



The declining racial earnings' gap in United States: Multi-level analysis of males' earnings, 1960–2000

Moshe Semyonov *, Noah Lewin-Epstein

Tel Aviv University, Department of Sociology, Tel Aviv, 69978, Israel

ARTICLE INFO

Article history:
Available online 17 December 2008

Keywords:
Racial inequality
Earnings inequality

ABSTRACT

Despite dramatic changes in education and occupational opportunities for Blacks in the United States, facilitated by affirmative action policies, the White–Black earnings' gap has not vanished. Although the literature on this issue has become substantial no one has yet provided a systematic examination of changes in the earnings' gap that takes into consideration the concomitant changes in the occupational structure and changes in the racial composition of occupational labor markets as well as changes in characteristics of the labor force. In the present research, we use 5 waves of IPUMS data and hierarchical linear modeling to estimate changes in the effect of race on earnings between 1960 and 2000. The models focus on the interaction of time and race with earnings while controlling for individual-level characteristics (i.e. education) at the individual-level and the characteristics of detailed occupational labor markets (i.e. occupational socioeconomic status, race and gender composition, occupational earnings inequality) at the aggregate level. In order to evaluate the effect of change over time, both linear and non-linear trends in earning gaps are estimated in the labor market as a whole and separately for the public and private sectors. The data reveal that net of changes in the occupational distributions and market-relevant characteristics of Black and White men, the gaps have generally narrowed but at a declining rate. The data also reveal considerable differences in racial earnings inequality between the public and the private sectors. Whereas the unexplained earnings gap in the public sector has virtually vanished by 2000, in the private sector, the gap is still significant, although it declined over time. The findings are discussed in light of past research in order to re-evaluate the contribution of labor market attributes and sector differences to change in earnings disparities between Black and White men in the US.

© 2008 Elsevier Inc. All rights reserved.

The research was supported by Grant 842/06 awarded by the Israel Science Foundation.

An early version of the paper was presented at the Research Committee on Social Stratification and Mobility Meeting (RC 28) in Nijmegen, Holland, May 2006. The authors thank William Bridges, Yinon Cohen, Yitchak Haberfeld, Anthony Orum and Erin Ruel and two reviewers for helpful comments and suggestions. We also thank Anya Glikman for her help in preparing the data files and in data analysis.

1. Introduction

The economic disadvantages faced by racial and ethnic minorities have long been a central focus of research for students of ethnic stratification and inequality. Consequently, considerable attention has been devoted to the study of sources of earn-

* Corresponding author.

E-mail address: moshes@post.tau.ac.il (M. Semyonov).

ings disparities between Blacks and Whites in the American labor market and trends in such inequality. The ever-growing literature on the issue has arrived at two explanatory approaches for understanding racial earning disparities. The first suggests that earning gaps between Black and White workers are attributable to differential levels of individuals human capital resources (such as education, skills and cognitive ability) (e.g. Card and Krueger, 1992; Farkas et al., 1997; Farkas and Vicknair, 1996; Hedges and Nowell, 1999; Jacobson et al., 2001; Maxwell, 1994; Neal and Johnson, 1996; O'Neill, 1990; Raudenbush and Kasim, 1998). According to this approach, one would expect that an over time decline in the gap of human capital resources between Black and White workers would bring a decline in earnings disparities between the groups.

The second explanation contends that earnings disparities between Blacks and Whites result mostly from over-concentration of minority workers in low-status and low-paying occupational labor market (e.g. Huffman, 2004; Huffman and Cohen, 2004; Kaufman, 1983, 2002; Tauber et al., 1966; Tomaskovic-Devey, 1993). According to this approach one would expect that upward occupational mobility of Black workers and over time decline in racial occupational segregation would lead to a decline in racial earning disparities.

Yet, unexpected opposing trends were observed in recent studies of change in racial earnings inequality. Despite a considerable rise in the educational level of Blacks (Jencks and Phillips, 1998; Mare, 1995) and despite a decline in occupational segregation (Farely, 1996) the Black–White earnings disparities did not decline at the rate commensurate with these changes. Some even suggest that Black–White earning gaps are no longer narrowing and they may be widening once again (e.g. Bound and Freeman, 1992; Grodsky and Pager, 2001).

These seemingly inconsistent patterns may occur if earning gaps between groups (i.e. gender, racial) are more pronounced in higher status lucrative occupations than in low-status low-paying occupations (Grodsky and Pager, 2001; Huffman, 2004; Kaufman, 1983) and in labor markets characterized by a greater dispersion of earnings (e.g. Blau and Kahn, 1996; Mandel and Semyonov, 2005). From this perspective racial inequality is not only a product of segregation across occupations but it also results from earnings inequality within occupational labor markets. According to this logic as more Blacks join lucrative high status occupations, hence attaining an occupational distribution more similar to Whites, they are likely to increasingly enter occupational labor markets in which racial income disparities are greater. This outcome may result from more intense earnings discrimination in high status occupations. Likewise, the same outcome may be observed if Blacks increasingly enter occupations in which there is high earnings dispersion and if they disproportionately enter at the bottom of the earnings distribution.

The crucial issue, however, is how the change in racial earnings inequality is related to over time changes in educational achievement and occupational distributions of the race groups. In the present paper, therefore, we intend to study change in racial earnings inequality between 1960 and 2000 while taking into account both changes in human capital attributes of Blacks and Whites and changes in the structure and composition of occupational labor markets. In light of the importance of public sector employment for minority workers and for reducing racial economic inequalities (e.g. Asher and Popkin, 1984; Blank, 1985; Collins, 1983; Eisinger, 1986; Grodsky and Pager, 2001; Maume, 1985; Zwerling and Silver, 1992) we will also examine changes in racial-linked earnings disparities separately in the public and private sectors of the economy. By so doing we intend to contribute to the literature on racial socioeconomic inequality in general and to a better understanding of trends in racial inequality in the US in particular.

2. Previous theory and research

Researchers that examined trends in racial inequality (e.g. Allen and Farley, 1986; Card and Krueger, 1992; Donohue and Heckman, 1991; Farley, 1984, 1996; Jaynes, 1998; Smith and Welch, 1989) observed a general improvement in the relative economic standing of Blacks during the second half of the 20th century. However, the rate of improvement varied considerably throughout the period. For example, Maloney (1994) suggested that Blacks' economic gains were much more pronounced during the 1940s but less so during the 1950s. Smith and Welch (1989) demonstrated that the economic convergence that started at a fast pace during the 1940s, slowed down during the 1950s and continued at even a slower rate during the 1960s and 1970s. Likewise, Jaynes (1990) observed rapid economic progress during the first three decades of the 1939–1985 period but relative stagnation after that; and Bound and Freeman (1992) argue that earnings disparities between Blacks and Whites may be widening again.¹ The researchers cited in this paragraph attribute the economic progress of the Black population to a number of factors. These factors include migration from the rural South to other regions and to urban centers, rise in education level, decline in occupational segregation, and the enactment of affirmative action policy and development of new job opportunities in government (for detailed discussion see also Allen and Farley, 1986; Farley, 1984).

Most research and commentary on the racial earnings gap in the United States follows two lines of reasoning. One approach tends to examine the labor process as a general phenomenon and focuses on factors that contribute to labor productivity and wage determination. Assuming that the labor market is sufficiently integrated, these factors are expected to explain earnings differences both with and across labor market segments. Analyses emanating from this approach underscore the importance of human capital attributes (especially education) and other factors such as cognitive ability, motivation and effort in determining earnings. It seeks to explain the racial wage gap as deriving from differences in attributes or in the ability to convert the attributes into economic outcomes. To the extent that structural characteristics are taken into account they are introduced as controls typically ignoring the variation in racial inequality across labor market segments.

¹ Several researchers (e.g. Donohue and Heckman, 1991; Heckman, 1989; Neal, 2004; Western and Pettit, 2005) argue that when selection bias of Blacks into the labor force is taken into account, the decline in the earnings gap between Blacks and Whites over the years is actually smaller than it appears to be.

Numerous studies on economic inequalities between Blacks and Whites have consistently found that Blacks are characterized by lower formal education, lower occupational status, and lower earnings than Whites (e.g. Farkas et al., 1997; Farkas and Vicknair, 1996; Fossett, 1984; Harrison and Bennett, 1995; Neal and Johnson, 1996; O'Neill, 1990; Semyonov et al., 2000). These studies further demonstrate that part of the earnings differentials between Blacks and Whites can be attributed to racial differences in both educational attainment and in occupational distribution. Part of the earnings differentials, however, could not be explained by either racial differences in educational levels and skills, or by patterns of occupational segregation between the two races. Furthermore, studies on racial inequality have repeatedly demonstrated that when compared to Whites, Blacks receive lower earning returns on their human capital resources (Farkas et al., 1997; Farkas and Vicknair, 1996; Neal and Johnson, 1996; O'Neill, 1990; Raudenbush and Kasim, 1998). The unexplained portion of the earnings gap is commonly attributed to the race factor and is often referred to in the literature as 'the portion of the earnings disadvantage that is resulting from some form of economic discrimination against the minority population'. Some researchers, however, argue that the remaining gap can be attributed, at least in part, to unmeasured differences in school quality (Hanushek and Rivkin, 2006; Neal and Johnson, 1996).

A second approach to the racial earnings gap focuses attention on occupational segregation as a central component that structures the differential earnings of Blacks and Whites. Occupational segregation emphasizes the role of occupational placement and suggests that Blacks are disproportionately represented in low status occupations while Whites tend to concentrate in upper level white-collar occupations and more profitable industries (e.g. Fossett, 1984; Fossett et al., 1986; Kaufman, 1983, 2002; Semyonov et al., 2000). Some researchers have suggested that employers are reluctant to hire Blacks for high status and lucrative jobs. Rather, they tend to employ them in low paying positions (e.g. Kaufman, 2002; Tomaskovic-Devey, 1993). Other researchers have argued that the presence of minority workers, in general, and Blacks in particular, in an occupational labor market permits employers to reduce wages of all workers and to degrade the work in such occupations (e.g. Cohen and Huffman, 2003; Huffman, 2004; Huffman and Cohen, 2004; Tomaskovic-Devey, 1993).

One difficulty with most structural analyses of racial earnings disparities is the tendency to examine average racial gaps in earnings across occupational labor markets, overlooking the possibility that the gaps vary systematically with structural characteristics of occupational labor markets. In particular, such an approach overlooks the possibility that racial earnings disparities are likely to increase with socioeconomic status of occupational labor markets. In effect researchers that view occupations as distinct labor markets have long suggested that attainment of earnings and patterns of racial inequality are differentially determined across occupations. They also suggest that structural characteristics of occupational labor markets interact with attributes of individuals in the determination of earnings and wages (e.g. Cohen and Huffman, 2003; Grodsky and Pager, 2001; Huffman, 2004; Huffman and Cohen, 2004; Kaufman, 1983). That is, patterns of earnings determination and patterns of earnings inequality differ across occupational labor market. Furthermore, a series of studies have demonstrated that racial earnings inequality is strongly influenced by the race and sex composition of occupational labor markets. Presence of minority workers or of women in occupational labor markets is likely to depress earnings of all incumbents. Concomitantly, the higher the proportion of minority workers (or women) in an occupation the larger are the earnings disparities between minority and majority group workers (e.g. Cohen and Huffman, 2003; Huffman, 2004; Huffman and Cohen, 2004).

Both the human capital approach and the occupational segregation approach have contributed considerably to understanding of the working of the labor market in general and the determination of the differential wages earned by Blacks and Whites, in particular. Yet, neither approach has provided a satisfactory explanation for the persistent racial wage gap in the American labor force during the second half of the 20th century. While historically occupational segregation has been extreme and probably accounted for a substantial portion of Black-White earnings' disparities recent decades have witnessed a significant decline in occupational segregation as large numbers of Black men entered technical, professional and managerial occupations (Farely, 1996). Yet, as occupational segregation declined rather rapidly the earnings of Blacks remained behind those of Whites and during the 1980s the gap even widened (Bound and Freeman, 1992). Likewise, human capital factors and demographic attributes that have changed over the years do not seem to provide a clear answer to this phenomenon.

In an attempt to resolve these apparent discrepancies Grodsky and Pager (2001) built on the insights of earlier work by Kaufman (1983). They set out to investigate the relationship between occupations and racial earnings inequality. Using data for 1990 they conducted cross-sectional analysis of occupational labor markets and found that in the private sector racial wage disparities increase as one moves up the earnings hierarchy. This is not the case for the public sector where racial inequality is related more to differences in individuals' human capital and the type of occupation they are in. Furthermore, when they controlled for individual-level attributes they found that occupational-level characteristics explained very little variation in the wage gap across occupations (Grodsky and Pager, 2001, columns 3 and 4 in Table 3, p. 558). They also show that the racial gap in earnings is substantially smaller in the public sector than in the private sector. This raises the need to examine over time trends in racial earnings inequality separately in the private and public economic sectors.

To be sure, the sociological literature has long demonstrated that racial inequalities differ across the two economic sectors (e.g. Blank, 1985; Grodsky and Pager, 2001; Lewin-Epstein and Semyonov, 1994). In particular, the literature suggests that racial inequalities are less evident in the public sector of the economy than in the private sector. The public sector is more open to minorities due to its bureaucratic and political nature and its grater commitment to universalistic criteria of recruitment and promotion. It is also more likely to adopt and enforce affirmative action policies and formal criteria and regulations (e.g. Blank, 1985; Eisinger, 1986; Zwerling and Silver, 1992). Therefore, the public sector has become a preferred locus of employment for ethnic minorities in liberal economies in general and for Blacks in the US in particular (e.g. Collins, 1983).

According to Collins (1983) most professional and managerial (highly-paid) jobs for Blacks were created through government programs at the local, state and federal government while Blacks' employment in the private sector "remains concentrated in economically underdeveloped area or in intermediary positions" (1983, p. 379). Indeed, the research on the issue reveals that Blacks in the US achieve higher status jobs in the public sector than in the private sector, and that they are less likely to suffer from economic discrimination in the public sector (Asher and Popkin, 1984; Eisinger, 1986; Maume, 1985; and see especially Grodsky and Pager, 2001).

The aim of our research, then, is to examine dynamics of racial earnings inequality in the US between 1960 and 2000 while focusing on the following research questions: first, whether and to what extent earnings disparities between Black and White men have narrowed between 1960 and 2000 (when changes in both the composition of the populations and their distribution across the occupational structure are taken into consideration). Second, whether the rise in the education of Blacks (hence, narrowing Black–White education gaps) was accompanied by a differential ability of Whites and Blacks to exploit their educational achievements. Third, whether earnings disparities between Blacks and Whites are associated with characteristics of the occupational labor markets; specifically, whether such gaps are more pronounced in high status occupations than in low status occupations and in occupations characterized by higher earnings inequality among incumbents. Fourth, whether trends and patterns of racial earnings inequality differ between the public and the private sectors of the economy. Answers to these questions will provide a clearer picture of the social mechanisms underlying the dynamics of racial earnings inequality in the United States following the enactment of the Civil Rights Act and the implementation of affirmative action policy.

3. Data and methodology

3.1. Data sources and variables

Data for the present study were obtained from the Integrated Public Use Microdata Series (IPUMS) for the five decennial census years between 1960 and 2000. The IPUMS contains compatible-format individual-level representative samples of the US population.² The advantage of the IPUMS data set over separate PUMS data files is that it assigns uniform codes across all the samples and brings relevant documentation into a coherent form to facilitate analysis of long time trends of social and economic change in the American population. It is important to further emphasize that both earnings data and occupational codes were adjusted and standardized across decennial years to enable comparability across years. Each of the decennial samples is independent and it is impossible to identify individuals from one decennial census to another.

The population included in the analysis is the civilian (non-farm and non-military) male Black and White labor force age 25–64 with reported earnings in the years 1959, 1969, 1979, 1989 and 1999. The reason for focusing on the male labor force is threefold: first, gender composition of the labor force changed substantially in the last half century with the rising labor force participation of women; second, the patterns and sources of racial inequality among women differ considerably from those among men and deserve separate analyses; and third, the studies to which we intend to compare our results all focused on the male workers. In other words, since researchers have long demonstrated that sources and patterns of racial inequality among women differ considerably from sources of racial earnings inequality among men (for a review article on the intersection between race and gender see Browne and Misra (2003), for empirical illustration see McCall (2001), and see Neal (2004), about differential selection processes into the labor force), the research reported here focuses only on changes in earnings inequality between Black and White men.

The selection procedure resulted in 271,777 sampled cases in 1960, 325,324 sampled cases in 1970, 352,195 sampled individuals in 1980, 402,033 sampled cases in 1990 and 423,519 respondents in the 2000 sample. The pooled data set, over all time points, includes a sample of 1774,848 economically active individuals.

The variables selected for the analysis are those commonly used in models predicting earnings. They include: race (Black = 1), age (in years), marital status (married = 1), immigrant status (born in the US = 1), region of residence (4 major regions), education (as a set of dummy variables distinguishing among three categories: under high school education; high school and incomplete college; academic degree), hours work (per week), number of weeks working last year, and occupation (according to the 1950 3-digit standard occupational classification).³ The dependent variable – annual earnings – was defined in 1950 constant dollars (adjusted for inflation) transformed to a logarithmic scale.⁴

² The analysis reported here focuses on the following five decennial censuses: 1960 (general sample), 1970 (from 2 metro samples), 1980 (1% metro sample), 1990 (1% metro sample), and 2000 (1% census sample). Although 5% samples were available for the latter years (i.e. 1980, 1990, 2000), only 1% samples are available for 1960 and 1970. Since the numbers of cases in the latter censuses are considerably larger than in early censuses, comparing 5% and 1% samples may further unbalance the analytical design. For the sake of consistency, thus, we used 1% in all years.

³ It should be noted that there is also a possibility to use 1990 3-digit occupational classification as the base for standardization. Our decision to use 1950 classification as the base for standardization stems from our understanding that the 1990 classification is preferable for later years but not for the 1960 and 1970 censuses and that sensitivity testing suggests that OCC1990 performs very similarly to OCC1950 for most purposes. Indeed, our own testing confirms this expectation. The correlations between occupational socioeconomic status scores (SEI scores) that were assigned to individuals based on the 1950 classification and based on the 1990 classification exceed 0.9 in each of the decennial censuses. Specifically, we obtained the following correlations: for 1960, $r = 0.915$; for 1970, $r = 0.913$; for 1980, $r = 0.924$; for 1990, $r = 0.920$; for 2000, $r = 0.904$.

⁴ We also estimated models for earnings measured in raw dollar terms, and transformed into a 100-point ranking distribution. The analyses lead to similar conclusions to those reported here.

Occupations were classified according to the 3-digit standard occupational classification codes. We limited the analysis to occupational categories that include at least 10 individuals belonging to a racial group (several small similar occupational categories were combined to create a unified category). This procedure resulted in 116 occupational categories.⁵ Each of the occupational categories was characterized with regard to several occupational labor market attributes. These include socio-economic status of the occupation (measured on Duncan's socioeconomic index scale); occupational earnings inequality (measured by the share of earnings received by the top 25% of the incumbents); racial composition of the occupation (percent Blacks employed in the occupational category); and gender composition of the occupation (percent women employed in the occupational category).⁶ The four occupational attributes provide the labor market context that according to the literature is expected to affect earnings as well as earnings inequality. The structure of individual employees nested in occupational labor markets lends itself to hierarchical linear modeling where earnings and earnings inequality between Blacks and Whites are estimated as a function of individual-level and occupational attributes at different points in time between 1960 and 2000. For a detailed list of variable definitions and measures see [Appendix A](#).

3.2. Methodology

Since individuals are embedded in occupational labor markets the analytic strategy we employ involves the estimation of two-level hierarchical models. At the individual-level we assess the contribution of demographic and market-relevant attributes to earnings within occupational categories. Occupations serve as the second-level variables that influence earnings above and over the individual-level attributes. According to the theoretical discussion the occupational characteristics that are especially important in the determination of earnings are the socioeconomic status, occupational earnings inequality, and race and sex composition of the occupational labor market.

By partitioning the earnings variance into within and between-occupation components it is possible to evaluate whether there is systematic variation in the relationships between occupations, race and earnings. Specifically, using this strategy we aim to assess the extent to which racial earnings inequality is correlated with occupational attributes net of individual-level characteristics.

The two-level model can be represented by a set of equations that capture the individual-level and occupation-level determinants of wages. The individual-level relationships are modeled according to the following equation:

$$y_{ij} = \beta_{0j} + \beta_{kj}x_{kij} + \varepsilon_{ij}, \quad (1)$$

where y_{ij} is the logarithmic transformation of wage for the i th individual in occupation j . β_{0j} is the intercept for occupation j , x_{kij} is the value of the k th variable for individual i in occupation j , β_{kj} is a corresponding vector of coefficients, and ε_{ij} is a disturbance term assumed to be random normal with a mean of 0 and variance σ^2 .

The set of intercepts from the individual-level model serves as a dependent variable in the second-level – occupational labor market equation which takes the following form:

$$\beta_{0j} = \gamma_{00} + \gamma_{0l}z_{lj} + v_{0j}, \quad (2)$$

where j indexes occupations and β_{0j} is the intercept term from the individual-level equation. It represents the average occupational earnings adjusted for individual attributes. γ_{00} is the across occupations intercept, z_{lj} is a vector (l) of occupational-level characteristics, γ_{0l} is a vector of corresponding coefficients, and v_{0j} is an occupation-specific disturbance term assumed to be randomly distributed. To this model we also added interaction terms between individual's race and education. The above equations are estimated simultaneously using maximum likelihood estimation techniques and generate the β and γ coefficients.

As our aim was also to evaluate the extent to which occupational attributes affected the relationship between individual-level characteristics (specifically race) and earnings we also estimate the slope from the individual-level model as a dependent variable. The slope as an outcome model is formally defined as

$$\beta_{1j} = \gamma_{10} + \gamma_{11}z_{lj} + v_{1j}, \quad (3)$$

where γ_{10} is the constant, γ_{11} represents the effects of occupational-level attributes on the slope, and v_{1j} is an error term pertaining to occupation differences in the effects of individual-level variables on earnings that are not attributable to specific occupational-level variables. The three equations are estimated simultaneously using maximum likelihood estimation techniques (HLM statistical package) to generate the β and γ coefficients.

Since our aim is to examine the dynamics of racial earning gaps over the latter part of the 20th century and since the racial and gender composition of occupations have changed significantly over the last half century we add the time dimension by pooling the occupation categories for the five time periods (1960–2000). The pooled file includes 580 (116×5 , occu-

⁵ The list of occupations and codes are available from the authors upon request.

⁶ Occupational labor market attributes thus reflect national averages. We are aware, of course, that specific occupations may vary in their racial (or gender) composition across places and that racial composition may exert differential effects on inequality across local labor markets (e.g. [Cohen and Huffman, 2003](#); [Huffman and Cohen, 2004](#)). However, the samples are not large enough to allow further breakdown of occupations by geographical areas. In our analysis we control for regional variations while operating under the premise that occupational characteristics exert similar effects on racial earnings inequality across regional labor markets.

patation by year) categories. In essence occupational characteristics vary over time and the year is entered as an additional variable in the second-level model. The interaction between census year and race permits an evaluation of changes over time net of other characteristics of individuals and net of the change in the racial and gender composition of occupations. For this purpose we extend the above models to include dummy variables for census year in the equation for the intercepts (Eq. (2)) as well as the equation for the slope (Eq. (3)). The models then take on the following form:

$$\beta_{0j} = \gamma_{00} + \gamma_{0i}z_{ij} + \delta_{0m}t_m + v_{0j}, \quad (4)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{1i}z_{ij} + \delta_{1m}t_m + v_{1j}, \quad (5)$$

where t is a vector (m) of dummy variables representing census year and δ_{1m} is a vector of corresponding coefficients.

4. Findings

Table 1 displays the characteristics of the White and Black male labor force in the US at five decennial points between 1960 and 2000. Specifically, the table lists the socio-demographic and labor market related attributes of the economically active populations and the characteristics of the occupations in which they are employed by race. The data reveal considerable differences between Blacks and Whites throughout the entire period. In all points of time, economically active Black men are slightly younger than White men, they are less likely to be married and they tend to work shorter hours and weeks. Black men are characterized by lower level of formal education (the gap is especially evident with regard to academic education), they are employed in occupations of lower socioeconomic status, and they earn less money than Whites.

It is also evident from the figures listed in Table 1 that the characteristics of both race groups have changed over the years. Especially evident is the rise in educational level, upward occupational mobility, and increase in earnings levels. The data also reveal that the gaps between Blacks and Whites have narrowed over the period of study. Although the gaps in education have declined the race disparity in academic education has remained quite substantial; the gap in occupational status had steadily declined from .51 (19.84/38.87) in 1960 to .77 (35.67/46.45) in 2000; and the earnings disparities declined from .57 in 1960 to .69 in 1980 but leveled off thereafter (.67 in both 1990 and 2000). It appears therefore that the relative educational and occupational achievements of the Black population of the US were not been fully converted into similar earnings gains.

While the descriptive statistics provide a useful overview of the labor market characteristics of Blacks and Whites and how they have changed over time, they do not directly shed light on the sources of the earnings gaps between the two groups. Furthermore, one cannot determine from the observed earnings to what extent changes in the racial earnings gap are associated with shifts in the occupational distribution. In the analysis that follows, therefore, we estimate a series of hierarchical linear models to predict earnings of individuals as a function of their race while controlling for both individual-level socio-demographic characteristics and occupational-level characteristics. In the two-level models estimated here, the dependent variable is the logarithmic transformation of earnings. The individual-level independent variables include, in addition to race, socio-demographic and labor force characteristics traditionally used to predict earnings. The occupational-level variables are represented by occupational status, occupational earnings inequality and percent Blacks and per-

Table 1

Descriptive statistics: mean (standard deviation) or percent of the variables included in the analysis by race and year.

	1960		1970		1980		1990		2000	
	White	Black	White	Black	White	Black	White	Black	White	Black
<i>Individual-level variables</i>										
Age	42.01 (10.62)	41.38 (10.40)	42.45 (10.97)	41.80 (10.84)	41.03 (11.15)	40.01 (10.89)	40.70 (10.38)	39.89 (10.18)	42.42 (10.05)	41.19 (9.78)
Marital status (married)	89%	80%	88%	77%	81%	67%	76%	59%	72%	56%
Place of birth (USA)	93%	98%	94%	97%	96%	96%	96%	93%	96%	90%
High school (12–15 years of schooling)	37%	19%	46%	32%	54%	51%	61%	66%	61%	71%
Academic (16+ years of schooling)	12%	4%	17%	6%	27%	12%	29%	15%	32%	18%
Work hours	42.80 (5.05)	41.38 (10.40)	42.74 (5.12)	41.23 (4.87)	43.25 (9.40)	40.28 (9.73)	44.34 (9.99)	41.48 (9.68)	45.01 (10.18)	42.33 (10.10)
Weeks working last year	48.06 (7.54)	45.65 (10.04)	49.08 (6.09)	47.89 (7.66)	48.59 (7.17)	47.11 (9.28)	48.40 (7.72)	46.71 (10.15)	48.77 (7.26)	47.12 (9.76)
Earnings	33,073 (18,563)	18,878 (10,231)	43,838 (26,544)	27,613 (15,250)	45,153 (27,297)	31,192 (18,850)	45,890 (37,199)	30,857 (22,005)	50,132 (49,858)	33,614 (29,603)
<i>Occupational-level variables</i>										
SEI of occupation	38.87 (22.73)	19.84 (15.69)	41.83 (23.51)	25.30 (18.69)	45.13 (24.22)	30.88 (21.91)	45.06 (24.63)	32.75 (22.78)	46.45 (24.61)	35.67 (23.53)
Earnings inequality	0.40 (0.05)	0.40 (0.04)	0.40 (0.04)	0.39 (0.03)	0.42 (0.04)	0.42 (0.03)	0.45 (0.05)	0.44 (0.04)	0.47 (0.06)	0.46 (0.05)
Percent of Blacks in occupation	0.07 (0.08)	0.20 (0.16)	0.08 (0.07)	0.15 (0.10)	0.09 (0.06)	0.14 (0.08)	0.08 (0.05)	0.12 (0.06)	0.09 (0.05)	0.12 (0.05)
Percent of women in occupation	0.18 (0.21)	0.19 (0.24)	0.22 (0.22)	0.26 (0.25)	0.26 (0.22)	0.30 (0.25)	0.31 (0.22)	0.34 (0.25)	0.33 (0.23)	0.35 (0.25)
N	249,601	22,176	297,280	28,044	320,227	31,968	368,925	33,108	384,519	39,000

cent women in each occupation. The effect of race, thus, represents the earnings disadvantage (or advantage) due to race net of socio-demographic characteristics and occupational composition.

In Table 2 we display coefficient estimates of three regression models for each decennial year. In model 1 earnings of individuals are predicted as a function of race, while controlling for other individual-level characteristics. In model 2 we also control for occupational attributes. In model 3 we also include interaction terms between race and education, race and occupational status and race and occupational inequality. The interaction terms permit us to estimate the extent to which Blacks and Whites are differentially rewarded on their educational credentials and the extent to which earnings gaps between Blacks and Whites tend to increase with occupational status and with occupational earnings inequality.

In all models and in all time points, Blacks' earnings are significantly lower than Whites' earnings as evident from the negative coefficient for race. The negative coefficients imply that throughout the second half of the 20th century the market disadvantage of Blacks, relative to Whites, was greater than what would be expected on the basis of differences in their market-relevant attributes. It should be noted, however, that the impact of race on earnings has steadily declined between 1960 and 2000 (model 2 in the various time points). In the 1960 equation the net earnings disadvantage associated with being Black was almost 24% (e.g. $b = -.239$) and in the 2000 equation the net earnings disadvantage of Blacks declined to less than 6% (e.g. $b = -.058$ in Eq. (2)). The data also suggest that the reduction of the net earning disadvantage associated with being Black appears not to be linear. The change is much more pronounced between 1960 and 1970 and between 1970 and 1980 than after 1980.

In addition, it is also worth noting that the effects of most individual-level and occupational-level variables on earnings remain quite similar across time. Earnings are likely to increase with education, age, hours of work⁷ and weeks of work and to be higher among married men. The coefficients for the occupational-level variables reveal that in all points in time earnings are likely to be higher in high status occupational labor markets and are generally lower in occupations characterized by high proportion of women and Blacks and with greater overall earnings inequality.

The interaction terms in Eq. (3) do not reveal clear trends over the years. In general educational credentials, especially academic degree, provide Black men with higher earnings returns in comparison to White men in all time points (except for 2000 when the interaction between race and education is not statistically significant). The interaction term between race and occupational socioeconomic status is negative and significant only in 1960 (only in 1960 were the earning penalties for Blacks more pronounced in higher status occupational labor markets). Although the interaction term between race and occupational earnings inequality is negative in all equations (indicating that earnings gaps between Blacks and Whites tend to be more pronounced in occupational labor markets characterized by higher rates of earnings inequality) the negative effect is statistically significant only in 1960 and in 1970.

The decline in the effect of race on earnings over time is of considerable interest. Nevertheless, it would be premature to conclude from the models presented in Table 2 (estimated separately for each decennial year) that earnings inequalities between Whites and Blacks in the US have actually declined throughout the second half of the 20th century. This caution is of special importance since both the composition of the populations and the composition of occupations have changed over time. Thus, in order to provide a more comprehensive and systematic examination of the extent to which earnings inequality between Blacks and Whites in the US had significantly changed between 1960 and 2000 we pooled the data for the five points in time and created a combined data file. The pooled file includes 1774,848 observations at the individual-level and 580 (116×5) observations at the occupational-level.

Using this pooled data set we estimated a number of hierarchical linear models predicting earnings as a function of race, individual-level and occupational-level variables and time. The estimated coefficients of these models are displayed in Table 3. We start out with a model that assumes that earnings are a function of the individual's characteristics alone and their effects on earnings are uniform across time (model 1).⁸ In model 2 we include, in addition to the individual-level variables, occupational-level variables and time indicators represented by dummy variables for census years, and interaction terms between race and year. This specification permits us to evaluate whether the effect of race on earnings had changed over time net of occupational attributes.⁹ In model 3 we also introduce interaction terms between education and race, occupational socioeconomic status and race and occupational earnings inequality and race. The first interaction term examines whether Blacks and Whites receive differential earnings returns on their education. The second interaction tests the hypothesis that Blacks' earnings penalty is more pronounced in the high status occupational labor markets. The third interaction term tests the hypothesis that the earnings penalty experienced by Black men is more pronounced in occupational labor markets characterized by higher levels earnings inequality.

The effects of the individual-level and occupational-level variables on (log) earnings are shown in columns 1, 2 and 3 of Table 3 and are consistent, for the most part, with the findings observed earlier in Table 2. That is, earnings are likely to be higher among married men and among individuals born in the United States. Earnings tend to rise with age, education, hours of work and weeks of work. The occupational-level effects reveal that earnings tend to rise with socioeconomic status of occupations and to decline with proportion of Blacks and women in the occupation. Earnings tend to decrease as within

⁷ The models were also estimated without hours of work included among the predictors. The results hardly change whether hours of work are included or not in the set of predictors. The results are available from the authors upon request.

⁸ The effect of race in this equation should be interpreted, thus, as the average net advantage or disadvantage due to race during this period.

⁹ The effect of year was also estimated as a linear function (measured on a 5-point scale in Eq. (1)) and with a curve-linear specification (year plus year squared in Eq. (2)). The analysis resulted in similar conclusions to those reported here.

Table 2

Coefficients (standard errors) obtained from bi-level regressions of logarithm of earnings on individual-level and occupation-level variables by year of survey.

	1960			1970			1980			1990			2000		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	10.005 [*] (0.025)	10.005 [*] (0.022)	10.007 [*] (0.023)	10.206 [*] (0.022)	10.203 [*] (0.017)	10.210 [*] (0.017)	10.166 [*] (0.025)	10.167 [*] (0.020)	10.169 [*] (0.020)	10.106 [*] (0.023)	10.109 [*] (0.017)	10.107 [*] (0.018)	10.100 [*] (0.024)	10.098 [*] (0.016)	10.095 [*] (0.017)
<i>Individual-level variables^{1,2}</i>															
Age	0.042 [*] (0.003)	0.042 [*] (0.003)	0.042 [*] (0.003)	0.048 [*] (0.003)	0.048 [*] (0.004)	0.048 [*] (0.003)	0.068 [*] (0.004)	0.068 [*] (0.004)	0.068 [*] (0.004)	0.068 [*] (0.004)	0.068 [*] (0.004)	0.068 [*] (0.004)	0.059 [*] (0.004)	0.059 [*] (0.004)	0.059 [*] (0.004)
Age ² × 10	-0.004 [*] (0.001)	-0.004 [*] (0.001)	-0.004 [*] (0.001)	-0.005 [*] (0.001)	-0.005 [*] (0.001)	-0.005 [*] (0.001)	-0.007 [*] (0.001)	-0.007 [*] (0.001)	-0.007 [*] (0.001)	-0.007 [*] (0.001)	-0.007 [*] (0.001)	-0.007 [*] (0.001)	-0.006 [*] (0.001)	-0.006 [*] (0.001)	-0.006 [*] (0.001)
Marital status (married)	0.204 [*] (0.010)	0.204 [*] (0.010)	0.204 [*] (0.010)	0.187 [*] (0.007)	0.187 [*] (0.007)	0.187 [*] (0.007)	0.168 [*] (0.008)	0.168 [*] (0.008)	0.168 [*] (0.008)	0.163 [*] (0.007)	0.163 [*] (0.007)	0.163 [*] (0.007)	0.172 [*] (0.008)	0.172 [*] (0.008)	0.172 [*] (0.008)
Place of birth (USA)	0.001 (0.012)	0.001 (0.012)	0.001 (0.012)	0.027 (0.011)	0.027 (0.012)	0.028 (0.012)	-0.004 (0.007)	-0.004 (0.007)	-0.003 (0.007)	-0.037 [*] (0.007)	-0.037 [*] (0.007)	-0.037 [*] (0.007)	-0.015 (0.011)	-0.015 (0.011)	-0.015 (0.011)
<i>Education³</i>															
High school	0.120 [*] (0.009)	0.118 [*] (0.009)	0.115 [*] (0.010)	0.133 [*] (0.009)	0.131 [*] (0.009)	0.127 [*] (0.008)	0.164 [*] (0.009)	0.162 [*] (0.009)	0.159 [*] (0.010)	0.197 [*] (0.010)	0.195 [*] (0.010)	0.195 [*] (0.010)	0.184 [*] (0.009)	0.187 [*] (0.009)	0.191 [*] (0.009)
Academic (16+ years of schooling)	0.224 [*] (0.20)	0.228 [*] (0.20)	0.221 [*] (0.21)	0.254 [*] (0.019)	0.261 [*] (0.019)	0.256 [*] (0.020)	0.280 [*] (0.021)	0.279 [*] (0.021)	0.274 [*] (0.021)	0.331 [*] (0.023)	0.330 [*] (0.023)	0.325 [*] (0.024)	0.335 [*] (0.021)	0.341 [*] (0.020)	0.337 [*] (0.021)
Work hours	0.003 [*] (0.001)	0.003 [*] (0.001)	0.003 [*] (0.001)	0.003 [*] (0.001)	0.003 [*] (0.001)	0.003 [*] (0.001)	0.008 [*] (0.001)	0.008 [*] (0.001)	0.008 [*] (0.001)	0.013 [*] (0.001)	0.013 [*] (0.001)	0.013 [*] (0.001)	0.017 [*] (0.001)	0.017 [*] (0.001)	0.017 [*] (0.001)
Weeks working last year	0.035 [*] (0.001)	0.035 [*] (0.001)	0.035 [*] (0.001)	0.034 [*] (0.001)	0.034 [*] (0.001)	0.034 [*] (0.001)	0.035 [*] (0.001)	0.035 [*] (0.001)	0.035 [*] (0.001)	0.036 [*] (0.001)	0.036 [*] (0.001)	0.036 [*] (0.001)	0.034 [*] (0.001)	0.034 [*] (0.001)	0.034 [*] (0.001)
Race (Black)	-0.244 [*] (0.014)	-0.239 [*] (0.014)	-0.278 [*] (0.017)	-0.203 [*] (0.012)	-0.201 [*] (0.012)	-0.222 [*] (0.014)	-0.110 [*] (0.010)	-0.111 [*] (0.010)	-0.132 [*] (0.014)	-0.078 [*] (0.010)	-0.079 [*] (0.010)	-0.081 [*] (0.018)	-0.059 [*] (0.009)	-0.058 [*] (0.010)	-0.046 [*] (0.018)
<i>Interaction terms</i>															
Race × high school			0.046 [*] (0.015)			0.042 [*] (0.011)			0.027 (0.010)			0.013 (0.015)			-0.014 (0.014)
Race × academic	-	-	0.118 [*] (0.028)	-	-	0.053 [*] (0.018)	-	-	0.059 [*] (0.017)	-	-	0.070 [*] (0.023)	-	-	0.041 (0.023)
Race × SEI × (10)			-0.002 [*] (0.001)			0.001 (0.001)			-0.001 (0.001)			0.001 (0.001)			-0.001 (0.001)
Race × earnings inequality	-	-	-0.799 [*] (0.312)	-	-	-0.938 [*] (0.295)	-	-	-0.384 (0.218)	-	-	-0.107 (0.193)	-	-	-0.217 (0.173)
<i>Occupation-level variables⁴</i>															
SEI	-	0.004 [*] (0.001)	0.004 [*] (0.001)		0.005 [*] (0.001)	0.005 [*] (0.001)		0.004 [*] (0.001)	0.004 [*] (0.001)		0.004 [*] (0.001)	0.005 [*] (0.001)		0.006 [*] (0.001)	0.006 [*] (0.001)
% of Black	-	-0.337 [*] (0.114)	-0.343 [*] (0.121)	-	-0.296 [*] (0.148)	-0.269 (0.143)	-	-0.225 (0.151)	-0.201 (0.151)	-	-0.330 (0.179)	-0.238 (0.176)	-	-0.573 [*] (0.198)	-0.536 [*] (0.201)
% of woman	-	-0.187 [*] (0.037)	-0.196 [*] (0.037)		-0.175 (0.039)	-0.172 (0.039)		-0.180 (0.054)	-0.186 [*] (0.054)		-0.214 [*] (0.052)	-0.237 [*] (0.048)		-0.244 [*] (0.042)	-0.249 (0.043)
Earnings inequality	-	-0.678 [*] (0.262)	-0.324 (0.272)	-	-0.485 [*] (0.244)	-0.183 [*] (0.247)	-	-2.207 [*] (0.357)	-1.940 [*] (0.374)	-	-1.516 [*] (0.289)	-1.414 [*] (0.274)	-	-1.179 [*] (0.209)	-0.996 [*] (0.210)
<i>Variance component</i>															
Occupation-level random effects - u_0	0.05388	0.02457	0.02595	0.04013	0.01534	0.01555	0.05127	0.02068	0.02101	0.04583	0.01636	0.01724	0.05188	0.01224	0.01311
Individual-level random effect - r	0.23597	0.23597	0.23589	0.27898	0.27897	0.27891	0.38786	0.38787	0.38783	0.35670	0.35671	0.356590	0.38415	0.38415	0.38410
r(intercept, race)			-0.204			-0.296			-0.522			-0.677			-0.522

¹ The slopes of the variables: education and race have been allowed to vary across occupations. These variables (dummy variables) are uncentered. The slopes of the other individual-level variables are constrained to be identical across 116 units. Age and work hours are centered around their grand mean. The dummy variables are uncentered.

² Controlling for geographical region (the coefficients are not presented).

³ Omitted category: less than 12 years of schooling.

⁴ The level-2 predictors have been centered around their grand mean.

* $p < 0.05$ (two-tailed).

Table 3

Coefficients (standard errors) obtained from bi-level regressions of logarithm of earnings on individual-level and occupation-level variables.

	(1)	(2)	(3)
Intercept	10.104 [*] (0.021)	10.122 [*] (0.014)	10.121 [*] (0.014)
<i>Individual-level variables^{1,2}</i>			
Age	0.059 [*] (0.002)	0.059 [*] (0.002)	0.059 [*] (0.002)
Age ² × 10	−0.006 [*] (0.001)	−0.006 [*] (0.001)	−0.006 [*] (0.001)
Marital status (married)	0.180 [*] (0.004)	0.180 [*] (0.004)	0.180 [*] (0.004)
Place of birth (USA)	−0.007 (0.005)	−0.006 (0.005)	−0.006 (0.005)
Work hours	0.011 [*] (0.001)	0.011 [*] (0.001)	0.011 [*] (0.001)
Weeks working last year	0.035 [*] (0.001)	0.035 [*] (0.001)	0.035 [*] (0.001)
<i>Education³</i>			
High school	0.160 [*] (0.005)	0.158 [*] (0.005)	0.155 [*] (0.005)
Academic	0.286 [*] (0.010)	0.288 [*] (0.010)	0.281 [*] (0.010)
Race (Black)	−0.131 [*] (0.006)	−0.048 (0.009)	−0.058 [*] (0.010)
<i>Interaction terms</i>			
Race × high school	—	—	0.027 [*] (0.0067)
Race × academic	—	—	0.076 [*] (0.010)
Race × SEI × (10)	—	—	−0.004 (0.002)
Race × earnings inequality	—	—	−0.507 [*] (0.107)
Race × 1960	—	−0.202 [*] (0.018)	−0.210 [*] (0.018)
Race × 1970	—	−0.147 [*] (0.015)	−0.155 [*] (0.015)
Race × 1980	—	−0.054 [*] (0.014)	−0.069 [*] (0.014)
Race × 1990	—	−0.024 (0.014)	−0.027 [*] (0.013)
<i>Occupation-level variables⁴</i>			
SEI	—	0.005 [*] (0.001)	0.005 [*] (0.001)
% of Black	—	−0.300 [*] (0.066)	−0.275 [*] (0.066)
% of woman	—	−0.206 [*] (0.021)	−0.212 [*] (0.021)
Earnings inequality	—	−1.366 [*] (0.127)	−1.103 [*] (0.132)
<i>Year of survey⁵</i>			
1960	−0.161 [*] (0.027)	−0.174 [*] (0.020)	−0.170 [*] (0.020)
1970	0.074 [*] (0.026)	0.051 [*] (0.019)	0.054 [*] (0.018)
1980	0.082 [*] (0.028)	0.049 [*] (0.019)	0.053 [*] (0.019)
1990	0.021 (0.028)	0.004 (0.018)	0.003 (0.018)
<i>Variance component</i>			
Occupation-level random effects – u_0	0.05445	0.02040	0.02116
Individual-level random effect – r	0.34087	0.34088	0.34082
r (intercept, black)	−0.307	−0.379	−0.422

¹ The slopes of the variables: education, race and the interactions between them have been allowed to vary across occupations. These variables (dummy variables) are uncentered. The slopes of the other individual-level variables are constrained to be identical across 116 units. Age and work hours are centered around their grand mean. The dummy variables are uncentered.

² Controlling for geographical region and year of survey (the coefficients are not presented).

³ Omitted category: less than 12 years of schooling.

⁴ The level-2 predictors have been centered around their grand mean. Dummy variables (year of survey) are uncentered.

⁵ Omitted category: 2000.

* $p < 0.05$ (two-tailed).

occupation earnings inequality increases. The effects of all four occupational-level variables were, indeed, significant and in the expected direction.

Race exerts a significant negative net impact on earnings. The negative coefficient for the race in equation 1 ($b = -.131$) implies that on average Black men earn approximately 13% less than comparable Whites during this period. However, the interaction terms between the dummy variables representing specific years and race in Eqs. (2) and (3) demonstrate that the decline in Blacks' earnings disadvantage was substantial between 1960 and 1980 but it leveled off after 1980. More specifically, Eq. (2), suggests that in 1960 Blacks' earnings penalty was 25% ($-.202 + -.048$); it declined to 10.2% in 1980 and to 7.2% and 4.2% in 1990 and 2000, respectively. While the earnings gap has narrowed substantially during this period the rate of decline slowed down considerably. Apparently, the decline in racial earnings inequality was not linear, and for all practical purposes, the decline had leveled off after 1980. It should also be noted that in 2000 a non-trivial portion of the White–Black earnings disparities still could not be attributed to social and demographic attributes of the populations. Nor could it be attributed to differences in characteristics of the occupational labor markets in which Blacks and Whites are employed.¹⁰

The interaction terms between race and education in Eq. (3) enable us to examine the extent to which Blacks and Whites are differentially rewarded on attainment of higher education. The findings suggest, rather forcefully, that other things being equal, Blacks receive higher returns than Whites on educational credentials. The higher earnings returns on education of Blacks as compared to Whites amount to 2.7% ($b = .027$) in the case of high school education (as compared to low education) and to approximately 7.5% ($b = .076$) in the case of academic education (as compared to low education). It should be noted that by 2000 Blacks academics were able to close the earnings gap with Whites while racial disparities still remained among those with lower educational levels. This finding is consistent with the argument advanced by Lang and Manove (2006) who suggested that in higher levels of education earnings returns of Blacks exceed those of Whites.¹¹

The interaction term between race and occupational socioeconomic status (SEI) and race and occupational earnings inequality were introduced to Eq. (3) in order to examine the hypothesis that racial disparities in earnings vary across occupational labor markets. More specifically, the interaction terms were included in the set of predictors to examine the hypotheses that racial earnings disparities tend to be more pronounced in occupational labor markets characterized by high socioeconomic status (or earnings) and high levels of earnings inequality. The interaction term between race and occupational SEI is negative but slightly below conventional standard of statistical significance ($b = -.004$). Therefore, this finding cannot support the hypothesis that earnings penalties for Blacks are more pronounced in high status occupations.

The negative and significant interaction coefficient ($b = -.507$) between race and occupational earnings inequality, however, lends firm support for the hypotheses that Blacks' earnings penalties are more pronounced in occupations characterized by higher levels of earnings inequality. More specifically, the findings indicate that throughout the second half of the 20th century the earnings penalty experienced by Black men in the American labor market tend to be more pronounced in occupational labor markets characterized by high levels of earnings inequality but not as much in high status occupations.

5. Racial disparities in the public and private sectors

At the outset of this paper we suggested that racial inequalities may differ across economic sectors. Specifically, the literature on the topic has observed that racial inequalities are less pronounced in the public sector than in the private sector of the economy. Thus, the analysis presented in this section is set to examine trends in racial earnings inequality separately in the public and private sectors of the economy in order to examine the hypothesis that the decline in earnings inequality throughout the second half of the 20th century was more evident in the public sector than in the private sector. For this purpose two regression equations were estimated, respectively, for each economic sector. Eq. (1) includes only individual-level variables as predictors of earnings (using data that were pooled for the five time points). Eq. (2) includes in, in addition to the individual-level predictors of earnings, a series of dummy variables representing the five time points, occupational-level variables (SEI, occupational earnings inequality, sex composition, race composition) and interactions between race and education, race and occupational SEI, race and occupational earnings inequality and race and time.

The findings displayed in Table 4 suggest that in general the effects of both the individual-level and the occupational-level variables on earnings are similar across the two sectors (and similar to those presented previously in Table 3). In all equations, earnings are likely to increase with age, education, hours of work and weeks of work, and are likely to be higher among married men and among those born in the US. In both sectors educated Blacks receive higher returns on their educational credentials than comparable Whites (as evident by the positive interaction terms between education and race in Eq. (2)). Yet it is worth noting that earnings returns for blacks on academic education are especially high in the private sector, perhaps due to different selectivity processes of educated blacks into the public and private sectors.

¹⁰ As greater overall inequalities are likely to exacerbate economic disparities between men and women as well as between ethnic groups, it is important to examine earnings differentials between Blacks and Whites while controlling for the structure of the earnings distribution. By employing a ranking scale we 'forced' the earnings distribution to be of similar shape in each decennial year. Hence, differences in racial earning gaps that result from structural changes in the earning distribution are controlled. We then re-estimated the hierarchical linear models presented in columns 1, 2 and 3 of Table 3 while using the percentiles measure. The results of the re-analysis lead to similar findings and conclusions reported in the paper.

¹¹ It should be noted that according to Lang and Manove (2006) the relation between education and earnings holds only when scholastic ability is not controlled. We will further elaborate and discuss this issue in Section 6.

Table 4

Coefficients (standard errors) obtained from bi-level regressions of logarithm of earnings on individual-level and occupation-level variables by sectors.

	Public sector		Private sector	
	(1)	(2)	(1)	(2)
Intercept	10.113* (0.024)	10.118* (0.020)	10.125* (0.025)	10.144* (0.015)
<i>Individual-level variables^{1,2}</i>				
Age	0.069* (0.003)	0.069* (0.003)	0.057* (0.002)	0.057* (0.002)
Age ² × 10	-0.007* (0.001)	-0.007* (0.001)	-0.006* (0.001)	-0.006* (0.001)
Marital status (married)	0.119* (0.004)	0.119* (0.004)	0.190* (0.004)	0.190* (0.004)
Place of birth (USA)	0.009* (0.008)	0.010* (0.008)	-0.006* (0.006)	-0.006* (0.006)
Work hours	0.010* (0.001)	0.010* (0.001)	0.011* (0.001)	0.011* (0.001)
Weeks working last year	0.033* (0.001)	0.033* (0.001)	0.035* (0.001)	0.035* (0.001)
<i>Education³</i>				
High school	0.176* (0.007)	0.166* (0.007)	0.159* (0.005)	0.156* (0.005)
Academic	0.350* (0.012)	0.338* (0.012)	0.289* (0.010)	0.286* (0.010)
Race (Black)	-0.049* (0.006)	-0.017* (0.015)	-0.150* (0.006)	-0.081* (0.011)
<i>Interaction terms</i>				
Race × high school	—	0.025* (0.011)	—	0.022* (0.007)
Race × academic	—	0.027* (0.014)	—	0.068* (0.011)
Race × SEI × (10)	—	-0.004* (0.002)	—	-0.003* (0.002)
Race × earnings inequality	—	0.032* (0.191)	—	-0.130* (0.116)
Race × 1960	—	-0.089* (0.018)	—	-0.210* (0.020)
Race × 1970	—	-0.079* (0.013)	—	-0.141* (0.017)
Race × 1980	—	-0.048* (0.015)	—	-0.062* (0.015)
Race × 1990	—	-0.010* (0.014)	—	-0.022* (0.013)
<i>Occupation-level variables⁴</i>				
SEI	—	0.005* (0.001)	—	0.006* (0.001)
% of Black	—	-0.157* (0.079)	—	-0.335* (0.077)
% of woman	—	-0.220* (0.020)	—	-0.256* (0.024)
Earnings inequality	—	0.739* (0.161)	—	-1.308* (0.150)
<i>Year of survey⁵</i>				
1960	-0.116* (0.026)	-0.174* (0.019)	-0.173* (0.031)	-0.177* (0.020)
1970	0.087* (0.024)	0.061* (0.017)	0.054* (0.030)	0.028* (0.019)
1980	0.062* (0.026)	0.043* (0.027)	0.080* (0.032)	0.049* (0.021)
1990	0.014* (0.026)	-0.004* (0.017)	0.027* (0.032)	0.011* (0.019)
<i>Variance component</i>				
Occupation-level random effects	0.03985	0.01409	0.06556	0.02147
Individual-level random effect	0.24414	0.24407	0.30955	0.30949
r(intercept, black)	-0.144	-0.045	-0.324	-0.342

¹ The slopes of the variables: education, race and the interactions between them have been allowed to vary across occupations. These variables (dummy variables) are uncentered. The slopes of the other individual-level variables are constrained to be identical across 116 units. Age and work hours are centered around their grand mean. The dummy variables are uncentered.

² Controlling for geographical region and year of survey (the coefficients are not presented).

³ Omitted category: less than 12 years of schooling.

⁴ The level-2 predictors have been centered around their grand mean.

⁵ Omitted category: 2000.

* $p < 0.05$ (two-tailed).

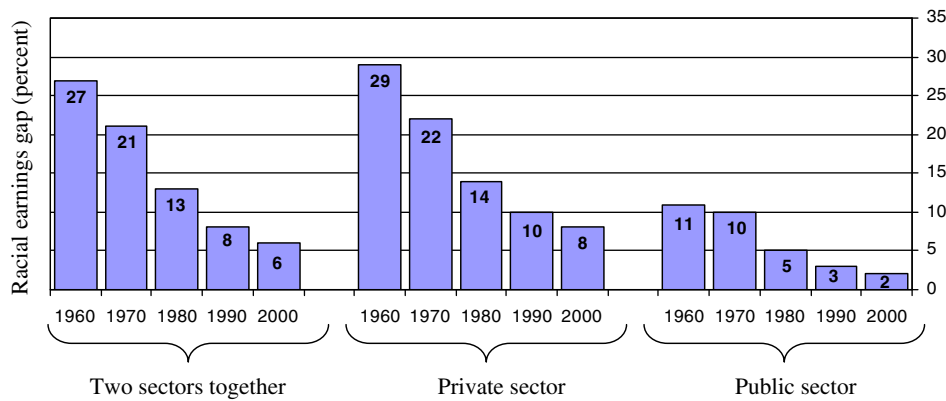


Fig. 1. Racial earning gap by year in the private and public sectors.

In both sectors earnings tend to increase with occupational socioeconomic status and with occupational earnings inequality and to decrease with percent women and percent Blacks.

The impact of race on earnings, however, differs somewhat across the sectors. Eq. (1) (in which only individual-level variables are included) reveals that during the 1960–2000 period the net earnings disadvantage of Black men in the public sector averaged 5%. In the private sector the net earnings disadvantage of Blacks was 15% – three times larger than in the public sector. When the time trend (year) and occupational characteristics of the populations (Eq. (2)) are taken into consideration, it becomes apparent that earnings differences between Black and White men had declined considerably over the years in both sectors. The decline had been especially sharp between 1960 and 1980 but leveled off by 1990.

Yet despite the similarities in the trend across sectors, the earnings penalty experienced by Black men is considerably larger in the private sector than in the public sector. When occupational characteristics and time are taken into consideration (Eq. (2)) the earnings disadvantages of Blacks in the private sector had declined from almost 30% in 1960 to almost 15% in 1980 and leveled off between 1990 and 2000 at 10.3 and at 8%, respectively. In the public sector the decline in Blacks' earnings penalty had been from 10.6% ($-.017 + -.089$) in 1960 to 6.5% in 1980 ($-.017 + -.048$), and then to 2.7% and 1.7% in 1990 and 2000, respectively. In effect, net racial earning gaps have become insignificant in the public sector by 1990, while in the private sector they remain substantial. For a graphic illustration of these findings see Fig. 1.

The interaction terms (in Eq. (2)) between race and occupational socioeconomic status and between race and occupational earnings inequality are not significant in both sectors; when economic sector is controlled, Blacks' earnings penalties are neither associated with occupational status nor with occupational earnings inequality.¹² There is no support, therefore, for the hypothesis that earnings penalties for Black men vary systematically across occupational labor markets (i.e. more pronounced in high status occupations and in occupations with high earnings inequality) when economic sectors are taken into consideration. Apparently, the association between race and occupational characteristics in the determination of earnings inequality observed earlier is a result of the association between occupations and economic sectors.

6. Discussion and conclusions

The objective of the study was twofold: first, to examine changes in the earnings gaps between Black and White men during the second half of the 20th century in conjunction with changes in the characteristics of the population and changes in the composition of occupational labor markets; and second, to explore sources and delineate social mechanisms underlying these trends. Our research, thus, examined the extent to which earnings gaps between Black and White men have actually decreased over time while considering shifts in both the educational and the occupational distributions of the economically active labor force.

The literature on temporal trends in racial economic inequality offers several explanations as to why racial earnings inequalities are expected to decline with the passage of time. The first explanation focuses on overtime narrowing of disparities in human capital resources associated with education (i.e. formal education, cognitive skills, achievement test scores). If gaps due to pre-market discrimination (such as education) decrease, one should expect market discrimination to follow suit. Although a series of studies reveal that while gaps in educational credentials and achievement (as proxies of productive capacity) had actually declined over time, it was also demonstrated that the rate of change

¹² These findings are consistent with Grodsky and Pager (2001, Table 3) multivariate analysis which shows that the interaction effect of race and occupational status is statistically insignificant.

in achievement test scores had slowed or even reversed after 1972 (Hedges and Nowell, 1999) and that the relative changes in achievement test scores had not been the same at the top and the bottom of the national distribution. The racial gaps were found to be much more pronounced at the upper level of the achievement distributions (Hedges and Nowell, 1999). This, indeed, can affect change in gaps in the labor market, especially at the top of the labor market.

The second explanation focuses on changing patterns of racial occupational distributions. As more Blacks enter lucrative, high status occupations, one would expect to observe a decline in the racial earnings gap. However, if earnings penalties for Blacks are more pronounced at the top of the labor market (i.e. economic discrimination is more pronounced in high status occupations) earnings gaps would not decline even if Blacks had been joining high status occupations (e.g. Grodsky and Pager, 2001; Huffman, 2004; Kaufman, 1983). Likewise, if Blacks had been joining occupations characterized by higher levels of earnings inequalities among workers, the racial earnings gaps would not necessarily decline.

The data presented here revealed that, net of individual-level characteristics and net of the occupational structure, earnings gaps between Black and White men actually decreased between 1960 and 2000 but not at a linear rate. The decline was rather pronounced between 1960 and 1980 but leveled off after that. These findings hold even when considering the relative educational gains of the Black population and the change in their occupational distributions over time. After 1980 the net earnings disadvantage of Black men had not decreased despite Blacks' achieved educational and occupational advancement. This was especially evident in the private sector of the economy.

A possible explanation for this finding is that years of schooling do not fully capture variations in quality of education and productive capacity of individuals. Despite the narrowing of the racial gap in formal education there is some evidence that the disparity in achievement test scores is still substantial and remained fairly constant throughout the last quarter of the previous century (Hedges and Nowell, 1999; Neal 2006). Indeed, the body of research on racial differences in quality of schooling and cognitive skills suggests that despite some decline in these differences they remained quite substantial (e.g. Hanushek and Rivkin, 2006; Hedges and Nowell, 1999; Neal, 2006). Disparities in quality of education and cognitive skills may explain why the reduction in earnings inequality between Blacks and Whites had tapered off despite continuing rise in years of schooling among Blacks (Hanushek and Rivkin, 2006; Neal and Johnson, 1996). However, the extent to which these differences account for the Black–White earnings gaps is still being debated (see for example, Farkas and Vicknair, 1996; Lang and Manove, 2006). Unfortunately, our data do not permit us to evaluate these arguments and, therefore, to join the debate.

Our data, however, did permit us to examine the role played by occupational segregation and the extent to which earnings inequality is systematically related to occupational attributes. We found some evidence that racial earnings inequality is more pronounced in high status occupation and in occupations characterized by high earnings inequality. This finding could provide some support for the thesis that economic discrimination against Blacks is more pronounced in high status occupational labor markets. However, when economic sector is controlled, economic penalties against Blacks were not systematically associated with either occupational status or with occupational earnings inequality. From this point of view, economic discrimination against Blacks and trends in such discrimination are associated, first and foremost, with economic sector and much less so with characteristics of occupational labor markets.

Indeed, the findings of our analysis reveal that the overall trends in racial earnings inequality that were observed in the market as a whole mask considerable differences between the private and the public sectors of the economy. Whereas racial disparity in the public sector had effectively disappeared (the gap had become statistically insignificant after controlling for characteristics of individuals and their occupations), the disparity remained statistically significant and substantial in the private sector even in 2000. We believe that the lower levels of racial earnings inequality in the public sector can be largely attributed to universalistic criteria, administrative regulations and affirmative action policy that are more likely to be adopted and enforced in the public sector of the economy. Consequently, the public sector has long been viewed as the arena in which ethnic minorities can achieve parity with co-workers belonging to the majority population. Nevertheless, researchers are yet to determine whether the decline in racial economic discrimination in the public sector was prompted by greater commitment to affirmative action and to equal opportunities policies or by lower sensitivity to variations in quality of education and productive capacity of the workers.

The private sector, by contrast, is still characterized by considerable racial disparities in earnings even after taking into considerations racial variations in socio-demographic attributes and in occupational distributions. In fact, the size of the earnings gap between Blacks and Whites in the private sector in 2000 is similar to the size of the gap between Blacks and Whites that was observed in the public sector three decades earlier. Although earnings disparities between the races in the private sector had also decreased over the years, it is clear that the rate of change is slower in the private than in the public sector and that the decline in the earnings gap in the private sector had become stagnant in recent decades. The data also reveal that in the private sector earnings returns for Blacks with academic educations are especially high. This finding raises the possibility that employers in the private sector are especially selective when recruiting blacks with academic training. The question future researchers will need to address, thus, is whether the process and trends that were observed in the public sector will eventually permeate and influence processes in the private sector or whether the private sector is still dominated by different rules and regulations that are more conducive to preservation of economic discrimination toward ethnic minorities.

Appendix A. Variables included in the analysis

Comments	Values of the new variable	Values of the original variable	Definition	Name of PUMS variable	Variable
The current analysis includes respondents between the ages of 25 and 64			Person's age in years as of the last birthday	Age	Age
	1. Married 0. Not married	1. Married, spouse present 2. Married, spouse absent 3. Separated 4. Divorced 5. Widowed 6. Never married/single	Marriage status	Marstat	Marriage status
	1. Born in USA 0. Other place	List of US and foreign countries	Indicates the US or the foreign country where the person was born	Bpld	Birth place
The regional and divisional categories denote the same geographic areas for all years		1. Northeast region 2. Midwest 3. South region 4. West region	Region and division where the housing unit was located	Region	Region
Region was transformed into 4 dummies variables (Northeast, Midwest, South, West)		9. State Unknown			
The race codes are comparable across years, with some exceptions: there have been fluctuations in the way Hispanics are coded. In 1980–2000 category “White” includes respondents who defined themselves as White, but not Hispanics. In 1960–1970 the majority of Hispanics were probably classified as White by enumerators. In 1980–2000 variable “Hispanic” was added	1. Black 0. White	1. White 2. Black/negro 3. American Indian 4. Chinese 5. Japanese 6. Other Asian or pacific islander 7. Other race 8. Two major races (2000) 9. Three or more major races (2000)	Race of the respondent	Race	Race
In the current analysis the category “White” in 1960–1970 includes Whites and Hispanic respondents		0. Not Hispanic 1. Mexican 2. Puerto-Rican 3. Cuban 4. Other 9. Not responded	Identifies and classifies persons of Hispanic/Spanish/Latino origin	Hispanic Available for 1980–2000	

(continued on next page)

Appendix A (continued)

Comments	Values of the new variable	Values of the original variable	Definition	Name of PUMS variable	Variable
The values of the schooling years were calculated as the average year of each category		0. NA/No schooling 1. None or preschool 2. Grades 1–4 3. Grades 5–8 4. Grade 9 5. Grade 10 6. Grade 11 7. Grade 12 8. 1–3 years of college 9. 4+ years of college	Respondent's highest grade of school or year of college completed	Educrec	Years of education
For the 1960–1970 the usual working hours per week were predicted by the average hours in each category of the total number of hours the respondent was at work during the previous week		0. NA 1. 1–14 2. 15–29 3. 30–34 4. 35–39 5. 40 6. 41–48 7. 49–59 8. 60+	The total number of hours the respondent was at work during the previous week	Hrswork2 Available for 1960–1990	Usual working hours per week
The current analysis was restricted to respondents earnings In order to compare this variable across years, the effects of the inflation were taken into account			The number of hours per week that the respondent usually worked, if the person worked during the previous year	Uhrswork Available for 1980–2000	Earnings
The translation of occupation codes into the 1950 classification is particularly problematic for 1980 onward. The Census Bureau significantly reorganized the occupational classification scheme in 1980 and again in 2000. Comparisons across the post-1980 period and with earlier years is more distorted than similar comparisons across other decades Occupations that include less than 10 cases were united with similar occupations. Farm and military occupations were excluded from the analysis			Reports each respondent's total pre-tax wage and salary income—that is, money received as an employee—for the previous year. Sources of income in INCWAGE include wages, salaries, commissions, cash bonuses, tips, and other money income received from an employer. Payments-in-kind or reimbursements for business expenses are not included OCC1950 applies the 1950 Census Bureau occupational classification system to occupational data, to enhance comparability across years	Incwage Occ1950	Earnings Occupation

General comments: The sample was restricted to Black/White men between the ages of 25 and 64, who were employed in non-farm and non-military occupations at the time of the decennial census and who had earnings for 1959, 1969, 1989 and 1999.

References

- Allen, W., Farley, R., 1986. The shifting social and economic tides of black America, 1950–1980. *Annual Review of Sociology* 12, 277–306.
- Asher, M., Popkin, J., 1984. The effect of gender and race differentials on public-private wage comparisons: a study of postal workers. *Industrial and Labor Relations Review* 38, 16–25.
- Blank, R., 1985. An analysis of workers choice between employment in the public and private sectors. *Industrial and Labor Relations Review* 38, 211–224.
- Blau, F.D., Kahn, L.M., 1996. Wage structure and gender earnings differentials: an international comparison. *Economica* 63, s29–s62.
- Bound, J., Freeman, R., 1992. What went wrong? The erosion of relative earnings and employment among young black men in the 1980s. *Quarterly Journal of Economics* 107, 201–232.
- Browne, I., Misra, J., 2003. The intersection of gender and race in the labor market. *Annual Review of Sociology* 29, 487–513.
- Card, D., Krueger, A.B., 1992. School quality and black-white relative earnings: a direct assessment. *Quarterly Journal of Economics* 107, 151–200.
- Cohen, P.N., Huffman, M.L., 2003. Occupational segregation and the devaluation of women's work across U.S. labor markets. *Social Forces* 81, 881–908.
- Collins, S., 1983. The making of the black middle class. *Social Problems* 30, 369–381.
- Donohue, J., Heckman, J., 1991. Continuous versus episodic change: the impact of civil rights policy on the economic status of blacks. *Journal of Economic Literature* 29, 1603–1643.
- Eisinger, P., 1986. Local civil service employment and black socioeconomic mobility. *Social Science Quarterly* 67, 169–175.
- Farley, R., 1984. *Blacks and Whites: Narrowing the Gap?* Harvard University Press, Cambridge, Mass.
- Farley, R., 1996. *The New American Reality: Who We Are, How We Got Here, and Where We Are Going*. Russell Sage Foundation, New York.
- Farkas, G., Vicknair, K., 1996. Comment: the need to control for cognitive skill. *American Sociological Review* 16, 557–564.
- Farkas, G., England, P., Vicknair, K., Kilbourne, B., 1997. Cognitive skill, skill demands of jobs, and earnings among young European American, African American, and Mexican American workers. *Social Forces* 75, 913–938.
- Fossett, M.A., 1984. City differences in racial occupational differentiation: a note on the use of odds ratios. *Demography* 21, 655–666.
- Fossett, M.A., Galle, O., Kelly, W.R., 1986. Racial occupational inequality, 1940–1980: national and regional trends. *American Sociological Review* 51, 421–429.
- Grodsky, E., Pager, D., 2001. The structure of disadvantage: individual and occupational determinants of the black-white wage gap. *American Sociological Review* 66, 542–567.
- Hanushek, E.A., Rivkin, S.G., 2006. *School Quality and the Black-White Achievement Gap*. NBER Working Paper Series, Cambridge.
- Harrison, R.J., Bennett, C.E., 1995. Racial and ethnic diversity. In: Farley, R. (Ed.), *State of the Union: America in the 1990s Social Trends*, vol. 2. Russell Sage Foundation, New York.
- Heckman, J., 1989. The impact of government on the economic status of black Americans. In: Shulman, S., Darity, W., Higgs, R. (Eds.), *The Question of Discrimination*. Wesleyan University Press, Middletown, CT.
- Hedges, L.V., Nowell, A., 1999. Changes in the black-white gap in achievement test scores. *Sociology of Education* 72, 111–135.
- Huffman, M.L., 2004. More pay, more inequality? The influence of average wage levels and the racial composition of jobs on black-white wage gap. *Social Science Research* 33, 498–520.
- Huffman, M.L., Cohen, P.N., 2004. Racial wage inequality: job segregation and devaluation across U.S. labor markets. *American Journal of Sociology* 109, 902–936.
- Jacobson, J., Olsen, C., Rice, J., Sweetland, S., Ralph, J., 2001. *Educational Achievement and Black-White Inequality*. National Center for Educational Statistics, Jessup, MD.
- Jaynes, G.D., 1990. The labor market status of black American: 1939–1985. *Journal of Economic Perspectives* 4, 9–24.
- Jaynes, G.D., 1998. Race and class in postindustrial employment. *American Economic Review* 88, 357–362.
- Jencks, C., Phillips, M. (Eds.), 1998. *The Black-White Test Score Gap*. Brookings Institution Press, Washington, DC.
- Kaufman, R.L., 1983. A structural decomposition of black-white earnings differentials. *American Journal of Sociology* 89, 585–611.
- Kaufman, R.L., 2002. Assessing alternative perspectives on race and sex employment segregation. *American Sociological Review* 67, 547–572.
- Lang, K., Manove, M., 2006. *Education and Labor Market Discrimination*. NBER Working Paper Series, Cambridge.
- Lewin-Epstien, N., Semyonov, M., 1994. Sheltered labor markets, public employment and socioeconomic returns of Arabs in Israel. *American Journal of Sociology* 100, 622–651.
- Maloney, T.N., 1994. Wage compression and wage inequality between black and white males in the United States, 1940–1960. *The Journal of Economic History* 54, 358–381.
- Mandel, H., Semyonov, M., 2005. Family Policies, wage structures and the gender gap: sources of earnings inequality in 20 countries. *American Sociological Review* 70, 949–967.
- Mare, R.D., 1995. Changes in educational attainment and school enrollment. In: Farley, R. (Ed.), *State of the Union: America in the 1990s Economic Trends*, vol. 1. Russell Sage Foundation, New York.
- Maume, D.J., 1985. Government participation in the local economy, and race- and sex-based earnings inequality. *Social Problems* 32, 285–299.
- Maxwell, N.L., 1994. The effect on black-white wages of differences in the quantity and quality of education. *Industrial and Labor Relations Review* 47, 249–264.
- McCall, L., 2001. Sources of racial wage inequality in metropolitan labor markets: race, ethnic and gender differences. *American Sociological Review* 66, 520–541.
- Neal, D., 2004. The measured black-white wage gap among women is too small. *Journal of Political Economy* 112, s1–s28.
- Neal, D., 2006. Why has black-white skill convergence stopped? In: Hanushek, E.A., Welch, F. (Eds.), *Handbook of Economics of Education*. Elsevier, Amsterdam.
- Neal, D., Johnson, W., 1996. The Role of premarket factors in black-white wage differences. *Journal of Political Economy* 104, 869–895.
- O'Neill, J., 1990. The role of human capital in earnings differences between white and black men. *Journal of Economic Perspectives* 4, 25–45.
- Raudenbush, S., Kasim, R., 1998. Cognitive skill and economic inequality: findings from the National Adult Literacy Survey. *Harvard Educational Review* 68, 33–79.
- Semyonov, M., Haberland, Y., Cohen, Y., Lewin-Epstein, N., 2000. Racial composition and occupational segregation and inequality across American cities. *Social Science Research* 29, 175–187.
- Smith, J.P., Welch, F., 1989. Black economic progress after Myrdal. *Journal of Economic Literature* 27, 519–564.
- Tauber, A.F., Tauber, K.E., Cain, G.C., 1966. Occupational assimilation and the competitive process: a reanalysis. *American Journal of Sociology* 72, 273–285.
- Tomaskovic-Devey, D., 1993. *Gender and Racial Inequality at Work: The Sources and Consequences of Job Segregation*. ILR Press, Ithaca, NY.
- Western, B., Pettit, B., 2005. Black-white wage inequality, employment, rates and incarceration. *American Journal of Sociology* 111, 553–578.
- Zwerling, C., Silver, H., 1992. Race and job dismissals in a federal bureaucracy. *American Sociological Review* 57, 651–660.