0.010	0.011	-0.009	0.086	0.115	0.200
(ii) Within-Education Positional Convergence	0.025	-0.039	0.050	0.131	0.016	0.014	0.004	0.005	0.036	0.170	0.206
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	-0.031	0.302	-0.179	0.123
(B) Conditional Positional Convergence	-0.006	-0.059	0.069	0.130	0.011	0.036	0.012	0.009	0.004	0.198	0.202
(i) Education Convergence	-0.040	-0.037	-0.020	0.042	-0.002	-0.006	0.015	-0.016	-0.097	0.032	-0.064
(ii) Within-Education Positional Convergence	0.034	-0.022	0.089	0.089	0.013	0.042	-0.004	0.025	0.101	0.165	0.266
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	-0.039		-0.158	
(B) Conditional Positional Convergence				0.002	0.018	0.014	0.019	0.000		0.053	
(i) Education Convergence				0.013	0.022	0.005	0.001	0.002		0.043	
(ii) Within-Education Positional Convergence				-0.011	-0.004	0.009	0.018	-0.002		0.010	

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.

Table 10: Impact of Education on the Earnings of Workers and Likelihood of Working - 1940-2013

	Dependent Variable: Log Earnings					Sample: Men with Positive Earnings				
	1940	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2013**
College Degree or more	0.915	0.515	0.630	0.618	0.625	0.893	0.923	1.019	1.091	1.091
	(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	0.561
	(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	0.315
	(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	1,496,365

	Dependent Variable: Indicator for Positive Earnings					Sample: All Men				
	1940	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2007**	**2010**	**2013**
College Degree or more	0.007	0.006	0.036	0.051	0.099	0.155	0.182	0.176	0.222	0.223
	(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	0.167
	(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	0.107
	(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	1,761,703

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 '2013' combines those from 2011-13. Standard errors are in parentheses.

Table 11: Decomposition of Distributional Convergence - Conditional on Education - 1940-2013

|	1940-50	1950-60	1960-70	1970-80	1980-90	1990-2000	2000-07	2007-13	1940-1970	1970-2013	1940-2013
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	-0.158	0.407	-0.632	-0.225
(i) Mean Returns to Education	0.090	-0.044	0.048	0.017	-0.067	-0.018	-0.009	-0.022	0.094	-0.099	-0.005
(ii) St Dev of Returns by Education	0.119	-0.002	0.001	-0.062	-0.028	0.004	-0.044	-0.040	0.118	-0.170	-0.052
(iii) Zero-Earnings Margin by Education	0.129	0.060	0.007	-0.193	-0.098	0.007	0.017	-0.096	0.195	-0.363	-0.168
(B) Conditional Positional Convergence	-0.016	0.000	0.084	0.251	0.150	0.033	0.004	0.002	0.069	0.439	0.508
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	-0.048	0.306	-0.334	-0.028
(i) Mean Returns to Education	0.113	-0.068	0.025	-0.001	-0.077	-0.025	-0.018	-0.019	0.070	-0.140	-0.070
(ii) St Dev of Returns by Education	0.111	0.008	-0.001	-0.039	-0.014	0.003	-0.025	-0.036	0.118	-0.111	0.007
(iii) Zero-Earnings Margin by Education	0.074	0.074	-0.030	-0.066	-0.014	-0.022	0.012	0.007	0.118	-0.083	0.035
(B) Conditional Positional Convergence	0.070	-0.036	0.088	0.182	0.068	0.023	0.015	-0.004	0.122	0.285	0.407
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	-0.031	0.302	-0.179	0.123
(i) Mean Returns to Education	0.107	-0.047	0.015	0.009	-0.072	-0.018	-0.020	-0.031	0.075	-0.132	-0.057
(ii) St Dev of Returns by Education	0.103	0.020	0.004	-0.024	-0.012	-0.004	-0.011	-0.022	0.127	-0.073	0.054
(iii) Zero-Earnings Margin by Education	0.042	0.043	0.015	0.007	0.017	-0.031	0.012	0.022	0.100	0.026	0.126
(B) Conditional Positional Convergence	-0.006	-0.059	0.069	0.130	0.011	0.036	0.012	0.009	0.004	0.198	0.202
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	-0.039		-0.158	
(i) Mean Returns to Education				---	---	---	---	---		---	
(ii) St Dev of Returns by Education				---	---	---	---	---		---	
(iii) Zero-Earnings Margin by Education				-0.052	-0.042	-0.022	-0.003	-0.039		-0.158	
(B) Conditional Positional Convergence				0.002	0.018	0.014	0.019	0.000		0.053	

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 Distributional Convergence (A) is then further decomposed into portions due to shifts in the (i) mean returns by education category for working men, (ii) standard deviation of returns by education category for working men and (iii) the fraction of men with zero-earnings by education category.
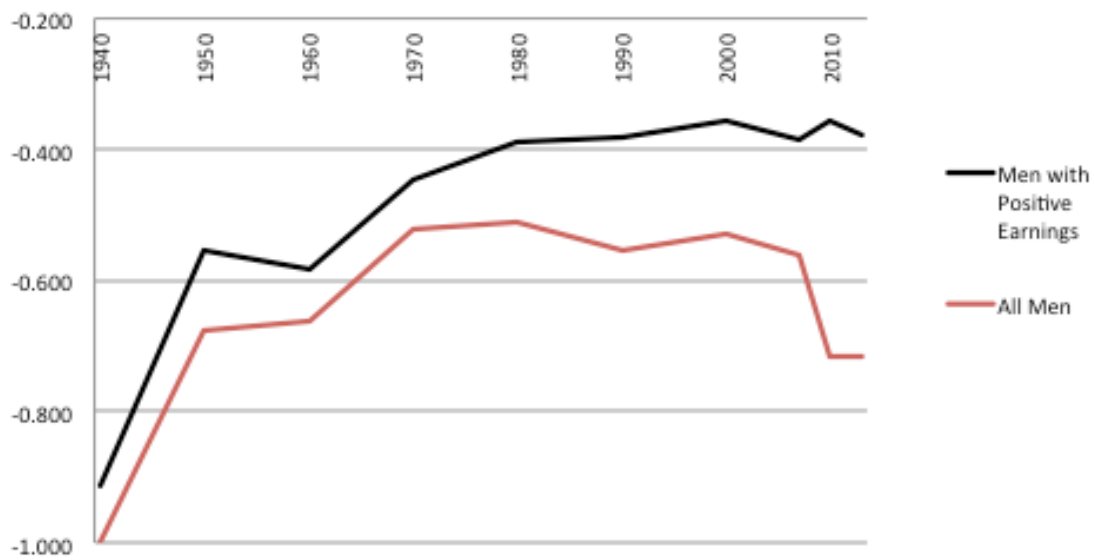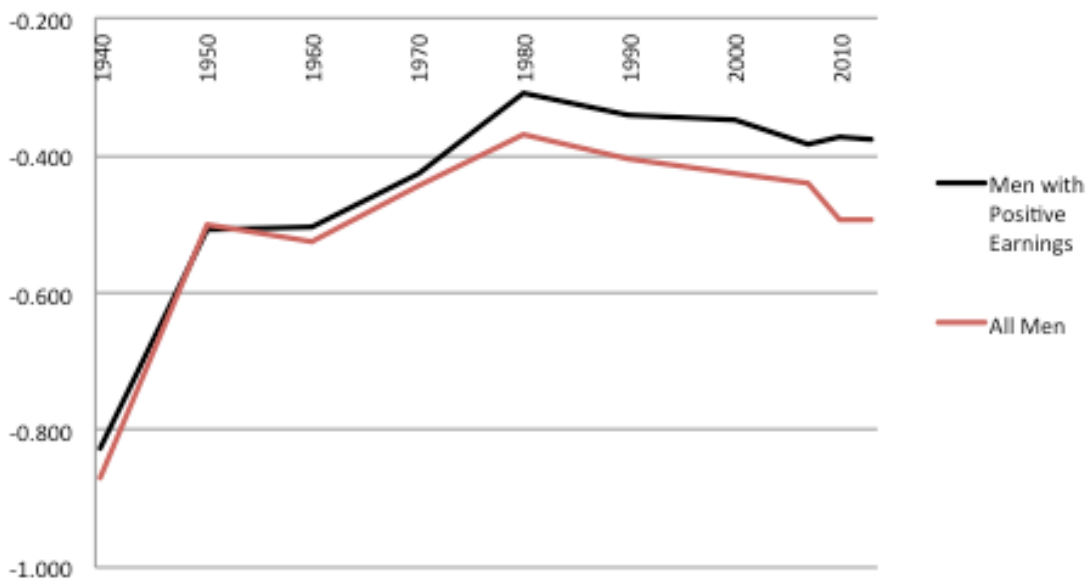
Figure 1: Racial Gaps in Work Status, 1940-2013
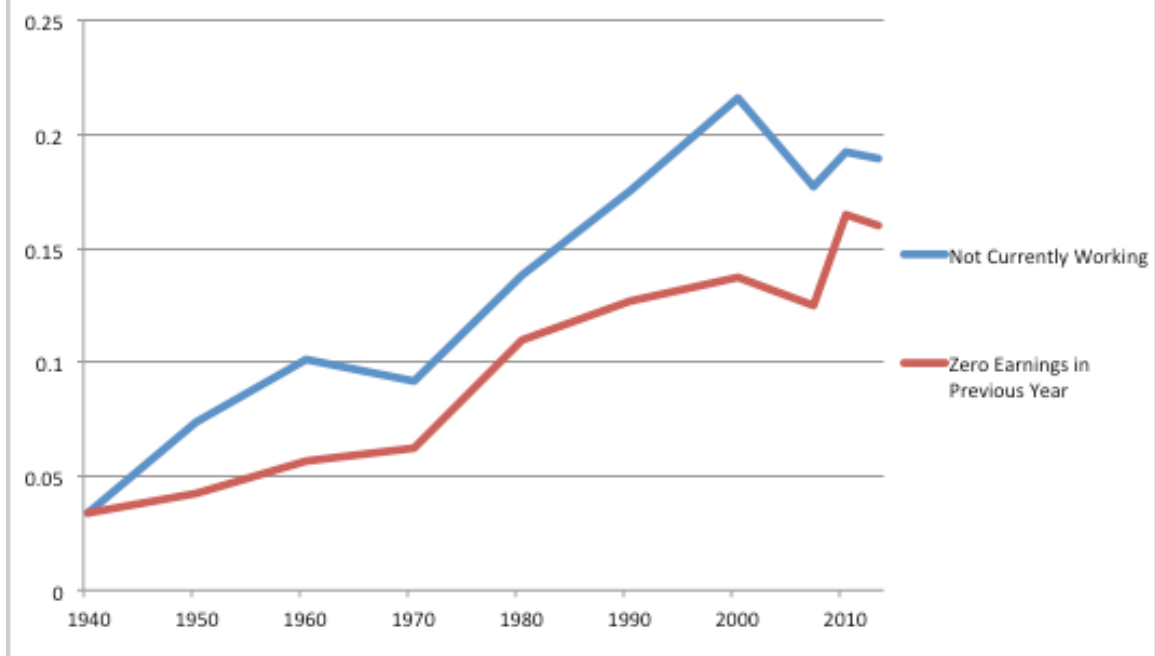
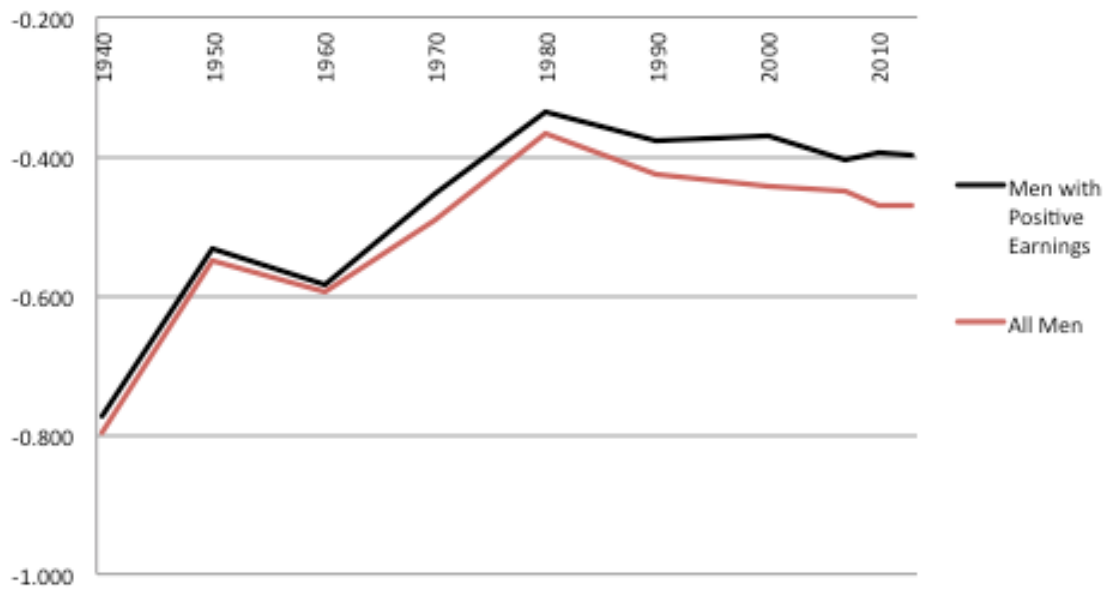Figure 2: Median Real Earnings of Black and White Men, 1940-2013
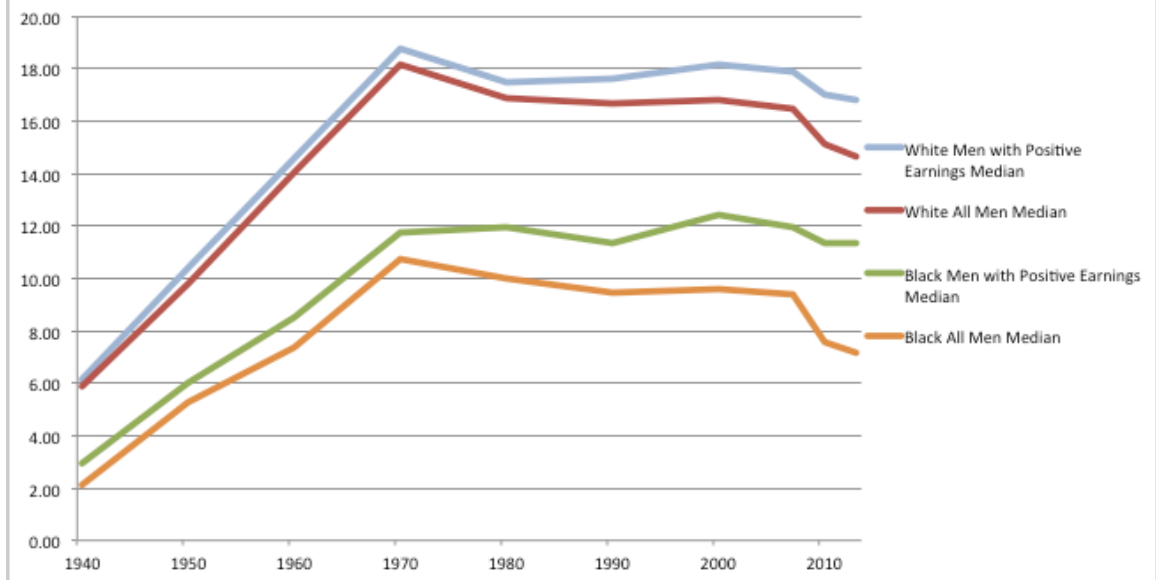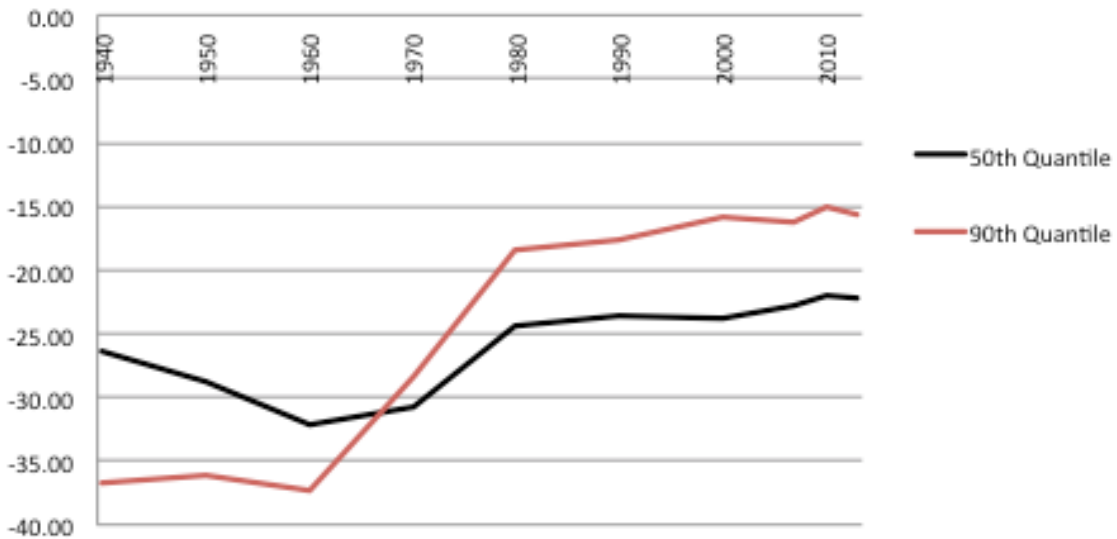
Figure 3A: Racial Earnings Gap, 1940-2013
50th Quantiles

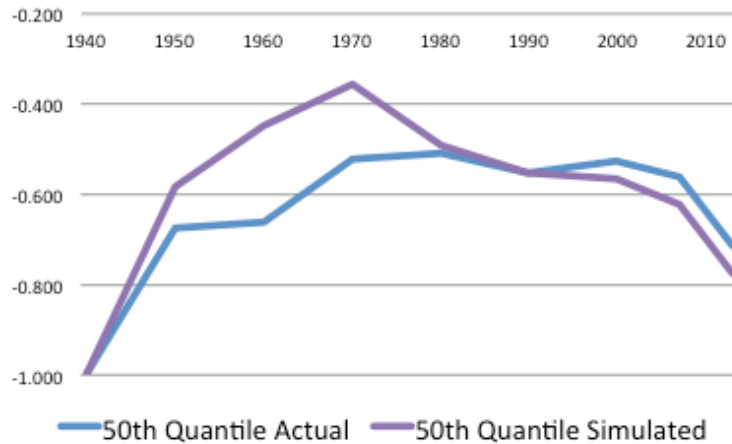Figure 3B: Racial Earnings Gap, 1940-2013
75th Quantiles

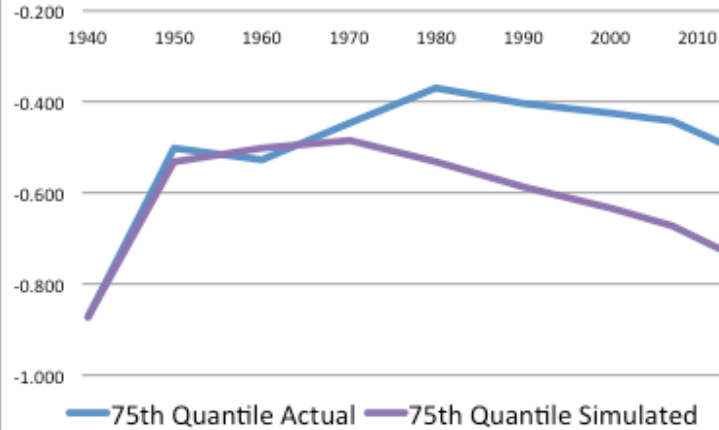**Figure 3C: Racial Earnings Gap, 1940-2013**
90th Quantiles

Legend: Men with Positive Earnings; All Men
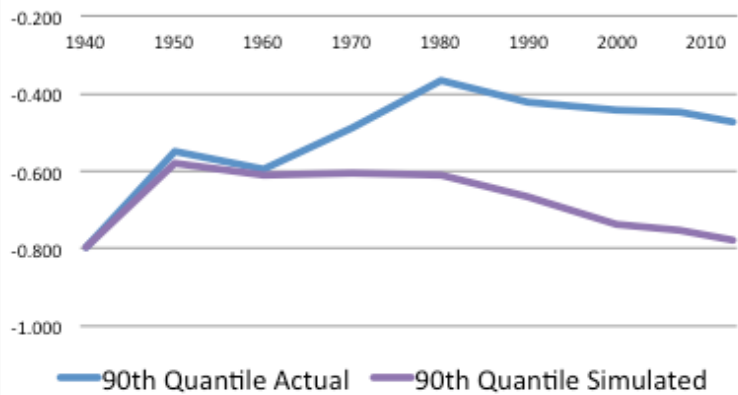

Figure 4: Racial Earnings Rank Gap, 1940-2013
50th and 90th Quantiles - All Men

Legend: 50th Quantile; 90th Quantile

Figure 5A: Actual vs Simulated Racial Earnings Gap - 50th Quantile
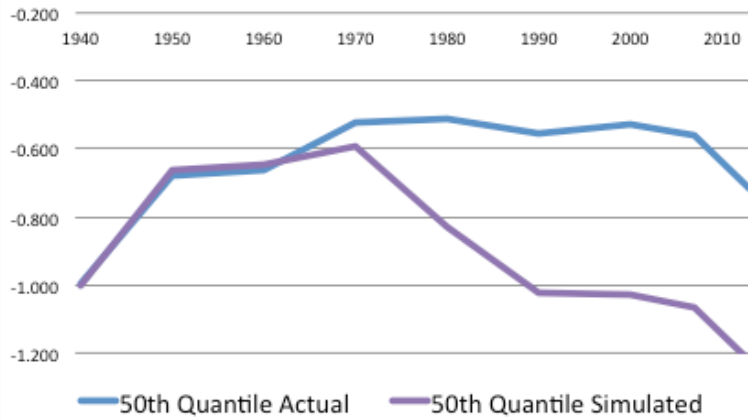
Figure 5B: Actual vs Simulated Racial Earnings Gap - 75th Quantile

Figure 5C: Actual vs Simulated Racial Earnings Gap - 90th Quantile

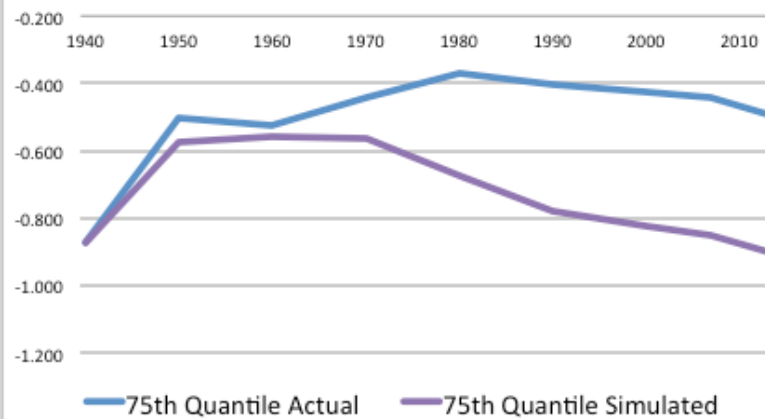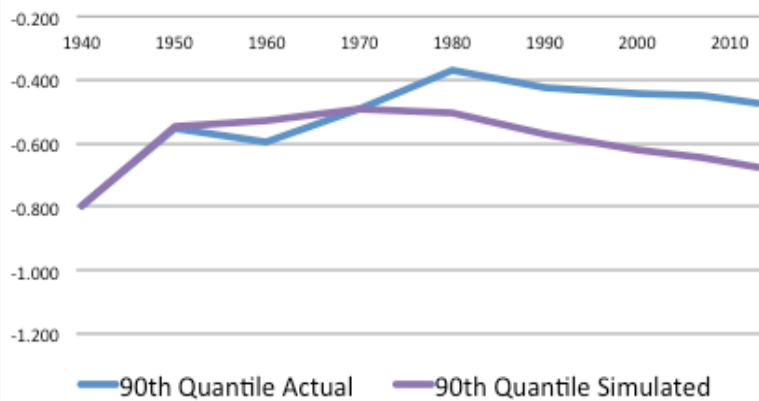Figure 5D: Actual vs Simulated Racial Earnings Gap - Zero Earnings
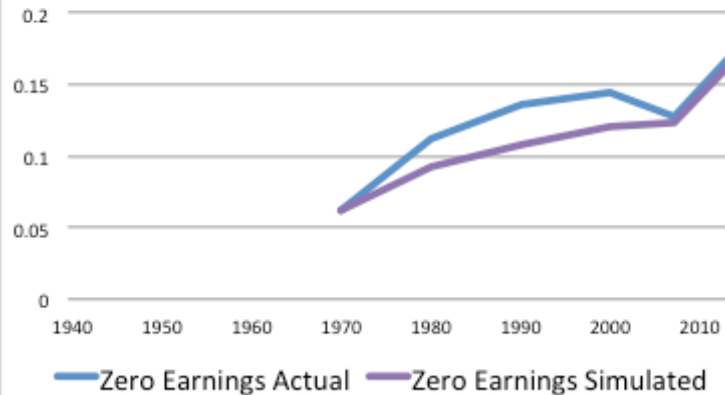
Figure 6A: Actual vs Simulated Racial Earnings Gap - 50th Quantile

Figure 6B: Actual vs Simulated Racial Earnings Gap - 75th Quantile

Figure 6C: Actual vs Simulated Racial Earnings Gap - 90th Quantile

Figure 6D: Actual vs Simulated Racial Earnings Gap - Zero Earnings