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ORIGINAL RESEARCH

Long-Term Earnings Differentials Between African American and White Men by Educational Level

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Abstract This paper investigates long-term earnings differentials between African American and white men using data that match respondents in the Survey of Income and Program Participation to 30 years of their longitudinal earnings as recorded by the Social Security Administration. Given changing labor market conditions over three decades, we focus on how racial differentials vary by educational level because the latter has important and persistent effects on labor market outcomes over the course of an entire work career. The results show that the long-term earnings of African American men are more disadvantaged at lower levels of educational attainment. Controlling for demographic characteristics, work disability, and various indicators of educational achievement does not explain the lower long-term earnings of less-educated black men in comparison to less-educated white men. The interaction arises because black men without a high school degree have a larger number of years of zero earnings during their work careers. Other results show that this racial interaction by educational level is not apparent in cross-sectional data which do not provide information on the accumulation of zero earnings over the course of 30 years. We interpret these findings as indicating that compared

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to either less-educated white men or highly educated black men, the long-term earnings of less-educated African American men are likely to be more negatively affected by the consequences of residential and economic segregation, unemployment, being out of the labor force, activities in the informal economy, incarceration, and poorer health.

Keywords Long-term earnings · Racial inequality · Education · Administrative data · Work disability

Introduction

Earnings differentials between African American and white men have been investigated in much prior research (e.g., Grodsky and Pager 2001; Quillian 2003; Bertrand and Mullainathan 2004; Western and Pettit 2005; Kim and Tamborini 2006; Pager and Shepherd 2008). Although highly informative, most of these studies investigate cross-sectional data. Analyses of racial differentials in long-term earnings are rare (Tomaskovic-Devey et al. 2005; Cheng 2014). This research lacuna is unfortunate because long-term earnings is likely quite important for assessing racial differentials in economic well-being, social status, wealth accumulation, retirement income, mortality, and inter-generational mobility (Duggan et al. 2007; Bloome 2014; Tamborini et al. 2015).

The extent to which black–white disparities in cross-sectional earnings correspond to those for long-term earnings remains unclear. Racial differentials in cross-sectional earnings may differ from those in long-term earnings due to patterns of intra-generational income mobility varying by race (Tomaskovic-Devey et al. 2005; Cheng 2014). In particular, the discrepancy in racial differentials between cross-sectional earnings and long-term earnings is likely to differ by level of education. Studies on racial inequality in labor markets typically limit their samples to positive earners, and the negative net effect for African American men is assumed to be constant by educational level (e.g., Farley 1996; Wilson and Rodgers 2016). However, because less-educated blacks are much more likely to be without positive earnings in any given year, studies of cross-sectional data underestimate the long-term negative net effect of race among less-educated African American men because they are more likely to be repeatedly unemployed over the course of their work careers. Prior research has not investigated racial differentials in long-term earnings for less-educated versus highly educated African Americans.

The main reason for the lack of studies on long-term earnings is the limited availability of longitudinal datasets that can provide information on long-term income for a representative sample of the labor force. To meet this challenge, a growing literature on long-term earnings in the U.S. makes use of newly available administrative data that are not in the public domain (Duggan et al. 2007; Tamborini et al. 2015; Mouw 2016). Among other results, these studies confirm the substantial effect of education (in terms of both the highest level completed and field of study) on cumulated earnings over the work career.

In the following, we contribute to this literature by investigating administrative data that match large, nationally representative samples of respondents from the 2004 and 2008 *Survey of Income and Program Participation* to their own longitudinal earnings records based on tax records submitted to the Internal Revenue Service (IRS) and compiled at the Social Security Administration (SSA). This unique dataset allows us to utilize rich demographic information, educational covariates, and socioeconomic variables to analyze respondents' earnings over a span of 30 years from 1982 to 2011. We compare the results of long-term earnings based on the administrative earnings to those of annual earnings self-reported in Census. We emphasize that our findings are based on empirically observed long-term earnings rather than mechanistically created estimates using synthetic cohort methods which merely extrapolate cross-sectional data (cf., Carnevale et al. 2013).[1]

Although informative, these prior studies of long-term earnings have not broken down the analysis by race. We seek to fill this research gap by providing new evidence on long-term earnings differentials between black and white men by educational level using the aforementioned administrative data. In particular, we investigate (1) whether the negative net effect for African American men is more negative for long-term earnings (i.e., cumulative earnings over 30 years) than for annual earnings; (2) whether the negative net effect for African American men in long-term earnings is more negative for less-educated men than for highly educated men; and (3) whether the negative net effect on long-term earnings for African American men by educational level can be statistically explained by fewer years of employment in the conventional labor market. Our analysis reveals the important finding that the negative net effect for African American men on long-term earnings is more negative at lower levels of educational attainment.

Theoretical Background and Prior Literature

Earnings refer to income obtained by working in the labor force. Labor market institutions and processes are thus the proximate determinants of our dependent variable. Our research objective is to measure and estimate racial differentials in long-term earnings, but we briefly summarize prior research on labor markets because they are the context in which racial differentials are generated. Because the effects of labor market institutions are various and have substantially changed over the past few decades in an increasingly volatile labor market, breaking down our analysis of racial differentials by educational level provides a more parsimonious and substantively compelling approach.

The Evolving Labor Market Context

In contrast to cross-sectional earnings, long-term earnings reflect not only current labor market institutions and processes but also how they change over time. Perhaps

[1] Tamborini et al. (2015) show that synthetic cohort estimates are subject to the over-estimation bias of long-term earnings.

the most well-known long-term trend in the U.S. labor market is rising inequality in annual earnings and wages (Autor et al. 2008; Acemoglu and Autor 2011; Cheng 2014). This trend began in the 1980s and coincides with significant changes in the economy including: increased globalization in production and marketing; greater price competition; advances in the use of information technologies in market transactions and in the workplace; organizational restructuring to cut costs and promote greater flexibility in the employment of labor and management; declining unionization; increased non-standard work arrangements and part-time employment; the decline of employment security, internal labor markets, and seniority wage effects; increased competition in capital markets and heightened concerns for shareholder demands for higher profits; reduced organizational commitment among workers; the increased use of sub-contracting, outsourcing and the downsizing of employment; and reduced sharing of firm rents particularly to less skilled workers (Berg and Kalleberg 2001; Cappelli 2001; Kalleberg 2003, 2009; Hollister 2004; Morgan and Tang 2007; Kim and Sakamoto 2008, 2010; Sakamoto and Kim 2014; Sakamoto and Wang 2017). These institutional changes have been associated with the rise of a more fluid and competitive labor market with increased job, firm, and occupational turnover (Jarvis and Song 2017).

Concomitantly, there are increasing economic returns to education, advanced work skills, job expertise, ability, and cognitive capacities (Acemoglu and Autor 2011; Sakamoto and Wang 2017). High-skilled workers are now earning more than ever before while the wages of low-skilled workers have remained relatively stagnant in real terms (Acemoglu and Autor 2011). Theories of labor market processes usually attribute the robust positive association between education and earnings to the enhanced skill development over the work career, improved trainability, endemic cumulative advantage, and greater bargaining power of highly educated workers compared to less-educated workers (DiPrete and Eirich 2006; Hout 2012; Sakamoto and Kim 2014).

The increased returns to education and higher skill are associated with increased earnings inequality in recent decades (Autor et al. 2008; Kim and Sakamoto 2008; Acemoglu and Autor 2011; Hout 2012). Declining wages for the less educated and rising wages for the more educated imply increasing wage inequality for the labor force as a whole. Well-educated workers tend to be better paid at every age level in every year (Hout 2012). Tamborini et al. (2015) document how these earnings advantages accumulate over a person's life and result in large gaps in lifetime earnings by education.

As the returns to education and skill have been rising since the 1980s, the effects of institutional variables (e.g., industry, union status, firm size, occupation, firm tenure) have been moderated at least for the labor force as a whole (Kim and Sakamoto 2008). Among workers who remain employed in the union sector, its traditional egalitarian influence has waned as inequality among unionized workers is increasingly coming to resemble inequality among non-unionized workers (Kim and Sakamoto 2010). A similar trend towards "nonunion private-sectorization" has been observed in regard to wages in the public sector (Kim and Sakamoto 2010).

Not only are the effects of labor market variables declining, but workers are becoming more mobile across those institutional demarcations over the course of

their careers. That is, intra-generational occupational and other sorts of class mobility has increased in recent years (Hollister 2011; Jarvis and Song 2017). Class categorizations based on cross-sectional labor market variables such as occupation have been popular in predicting cross-sectional earnings (e.g., Weeden and Grusky 2005), but these categorizations could be weak predictors of long-term earnings in the era of the rising intra-generational occupational mobility.

Black–White Differentials in Long-Term Earnings by Educational Level

The aforementioned studies of labor market variables are typically focused more on rising inequality in general and not on racial differentials. Descriptions of changes in labor market institutions as mentioned above do not consider earnings differentials between white and black workers within any given class grouping, occupation, skill grade, or educational level. The decline of the unionized manufacturing sector, for example, may explain some of the decline in wages for workers without a college degree, but that decline does not address why less-educated black men have lower wages than less-educated white men.

The declining effects of traditional labor market variables and the growing importance of education suggesting the black–white differential in long-term earnings may vary more by level of schooling. Being a critical resource of labor market advantage and skill development throughout a worker's career despite institutional change, highly educated African Americans may be more successful at avoiding discriminatory practices. For example, highly educated blacks have likely benefitted more from affirmative action policies and related diversity programs including promotions to managerial positions than less-educated blacks (Wilson 1987; Takei and Sakamoto 2008). By contrast, racial profiling and other forms of discrimination in lowering wages may be more prevalent among workers with lower levels of education as suggested by audit studies (Bertrand and Mullainathan 2004; Pager et al. 2009).

In other words, the negative net effect for African American men may be more severe at lower levels of education (Leicht 2008, pp. 241–242). One likely major source of the race–education interaction is residential segregation. Low-income and less-educated African Americans tend to live in economically isolated and racially segregated neighborhoods with very limited community resources (Wilson 1987). Highly educated African Americans are more likely to live in white neighborhoods or in higher-income black neighborhoods (Iceland and Wilkes 2006; Reardon and Bischoff 2011). Indeed, the level of economic segregation is significantly greater among blacks than among whites (Reardon and Bischoff 2011).

Economic segregation among whites exists too of course, but low-income whites are more likely than low-income blacks to live in middle-class neighborhoods (Reardon and Bischoff 2011). Low-income whites therefore have greater access to quality schools and educational resources than low-income blacks (Owens et al. 2016). Due to reduced school funding in low-income black neighborhoods, African American children from lower SES origins more likely attend schools with underpaid teachers, have limited access to advanced coursework, fewer middle-class peers, and other compromised aspects beginning early in the educational

system (Massey and Denton 1993; Maxwell 1994; Duncan and Magnuson 2011; Owens et al. 2016). In general, low-income blacks suffer the most from negative neighborhood effects "in terms of schooling, employment, exposure to higher crime, single parenthood, concentrated poverty, and even health and cognition outcomes" (Iceland and Wilkes 2006, p. 248).

The lack of adequate employment (i.e., high unemployment and underemployment) for less skilled workers is particularly problematic in low-income black communities (Lichter 1988; Wilson 1996; Wilson et al. 1995). As stated by Wilson (1996, p. 567), "The consequences of high neighborhood joblessness are more devastating than those of high poverty. A neighborhood in which people are poor but employed is different from a neighborhood in which people are poor and jobless. Many of today's problems in the inner-city ghetto neighborhoods—crime, family dissolution, welfare, low levels of social organization, and so on—are fundamentally a consequence of the disappearance of work." Studies of cross-sectional data are consistent with Wilson's (1996) view that in the modern American economy, unemployment among less-educated black men has become prominent (Fairlie and Sundstrom 1997).

In addition to unemployment per se, the labor force participation rates of less-educated men have generally declined in recent decades but the reduction has been significantly greater for less-educated African American men (Sum et al. 2011). Less-educated black men are now far more likely to be out of the labor force or unemployed than either Hispanic or white men—so much so that since 2010, the preponderant majority of less-educated black men are no longer employed (Hirsch and Winters 2014, p. 935). As stated by Hirsch and Winters (2014, p. 945) in their study of cross-sectional data from 2000 to 2010, "our analysis shows that the widening black–white annual earnings gap is largely attributable to decreased employment among black men, both from a large institutional population and from declining employment among the non-institutionalized population."

Non-employment (i.e., the lack of full-time paid work whether due to involuntary part-time employment, unemployment, or being out of the labor force) directly reduces one's annual earnings. The extent to which the same individuals tend to repeatedly experience non-employment over their work careers, however, is only evident in long-term earnings. In cross-sectional studies of earnings inequality, persons who are unemployed or out of the labor force are often removed from the sample (e.g., Grodsky and Pager 2001). As a consequence, these analyses cannot ascertain lowered long-term earnings due to repeated spells of unemployment for the same individuals.

Non-employment also has an indirect effect on long-term earnings. By accumulating less employment experience, a worker tends to develop fewer job skills. Reduced human capital and less competitive credentials thereby compromise wages and employability in the worker's future employment (Tomaskovic-Devey et al. 2005) leading to a "cumulative disadvantage" as compared to workers with a continuous work history (DiPrete and Eirich 2006). Non-employment is often treated as an exogenous variable in cross-sectional studies of earnings inequality, but non-employment is quite significant for understanding inequality in long-term earnings.

Criminal justice statistics document the significant role of incarceration among less-educated black men. Black men have substantially higher incarceration rates than white men, and men without a high school degree have much higher incarceration rates than men with some college (Pettit 2012, p. 15). However, the group that is most notable in terms of having the highest incarceration rate is African American men without a high school degree. According to Pettit (2012, p. 15), 37% of black men without a high school degree were incarcerated in 2008 which is about 3 times higher than the incarceration rate for white men without a high school degree (i.e., 12%) and about 18 times higher than the incarceration rate for black men with some college (i.e., 2%). Thus, the incarceration of less-educated African American men is particularly high in part because of their involvement in illegal activities in the informal economy. By contrast, according to Pettit (2012, p. 15), the incarceration rate for black men with some college does not differ greatly from that for white men with some college (i.e., about 2% for both groups).

Being a type of non-employment, incarceration has negative consequences for long-term earnings. Incarceration stalls educational advancement and disrupts the accumulation of work experience and the development of job skills (Tomaskovic-Devey et al. 2005). Recidivism and multiple spells of imprisonment may further disrupt promotion chances compared to persons who have an orderly work career (Pettit and Western 2004). For many men who have been incarcerated, recidivism is so common that their long-term earnings trajectories may include multiple spells of zero earnings.

An additional complicating factor influencing the black–white earnings gap is the disproportionate prevalence of work limitations and other health conditions that limit or prevent work among black men. At prime working ages and older ages, black men are much more likely than white men to self-report a work or activity limitation, as well as a range of chronic conditions (Pais 2014; Zajacova et al. 2014). Chronic conditions may be aggravated by lack of access to medical care or poor working conditions.

In sum, black–white differentials in long-term earnings are likely to vary significantly by educational level despite being too small to be notable in cross-sectional analyses (Farley 1996). Compared to either less-educated white men or highly educated black men, the long-term earnings of less-educated African American men are likely to be more negatively affected by the consequences of residential and economic segregation, unemployment, being out of the labor force, incarceration, and poor health. These negative characteristics may furthermore interact with each other.

Research Methods

Analytic Approach

The dependent variable that we investigate is long-term earnings defined as *total taxable earnings and remuneration accumulated over 30 years from all formal employment from 1982 to 2011* using the 2004 and 2008 panels of the *Survey of Income and Program Participation* (SIPP) matched to the Internal Revenue Service

(IRS) tax records. Persons who did not work for any given number of years (for whatever reasons) are defined as having zero earnings during those years in the calculation of their long-term earnings. Thus, zero earnings is a theoretically valid outcome for any particular year of data (cf. Western and Pettit 2005). We only deleted the tiny percentage of cases where the person had zero earnings in all of the 30 years or died during the observational period.

By including persons who are unemployed or out of the labor force in a particular year in our analysis sample, our definition of long-term earnings is more revealing of "cumulative disadvantage" (DiPrete and Eirich 2006) over a 30-year period by race and educational level. By contrast, Tomaskovic-Devey et al. (2005) and Cheng (2014) investigate intra-generational growth in the annual hourly wage for which values of 0 are considered to be missing. Those studies are also based on the NLYS79 data which do not include older middle-aged men when earnings are peaking for college graduates (Tamborini et al. 2015). Our findings about racial differentials by educational level are entirely novel.

We reiterate that our estimates of long-term earnings do not exclude all men in our sample who were incarcerated at some point during their lifetimes. Because our sampling frame refers to men residing in households in the 2004 or the 2008 SIPP, men who were incarcerated between 1982 and 2011 (but not in both 2004 and 2008) are included in our target population so long as they were employed in the labor market in at least one year during the 30-year observational window (and did not die before 2012).[2] For each year of incarceration without paid employment, annual earnings is defined to be 0 in the calculation of long-term earnings over the 30-year observational period.

Data

We use data from a nationally representative sample of respondents from Wave 2 of the 2004 and 2008 panels of the *Survey of Income and Program Participation*. We pool these two panels together to increase the sample size. Each respondent is matched with his longitudinal earnings as recorded in an administrative file based on tax information compiled by SSA. The administrative file, known as the Detailed Earnings Record (DER), uses the W-2 tax records that employers are required by law to submit to the Internal Revenue Service for each employee. As this information is confidential, the DER is not publicly available.[3] We henceforth refer to this matched longitudinal dataset as the SIPP-IRS.

The key advantage of these administrative data is that they permit the construction of long-term earnings for each individual over the 30-year period from 1982 and 2011. At the same time, the linked SIPP data provide rich information on demographic variables, albeit for only the two years (2004 and 2008). The match rate for individuals across the SIPP and the DER files is about

[2] Our data do not provide information on whether respondents were ever incarcerated. Men who were incarcerated or otherwise institutionalized during *both* 2004 and 2008 are not included in our sampling frame.

[3] Following both legal and ethical dictates, our analysis of these data maintains the complete anonymity of all of the respondents during all phases of this research.

80% for the 2004 panel and about 90% for the 2008 panel. Although the matching of these data has been shown to incur very little bias (Davis and Mazumder 2011), all of our analyses apply a modified SIPP weight that adjusts for unsuccessful matching across key characteristics so as to maintain the national representation to the survey year (Tamborini et al. 2015).[4] Moreover, all standard errors were adjusted to account for SIPP's stratified sample design.

The administrative earnings data refer to respondents' annual earnings for all jobs subject to federal income tax including full wages, salaries, and other compensation such as bonuses, commissions, tips, and self-employment.[5] We begin our analysis in 1982 because that is when the SSA started to collect reliable information on full earnings beyond the maximum amount taxable by the Social Security payroll tax. More detailed descriptions of the SSA administrative records and the survey matches are found elsewhere (Kim and Tamborini 2012).

There are several advantages of using the SIPP-IRS over other data on earnings. Since our sample is based on administrative records that are legally required and officially maintained by the IRS, sample attrition is minimal in contrast to other longitudinal datasets. Due to the very long time period used to construct long-term earnings (i.e., 30 years), even a small rate of annual attrition in a longitudinal study could potentially eliminate a substantial proportion of the original sample over the course of many years. In addition, earnings in the SIPP-IRS data are not top-coded as is common for datasets that are publicly available. The SIPP-IRS is usually considered to be less prone to response bias, non-response selectivity, and other measurement error (Kim and Tamborini 2012).

Our primary research interest is in the empirical analysis of the SIPP-IRS. However, in order to contrast long-term earnings observed in the SIPP-IRS with annual earnings observed in a cross-section, we also investigate data from the 1% file of the 2000 Integrated Public-Use Micro-data Sample (Ruggles et al. 2015). This file is a nationally representative cross-sectional dataset obtained from a random sample of the respondents who completed the long-form questionnaire of the 2000 Census. The 2000 IPUMS is a well-known dataset that includes information on major demographic characteristics and earnings in 1999. We use the 2000 Census over alternative years because 1999 falls at the mid-point of the 30-year period that we consider for our analysis of long-term earnings.

Target Population

Our analytic sample focuses on native-born, non-Hispanic black and white men from the baby boom cohort (i.e., were born between 1949 and 1964), and who were alive in the U.S. through 2011. In 1982, the youngest men in the sample (i.e., born in 1964) were 18 years old while the oldest men in the sample (i.e., born in 1949) were

[4] Nonetheless, our final estimates are not sensitive to weighting. For example, the statistical significance of our estimated coefficients do not change (at the 0.05 level) when using weights relative to not using them.

[5] The self-employed are included in our analysis as they are part of the formal labor market. Because unincorporated self-employed persons do not file a W-2 form, their earnings are obtained from other tax documents that are accessed by the SSA.

33 years old. In 2004, they were 40 years old and 55 years old, respectively, while by 2011, they were 47 years old and 62 years old, respectively.

Excluded from our target population are men without at least 1 year of positive earnings during the entire 30-year period of 1982–2011 or who never had a W-2 form submitted for them during that time ($n = 35, < 1\%$). We also ensured that respondents did not die during the observational period subsequent to the survey year (through 2011) using death records contained in the administrative data. We also exclude a small number of respondents who report having a work-limiting disability before age 16 ($n = 209$, 1.3%). Because our sampling frame is based on the 2004 and 2008 SIPP, our target population excluded old men aged 40–55 years who were institutionalized (i.e., not residing in households) in 2004 and 44–59 years who were institutionalized in 2008. Because we select men aged 40–59 in the survey years and traced back their earnings when they were young using the IRS tax records, our estimates are unlikely to be affected from the exclusion of the young, less-educated, and incarcerated black men.

For the analysis using the 2000 IPUMS, we also selected native-born, non-Hispanic black and white men born between 1949 and 1964 (i.e., were between the ages of 36 and 51 in 2000) from the non-institutionalized population. We further limited the target population for these data to native-born men who had positive earnings in 1999. Our target population for the analysis of the 2000 IPUMS is thus the cross-sectional analogue of the target population for the SIPP-IRS.

Statistical Models and Variables

Consistent with prior research on racial income differences, our main statistical tool is linear regression estimated by OLS. Equation (1) shows our model:

$$y_i = \alpha + \Sigma\beta_j \mathrm{Edu}_{ij} + \sum \gamma_j \left(\mathrm{Edu}_{ij} \times \mathrm{Black}_i\right) + \sum \delta_k X_{ik} + e_i. \quad (1)$$

The main dependent variable, y_i, is the 30-year cumulative earnings from 1982 to 2011 for individual i. All earnings are adjusted to 2011 dollars using the Consumer Price Index (i.e., series CPI-W). The actual dependent variable used in our regression models is the natural log of earnings (i.e., log earnings) in order to account for the high positive skew in earnings. Edu_{ij} refers to the highest level of education. To measure the *highest level of educational attainment* completed, j number of dichotomous variables are used to indicate: less than high school (LTHS); high school graduate (HSG); some college (SC); and bachelor's or higher degree (BA+). Note that the levels of education in our analyses reflect the respondent's highest level of education completed by the year 2004 (or 2008) as recorded in Wave 2 of the SIPP. For example, the DER includes the earnings of a graduate degree holder at age 22 even though he had not yet obtained his graduate degree by that age. Our models also control for age at the completion of the highest degree in order to account for how that variability may affect long-term earnings.[6]

[6] As a sensitivity analysis, we re-estimated our models after deleting those who completed their highest degree at age 29 or older. The results are quite similar. Nonetheless, we recognize that our analysis is inherently descriptive and we cannot assume that the effect of education is purely causal.

Our main interests are the interaction effects between education and black, γ_j. To facilitate interpretation, each level of education is interacted with the dichotomous variable for black (with the reference group being non-Hispanic whites), but no "main effect" for black is included in the model; the regression specification does not enter the dichotomous variable for African American by itself. Each interaction effect fully indicates the net effect of black at that educational level relative to comparable white men.

In Eq. (1), X_{ik} refers to other control variables. Several independent variables were constructed using the information in Wave 2 of the SIPP panels including a vector of *demographic characteristics* consisting of: age in 1982; the square of age in 1982; whether married before age 18; whether never-married; whether ever-divorced; and number of children. To further control for background characteristics, we construct a variable indicating whether the respondent was born in the South using the administrative data. A vector of additional *educational control variables* includes age at time of the completion of the highest degree; whether attended a private high school; whether college preparatory courses completed in high school; whether advanced placement courses in math and science were completed in high school; whether the field of study for the highest degree is in the area of science, technology, engineering, or math (i.e., STEM); whether the field of study for the highest degree is a business major; and whether the field of study for the highest degree is a law or medical degree. Most previous studies on racial differentials control for a limited number of demographic variables and levels of educational attainment. In this study, we account for the potential skill differences among the less-educated workers, which is measured by the type of high school and the courses taken during high school. These detailed variables on educational history are available from the Wave 2 topical modules.

Some of our regression specifications include controls for *work disability*. Several measures were constructed from the available survey and administrative data. First, a dichotomous variable based on topical-module SIPP information in Wave 2 indicates self-reported work-limiting disability. A related covariate is the age that the respondent retrospectively reported having first had the health condition responsible for their work limitation. Second, using several disability-related administrative files merged to the SIPP, a dichotomous variable indicates whether the respondent had ever-received a Social Security disability benefit over the 30-year observation period. The age when he first received this benefit is another control variable.

Two additional control variables utilize the matched longitudinal earnings records. The first is the number of years with self-employment earnings according to respondents' matched tax records. The second is employment history, defined as the number of years in which the respondent had zero earnings over the 30-year observational period (1982–2011). Regarding the latter variable, we emphasize that we do not assume that the number of years with zero earnings over the observational period is an exogenous independent variable (i.e., zero earnings in any given year is part of the dependent variable by construction). Rather, this covariate is used for purely descriptive purposes in order to ascertain the extent to which it statistically mediates the effects of other independent variables (particularly race).

Our analytic approach is to estimate a series of iterative regression models that include various sets of covariates. The results then provide a multivariate depiction of the extent to which the associations between African American and long-term earnings are statistically explained by the varying sets of covariates. The most basic model (i.e., Model 1) includes only the most clearly exogenous independent variables which are year of the survey, age, and educational level. Only the most complete model (i.e., Model 4) includes the number of years of zero earnings in order to assess (i.e., as an accounting exercise) how the effects of race may be partially explained by the lack of employment in the labor force.

In addition, we estimate the effects of being African American using the 2000 IPUMS, and then compare this result with those using the SIPP-IRS. We thus compare the results using the 30-year cumulative earnings with those using the conventional annual earnings. In these additional analyses, total annual earnings refer to all labor market income obtained in 1999. Control variables similar to those used in the SIPP-IRS analysis were constructed using the 2000 PUMS. Dichotomous variables include self-reported work-limiting disability; several categories of marital status; state of birth; current region of residence; self-employment; age; and the square of age. Dichotomous variables for education include less than high school (LTHS); high school graduate (HSG); some college (SC); and bachelor's or higher degree (BA+).

Empirical Findings

Descriptive Statistics

For descriptive purposes, Fig. 1 shows black–white differences in median annual earnings from 1982 to 2011 among men in the baby boom cohort (born 1949-1964) when treating the SIPP-IRS as repeated cross-sectional survey data. At the youngest ages of the cohort (i.e., age 18–33), the ratio of median yearly earnings for black men relative to white men is around 60% of that of white men and reaches a high of about 65% at ages 23–38 in 1987. Thereafter, the earnings gap grows with age. When the cohort reaches ages 47–62 in 2011, the median annual earnings of African American men is 45% of that of white men.

Table 1 displays descriptive estimates for long-term earnings (i.e., annual earnings added up across the entire 30-year period for each individual). The median long-term earnings (row A) for white men is $1,351,836, while for black men it is $814,503. These two figures imply an absolute racial differential of $537,333. Another way to assess the black–white earnings differentials is by considering log earnings (row B). Table 1 indicates that the mean log of long-term earnings is 13.992 for white men while for black men it is 13.329. Differences in logs are equivalent to proportionate differences. Taking the antilog of the difference yields $e^{-0.663} = 0.52$ which is the ratio of the geometric mean of long-term earnings for black men (i.e., $614,768) to the geometric mean of long-term earnings for white men (i.e., $1,193,022). This proportion of 0.52 implies that the average long-term

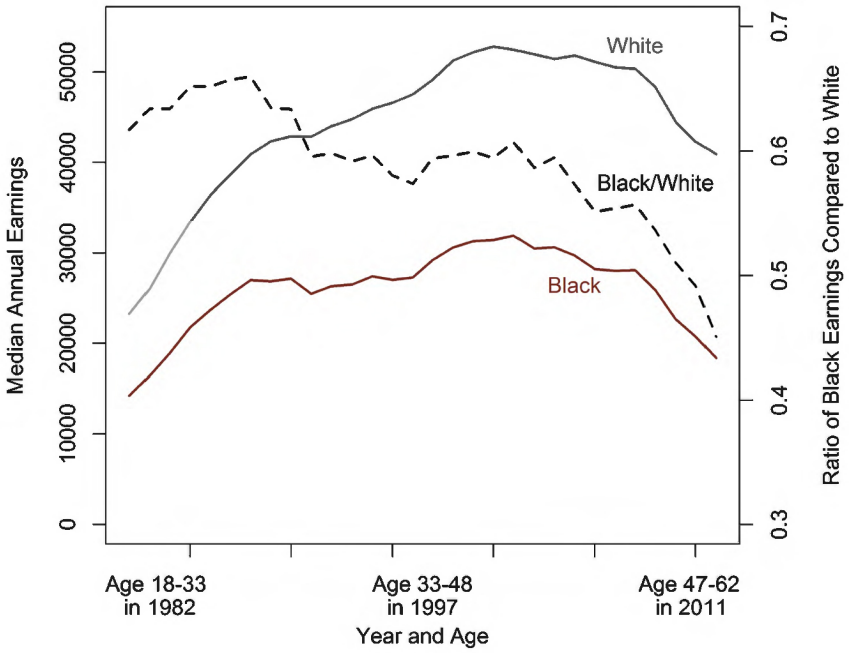

Fig. 1 Median annual earnings trajectory over the 30-year observational period for sample of baby boom men (born 1949–1964), by Race. *Notes* Data source is the SIPP-IRS matched file. Samples are limited to those with at least 1 year of positive earnings over the 30-year period. The left side Y-axis indicates white and black annual earnings, and the right side Y-axis indicates the ratio of black earnings compared to white earnings

earnings of African American men is 48% of that of white men (i.e., $1 - 0.52 = 0.48$).

Turning to single-year estimates based on the 2000 PUMS, Table 1 (row C) shows that the mean log of annual earnings is 10.250 for white men while for black men it is 9.786. The antilog values for these figures are lower than those for long-term earnings because annual earnings refers to only 1 year rather than 30 years. However, the difference of − 0.464 implies that the ratio of the geometric mean of annual earnings for black men to the geometric mean of annual earnings for white men is 0.63 (because $e^{-0.464} = 0.63$). The racial gap is thus 0.37 in terms of annual earnings. This gap (i.e., 0.37) is smaller than gap estimated using long-term earnings (i.e., 0.48).

Descriptive Statistics for Long-Term Earnings by Level of Education

Table 1 also shows descriptive estimates broken down by education level. Estimates of 30-year log earnings (row B) reveal differences in the long-term returns of a college degree within each racial group. For white men, the mean log is 14.444 for BA+ while it is 13.720 for HSG. The difference of 0.724 represents the increase in long-term earnings for a college degree among white men. In proportionate terms,

Table 1 Descriptive statistics

	White	Black	Gap (black–white)
A. 30 year earnings[a]			
Mean	1,669,101	959,300	− 709,801
10th percentile	444,177	151,054	− 293,123
50th percentile (median)	1,351,836	814,503	− 537,333
90th percentile	2,896,489	1,883,775	− 1,012,714
Median: less than high school	589,086	292,854	− 296,232
Median: high school graduates	1,090,048	688,870	− 401,178
Median: some college	1,269,421	880,844	− 388,577
Median: bachelor or higher	1,976,131	1,455,405	− 520,726
B. 30-year log earnings[a]			
Total	13.992	13.329	− 0.663
Less than high school	12.979	12.345	− 0.634
High school graduates	13.720	13.166	− 0.554
Some college	13.910	13.423	− 0.487
Bachelor or higher	14.444	14.066	− 0.378
C. Annual log earnings in 2000 from PUMS 1% file[b]			
Total	10.250	9.786	− 0.464
Less than high school	9.623	9.309	− 0.314
High school graduates	10.092	9.725	− 0.367
Some college	10.159	9.897	− 0.262
Bachelor or higher	10.786	10.499	− 0.287
D. Level of education (%)[a]			
Less than high school	4.6	9.9	5.3
High school graduates	26.5	34.5	8.0
Some college	35.9	39.9	4.0
Bachelor or higher	32.9	15.7	− 17.2
E. Work disability (received SSA DI/SSI benefit or self-reported work limitation)[a]			
Total	13.7	27.1	13.4
Less than high school	33.4	46.8	13.4
High school graduates	17.0	28.1	11.1
Some college	15.9	26.7	10.8
Bachelor or higher	5.7	13.3	6.1
Sample size	13,771	1552	

[a]Data source is the SIPP-IRS matched file

[b]Data source is the 2000 IPUMS 1% file. For Panels A, B, and C, all racial gap values are statistically significant at the 0.001 level (2-tailed test)

this yields $e^{0.724} = 2.063$. That is, long-term earnings for white men with a college degree is 106.3% greater than white men with only a high school degree. The college premium appears even larger among black men in our sample. Their mean

log of long-term earnings is 14.066 for BA+ while it is 13.166 for HSG. The difference of 0.900 represents the increase in long-term earnings for a college degree among black men ($e^{0.900} = 2.460$). In proportionate terms, long-term earnings for college-educated black men is 146.0% greater than that for black men with only a high school degree. Thus, the long-term return to a college degree is higher in percentage terms for black men, though they have lower earnings in absolute terms (both annually and long-term) compared to white men.

Table 1 shows black–white differences in 30-year log earnings by education (row B). For LTHS, the mean difference (black–white) is − 0.634; for HSG it is − 0.554; for SC it is − 0.487, while for BA+ it is − 0.378. These estimates indicate systematic declines in black–white differences in long-term earnings in relative terms at higher educational levels.

Using cross-section data on annual earnings in the 2000 PUMS, Table 1 also shows smaller black–white differences in earnings at higher educational levels, but the decline is less notable compared to long-term earnings. As is shown in Table 1 (row C), the racial difference in the mean annual log earnings for LTHS is − 0.314; for HSG it is − 0.367; for SC it is − 0.262, while for BA+ it is − 0.287. The negative net effect for African American men in terms of annual earnings seems to vary only moderately by educational level.

Researchers commonly assume that inequality in long-term earnings must be lower than inequality in cross-sectional or annual earnings because year-to-year volatility and random fluctuations are said to be averaged out over the course of a career (Breen and Chung 2015). However, in the case of African American men, our findings for these data indicate that long-term earnings inequality is actually greater than annual earnings inequality.[7] For that group, the inequality-enhancing process of cumulative advantage (DiPrete and Eirich 2006) exceeds the inequality-reducing averaging of transitory, annual fluctuations (Breen and Chung 2015). This finding calls attention to the error of assuming that earnings mobility must necessarily reduce long-term inequality (Fields and Ok 1996).

In regard to work disability, Table 1 shows a substantially lower prevalence for white men (14%) compared to black men (27%). The percentage with a work disability declines with higher educational attainment for both racial groups. However, black men have higher percentages than white men at every level.

Regression Estimates of Log Cumulative 30-Year Earnings by Level of Education

Table 2 shows the main results from the OLS multivariate regression models of 30-year cumulative log earnings using the SIPP-IRS data. Given our research concerns, we focus on the net effects relating to race. The main effect of being African American is omitted from the model specification in order to facilitate comparison. The interaction effects shown in Table 2 quantify the total net effect of being African American compared to equally educated whites net of control variables.

[7] These results are available upon request.

Table 2 OLS estimates of the interaction effect between black and educational level on 30-year cumulative log earnings from 1982 to 2011 using the SIPP-IRS matched data

	Model 1		Model 2		Model 3		Model 4	
	Coeffi	(SE)Sig	Coeffi	(SE)Sig	Coeffi	(SE)Sig	Coeffi	(SE)Sig
Interaction of black × education (ref = equally educated white)								
Black × LTHS	− 0.637	(0.150)***	− 0.517	(0.131)***	− 0.472	(0.129)***	− 0.204	(0.063)**
Black × HSG	− 0.545	(0.060)***	− 0.428	(0.048)***	− 0.429	(0.049)***	− 0.266	(0.028)***
Black × SC	− 0.475	(0.048)***	− 0.371	(0.039)***	− 0.348	(0.039)***	− 0.220	(0.024)***
Black × BA+	− 0.339	(0.055)***	− 0.261	(0.048)***	− 0.228	(0.046)***	− 0.237	(0.033)***
Control variables								
Survey year dummy	Yes		Yes		Yes		Yes	
Level of Education	Yes		Yes		Yes		Yes	
Age-in-1982, age-in-1982-squared	Yes		Yes		Yes		Yes	
Work disability			Yes		Yes		Yes	
Demographic covariates					Yes		Yes	
Other educational covariates					Yes		Yes	
Self-employment					Yes		Yes	
Years of zero earnings							Yes	
R^2	0.213		0.374		0.425		0.690	
Sample size	15,323		15,323		15,323		15,323	

Standard errors account for SIPP's stratified sample. Level of education includes dichotomous variables for less than high school, GED, some college, bachelor degree only, and graduate degree setting high school graduate as a reference group. Work disability consists of a dichotomous variable for self-reported work limitation; a dichotomous variable for ever-received Social Security disability benefit; age of first reported work limitation or disability; and age of first reception of Social Security disability benefit. Demographic covariates include dichotomous variables for never-married; married before age 18; ever-divorced; born in the South; and number of children. Educational covariates include age of the final degree; dichotomous variables for private high school; college preparation courses; advanced math and science courses (i.e., AP courses); STEM major; business major; and law/medicine major. Self-employment is measured by the number of years with self-employed earnings. Years of zero earnings indicate the number of years with zero earnings between 1982 and 2011

*< 0.05; **< 0.01; ***< 0.001 (2-tailed test)

The simplest specification is Model 1, which includes controls for only the most exogenous characteristics: age, age squared, and level of education with interactions by race, and a dummy variable indicating the SIPP survey year. While the full set of regression results is available upon request, Table 2 displays only the interaction terms for African Americans by educational level: − 0.637 for LTHS (which is − 047% because $e^{-0.637} - 1 = -0.47$); − 0.545 for HSG (− 42%); − 0.475 for SC (− 38%); and − 0.339 for BA+ (−29%). These estimates show that black men have lower long-terms earnings than white men even holding educational level and age constant. The extent of racial differences in long-term earnings declines systematically with educational level, from − 47% for LTHS to − 29% for BA+.

Model 2 adds the set of four covariates measuring work disability (self-reported work limitation, age the work limit began, receipt of disability benefit, age of first receipt). As we observed from the descriptive statistics, black men in our sample were more likely to have a work disability at some point over the 30-year observation period. Including these variables into the regression substantially attenuates the net effect of being African American from 13% for LTHS (from − 0.637 to − 0.517) to 8% for BA+ (from − 0.339 to − 0.261). Model 3 adds the set of covariates measuring self-employment, demographic characteristics, and other educational characteristics, including private high school attendance and college majors. Controlling for these independent variables in Model 3 modestly attenuates the net effect of being African American, but less so than Model 2. A larger black–white gap in long-term earnings at lower levels of education is still evident. The black–white gap in long-term earnings for LTHS remains about double the size of BA+ in Models 2 and 3. HSG also shows substantially larger black–white gaps than BA+.

Model 4 in Table 2 adds employment history (i.e., the number of years with zero earnings between 1982 and 2011). This variable is obviously not exogenous (more years of zero earnings will reduce long-term earnings) and is investigated only for descriptive purposes. Model 4 informs us whether the wider black–white gaps in long-term earnings among the less educated are associated with a higher prevalence of non-employment among black men with little education. The results for Model 4 do indeed show notably different patterns from Models 1 to 3. The differentials by education in Model 4—ranging from − 0.204 to − 0.266 by education level—are substantially narrowed indicating that black–white differences in employment history (in terms of years with zero earnings) statistically explains the larger net black–white gaps in long-term earnings at lower levels of education.

To further investigate the role of employment history, Fig. 2 documents the descriptive pattern of positive annual earnings over the 30-year observation period among black and white men by education. The left-hand side refers to the proportion of each racial group (indicated by solid lines) with positive earnings in a given year. The right-hand side refers to the difference between the two proportions in a given year (indicated by the dashed line). The simplest case is for BA+ men among whom the racial differences are small and hover around zero since over 90% as both groups report positive earnings in a given year (except at the earliest ages and at the oldest ages where the proportions are a little higher for whites). The racial

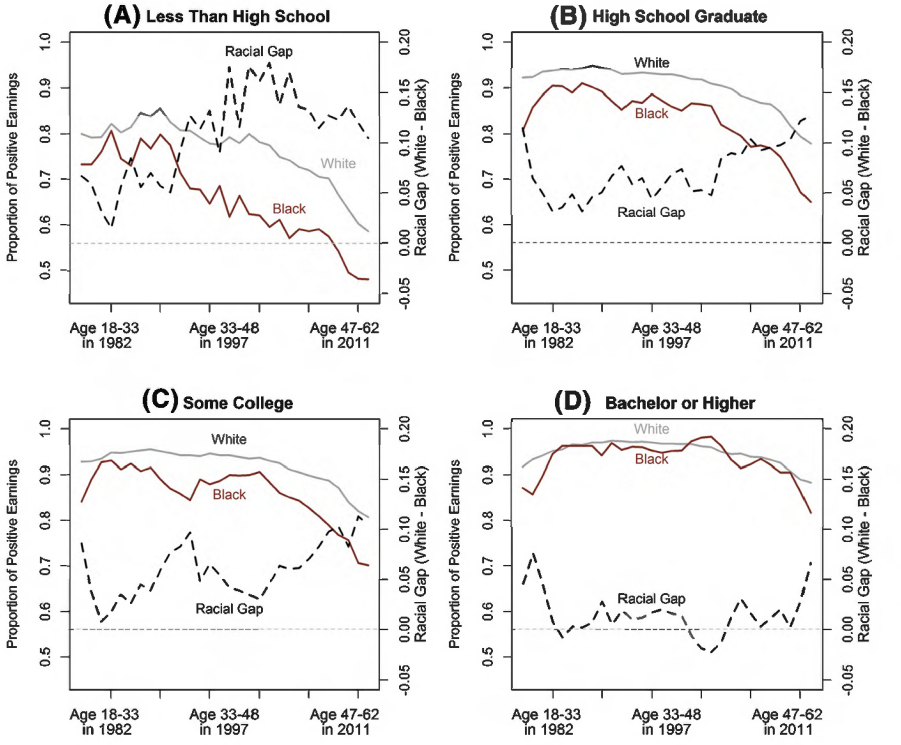

Fig. 2 The proportion of sample of men (born 1949–1964) with positive annual earnings in each year over the 30-year observational period, by race and level of education. *Notes* Data source is the SIPP-IRS matched file. Samples are limited to those with at least one year of positive earnings over the 30-year period. The left side Y-axis indicates the proportion of population who reported positive annual earnings while the right side Y-axis indicates the difference between white and black (i.e., the proportion white—the proportion black)

differences are slightly larger for HSG and SC men, than for BA+, but are still generally below a differential of 0.10.

By contrast, LTHS shows the sharpest racial difference in Fig. 2. For many of the years over our 30-year observational period (except at the younger ages,) the racial differential in employment among LTHS is greater than 0.10, and exceeds 0.15 in several of the years around the middle of the 30-year period. This descriptive finding is consistent with the contrasts between Models 3 and 4 which find years with zero earnings (which in turn is partly but not entirely associated with ever having a work disability) playing an important role in mediating the size of the net effect of race for LTHS black men.

Next, we consider whether our estimates based on long-earnings differ from estimates based on cross-sectional, log annual earnings using the 2000 IPUMS (see Table 3). Model 5 is the simplest specification that includes only age, age squared, and level of education with interactions by race. This regression using the 2000 IPUMS is the analogue for Model 1 in Table 2 using the SIPP-IRS. The results for

Table 3 OLS estimates of the interaction effect between black and educational level on annual log earnings using the 2000 IPUMS 1-percent file

	Model 5		Model 6		Model 7	
	Coeffi	(SE)Sig	Coeffi	(St.Err.)Sig	Coeffi	(St.Err.)Sig
Interaction of black × education (ref = equally educated white)						
Black × LTHS	− 0.389	(0.021)***	− 0.375	(0.021)***	− 0.270	0(.021)***
Black × HSG	− 0.380	(0.013)***	0.362	(0.013)***	− 0.284	(0.012)***
Black × SC	− 0.330	(0.012)***	− 0.313	(0.012)***	− 0.256	(0.012)***
Black × BA+	− 0.328	(0.014)***	− 0.315	(0.014)***	− 0.265	(0.014)***
Control variables						
Level of education	Yes		Yes		Yes	
Age, age squared	Yes		Yes		Yes	
Work disability			Yes		Yes	
Demographic covariates					Yes	
Self-employment					Yes	
R^2	0.162		0.167		0.215	
Sample size	242,802		242,802		242,802	

Samples are limited to those who are born in 1949 to 1964 (age 36–51 in 2000); reported positive earnings in 2000; and non-Hispanic single race US-born whites and blacks. Level of education includes dichotomous variables for less than high school, some college, bachelor degree only, and graduate degree. Work disability variable is a dichotomous variable for self-reported work limitation. Demographic covariates include dichotomous variables for marital status, birth states, and dichotomous variables for region of current residence. Self-employment is measured by a dichotomous variable

*< 0.05; **< 0.01; ***< 0.001 (2-tailed test)

Model 5 indicate smaller racial gaps in single-year earnings by education relative to Model 1 (Table 2) using long-term earnings. Although statistically significant, the differences in the black–white gaps by education are narrower in Model 5. For LTHS, the racial gap in earnings is $e^{-0.389} - 1 = -0.32$ while for BA+ it is $e^{-0.328} - 1 = -0.28$.

Model 6 in Table 3 using the 2000 PUMS adds a measure of self-reported work disability and is the analogue for Model 2 in Table 2 using the SIPP-IRS. The estimated racial gaps by education are slightly lower in Model 6 compared to Model 5, but the change is relatively minor. This is different from the results reported for Models 1 and 2 using long-term earnings because work disability is more highly associated with total earnings in the course of 30 years than in just 1 year among labor market participants.

Model 7 (Table 3) adds the demographic control variables and self-employment status and reflects a typical log-earnings specification. Including these additional controls reduces the estimated black–white differences in log earnings by education relative to Model 6. However, in contrast to the results for Model 3, the difference in the racial interaction terms across education is not statistically significant in Model 7. The coefficients estimated in Model 7 are in fact similar to those in Model 4 which controls for men's employment history. These results imply that the estimate of the net effect of race for less-educated African Americans using annual earnings

is likely to underestimate the net negative effect in terms of long-term earnings associated with the exclusion of African American men from the labor markets.

Additional Exploratory and Sensitivity Analyses

The results of several exploratory regressions are shown in Table 4. For Model 8, the sample is limited to respondents with very high work attachment over the entire 30-year observational period, defined as those who had positive annual earnings in at least 29 of the 30 years.[8] Men who had zero earnings in two or more years out of 30 years are removed. The results for Model 8 yield the lowest net black–white differences in long-term earnings by education for any of our models. The racial interaction terms are still statistically significant but their magnitudes are roughly half as large as the coefficients for Model 3 in Table 2 using the original sample. Furthermore, the racial effects are no longer systematically greater at lower educational levels. Only HSG stands out as being slightly more negative (i.e., − 0.260). These results reveal that the larger black–white gaps in long-term earnings as estimated in previous models are indeed associated with a disproportionate share of black men who have more than 2 years of zero earnings in their employment history.

Model 9 is based on the sample that excludes men who had a work disability at least once during the 30-year period. The results indicate larger racial effects across education than in Model 8. The estimates of the racial interaction terms are fairly close to those in Model 3. The one minor difference is that, in comparison with Model 3, the net black–white gap for LTHS is slightly smaller in absolute value in Model 9.

Model 10 excludes men who had a work disability before age 30 (as opposed to Model 9 which excludes men with a work disability at any age during the observational period). The rationale motivating Model 10 is that work disabilities that occur before age 30 may be somewhat more likely to derive from factors other than long-term low earnings itself, and may therefore be more likely to be exogenous with respect to the labor market. However, most of the estimates (except for LTHS) for Model 13 are very similar to those in Model 12 indicating that the net negative effect of race is similar whether the work disability occurs before or after age 30.

The one exception is for LTHS men. At that educational level, the black–white gap in long-term earnings is larger in Model 10 than in Model 9. This contrast suggests that work disabilities after age 30 are an important factor associated with the net negative effect of race in long-term earnings for LTHS. On the other hand, the contrast between the parameter estimates for LTHS between Models 8 and 9 suggests that work disability alone do not account for the net racial effect at that

[8] Table 4 are the results restricting the target sample as described in each model. To address the concern that the SIPP surveys are not designed to draw a random sample within the subpopulation we analyzed in Table 4 so that standard errors and significance levels can be different from the random sample of subpopulation, we did additional analyses with the "subpop" option of Stata's svy commands. New results are almost identical with Table 4 (not shown here). No statistical significance levels for the estimated interaction effects in Table 4 are changed in the new estimates.

Table 4 OLS estimates of the interaction effect between black and educational level on 30-year cumulative log earnings from 1982 to 2011 using various samples from the SIPP-IRS matched data

	Model 8		Model 9		Model 10	
	OLS using samples who reported 29 or 30 years of positive earnings		OLS using samples excluding ever disabled		OLS using samples excluding those who disabled before age 30	
	Coeffi	(SE)Sig	Coeffi	(SE)Sig	Coeffi	(SE)Sig
Interaction of black × education (ref = equally educated white)						
Black × LTHS	− 0.190	(0.077)*	− 0.364	(0.176)*	− 0.520	(0.138)***
Black × HSG	− 0.260	(0.030)***	− 0.434	(0.047)***	− 0.426	(0.048)***
Black × SC	− 0.185	(0.029)***	− 0.330	(0.042)***	− 0.354	(0.041)***
Black × BA+	− 0.166	(0.036)***	− 0.242	(0.043)***	− 0.233	(0.046)***
Control variables						
Survey year dummy	Yes		Yes		Yes	
Level of education	Yes		Yes		Yes	
Age-in-1982, and squared-term	Yes		Yes		Yes	
Work disability	Yes					
Demographic covariates	Yes		Yes		Yes	
Other educational covariates	Yes		Yes		Yes	
Self-employment	Yes		Yes		Yes	
R^2	0.350		0.288		0.384	
Sample size	10,228		12,991		15,063	

Standard errors account for SIPP's stratified sample design. Level of education includes dichotomous variables for less than high school, GED, some college, bachelor degree only, and graduate degree setting high school graduate as a reference group. Work disability consists of a dichotomous variable for self-reported work limitation; a dichotomous variable for ever-received Social Security disability benefit; age of first reported work limitation or disability; and age of first reception of Social Security disability benefit. Demographic covariates include dichotomous variables for never-married; married before age 18; ever-divorced; born in the South; and number of children. Educational covariates include age of the final degree; dichotomous variables for private high school; college preparation courses; advanced math and science courses (i.e., AP courses); STEM major; business major; and law/medicine major. Self-employment is measured by the number of years with self-employed earnings

*< 0.05; **< 0.01; ***< 0.001 (2-tailed test)

educational level. Many LTHS African American men have more than 2 years of zero earnings even when they do not have a work disability per se.

Discussion and Conclusion

In sociological research, analyses of class inequality have often been limited to the study of annual earnings, but often the concept of class implicitly refers to long-term socioeconomic resources. Thus, Weber refers to class as relating to "life chances"

but the latter are better represented by long-term earnings than by cross-sectional earnings.

Using data on long-term earnings, our analysis reveals several new findings. First, as a basic descriptive result, the black–white differential in long-term earnings is larger than in annual earnings. When using the 2000 IPUMS as an illustrative cross-sectional dataset, the overall black–white gap in annual earnings is 37% as opposed to 48% for long-term earnings. These two estimates are not dramatically different, but when broken down by level of education, more substantial differences in the racial gap emerge. In particular, the earnings differential for black men without a high school degree is notably more negative when estimated using long-term earnings compared to annual earnings (47 vs 27%, respectively) while the difference between long-term and annual earnings for a college-educated worker is negligible.

Although less evident in cross-sectional studies, our analysis of long-term earnings reveals a more negative racial effect at lower levels of education. In other words, educational level substantially moderates the net effect of being African American among men. In comparison to the racial differential among the college-educated, African American men without a college degree have a more negative net racial effect. African American men without a high school degree have the most negative net racial effect. The latter is still evident albeit slightly attenuated after controlling for work disability, demographic characteristics, and detailed measures of educational achievement (Model 3). By contrast, the black–white gaps in annual earnings are not significantly different across educational levels after controlling for a similar set of covariates because cumulative disadvantage is less apparent in a single year using cross-sectional data that exclude men who are currently out of the labor force.

These racial interactions by educational level are statistically explained away after further controlling for respondents' employment history (i.e., years of zero earnings in Model 4). When men's work histories are taken into account, the net racial effect in long-term earnings for the highly educated is not statistically different from that for the less educated. A college education thus weakens the mechanisms that lead to black men having more unstable work careers in the labor market. As shown in Fig. 2, the racial differential in the proportion with zero earnings is greatest among LTHS men.

In addition to education, work disability is another confounding factor associated with more unstable work careers especially among African American men. The less educated are more likely to self-report work limits and to receive a Social Security disability benefit than the highly educated. At the same time, black men are more likely to self-report work limits and to receive a Social Security disability benefit than white men at all educational levels. Controlling for a work disability moderates some but not a large portion of the net racial effect at all educational levels as is evident in the comparison of the racial interactions in Models 1 and 2.

Work disability occurred after age 30 appears to be most pertinent to aggravating the net effect among LTHS black men. Controlling for being ever disabled (Model 9) versus having a disability before age 30 (Model 10) does not substantively affect the net racial effect among HSG, SC, or BA+ men. The net racial effect for LTHS

black men in Model 9 is, however, significantly attenuated compared to the net racial effect for LTHS black men in Model 10. This implies that work disabilities incurred after age 30 are associated with relatively lower long-term earnings among LTHS black men who thereby have reduced work careers in the formal economy and greater cumulative disadvantage relative to LTHS white men.

Work disabilities incurred after age 30 are more likely to be primarily endogenous (i.e., the consequence of poor working conditions and low wages). Low earnings over a period of many years is likely associated not only with higher health risks but also with reduced access to health care and a narrower scope of available jobs with better work conditions. Longitudinal data spanning 30 years suggest that the increased occurrence of work disabilities among LTHS black men is a mediating factor that partially explains their lower long-term earnings relative to LTHS white men.

From a broader substantive perspective, we interpret these findings as indicating that compared to either less-educated white men or highly educated black men, the long-term earnings of less-educated African American men are likely to be more negatively affected by the consequences of residential and economic segregation, unemployment, being out of the labor force, incarceration, and consequentially poorer health (Wilson 1987; Pettit 2012). These negative outcomes likely aggravate or reinforce each other. For example, being unemployed may lead to greater participation in the informal economy that can then lead to incarceration which reduces one's work experience and employability (Western 2002; Gangl 2006; Pager et al. 2009; Wakefield and Uggen 2010). The interaction between these phenomena in the social lives of African American men results in a statistical interaction that reduces the long-term earnings for less-educated African American men in comparison to less-educated white men or highly educated black men.

In conclusion, our analysis shows that the overall black–white earnings gap among men is somewhat understated by investigating only annual earnings. Annual earnings differentials also do not indicate a significant net racial interaction by educational level. Because the negative effects of racial minority status and reduced educational attainment unfold over a work career, long-term earnings differentials reveal that the net racial effect is more negative at lower educational levels even after taking into account a rich set of controls. The major intervening factor associated with the lowered long-term earnings is the relatively larger number of years with zero earnings over the careers of black men with low levels of education.

From a policy point of view, our findings underscore the importance of Wilson's (1996) emphasis on increasing employment opportunities among African American men. Particularly among less-educated African American men, long-term earnings is substantially compromised by the repeated lack of annual earnings over the work career which is further aggravated with increased chances of developing a work disability after age 30. In part due to this policy relevance, sociological and demographic research should place a renewed focus on the study of the sources of full employment and the reduction of underemployment especially for less-educated African American men.

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References

Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. *Handbook of Labor Economics, 4,* 1043–1171.

Autor, D. H., Katz, L. F., & Kearney, M. S. (2008). Trends in U.S. wage inequality: Revising the revisionists. *Review of Economics and Statistics*, *90*(2), 300–323.

Berg, I., & Kalleberg, A. L. (2001). Emerging labor market structures: Contexts and correlates. In I. Berg & A. L. Kalleberg (Eds.), *Sourcebook of labor markets evolving structures and processes* (pp. 3–29). New York: Kluwer Academic/Plenum Publishers.

Bertrand, M., & Mullainathan, S. (2004). Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American Economic Review, 94,* 991–1013.

Bloome, D. (2014). Racial inequality trends and the intergenerational persistence of income and family structure. *American Sociological Review, 79,* 1196–1225.

Breen, R., & Chung, I. (2015). Income inequality and education. *Sociological Science, 2,* 454–477.

Cappelli, P. (2001). Assessing the decline of internal labor markets. In I. Berg & A. L. Kalleberg (Eds.), *Sourcebook of labor markets evolving structures and processes* (pp. 207–245). New York: Kluwer Academic/Plenum Publishers.

Carnevale, A. P., Rose, S.J., & Cheah, B. (2013). The college payoff: Education, occupations, lifetime earnings. Georgetown University Center on Education and the Workforce.

Cheng, S. (2014). A life course trajectory framework for understanding the intracohort pattern of wage inequality. *American Journal of Sociology, 120,* 633–700.

Davis, J., & Mazumder, B. (2011). An analysis of sample selection and the reliability of using short-term earnings averages in SIPP-SSA matched data. US Census Bureau Center for Economic Studies Paper No. CES-WP-11-39.

DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology, 32,* 271–297.

Duggan, J. E., Greenlees, J. S., & Gillingham, R. (2007). Mortality and lifetime income: Evidence from US social security records. No. 7-15. International Monetary Fund Working Paper #7-15.

Duncan, G. J., & Magnuson, K. (2011). The nature and impact of early achievement skills, attention skills, and behavior problems. In G. J. Duncan & R. J. Murnane (Eds.), *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 47–70). New York: Russell Sage Foundation.

Fairlie, R. W., & Sundstrom, W. A. (1997). The racial unemployment gap in long-run perspective. *The American Economic Review, 87,* 306–310.

Farley, R. (1996). *The new American reality*. New York: Russell Sage Foundation.

Fields, G. S., & Ok, E. A. (1996). The meaning and measurement of income mobility. *Journal of Economic Theory, 71,* 349–377.

Gangl, M. (2006). Scar effects of unemployment: An assessment of institutional complementarities. *American Sociological Review, 71,* 986–1013.

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.

Hirsch, B. T., & Winters, J. V. (2014). An anatomy of racial and ethnic trends in male earnings in the US. *Review of Income and Wealth, 60,* 930–947.

Hollister, M. (2004). Does firm size matter anymore? The new economy and firm size wage effects. *American Sociological Review, 69,* 659–676.

Hollister, M. (2011). Employment stability in the US labor market: Rhetoric versus reality. *Annual Review of Sociology, 37,* 305–324.
Hout, M. (2012). Social and economic returns to college education in the United States. *Annual Review of Sociology, 38,* 379–400.
Iceland, J., & Wilkes, R. (2006). Does socioeconomic status matter? Race, class, and residential segregation. *Social Problems, 53,* 248–273.
Jarvis, B. F., & Song, X. (2017). Rising intragenerational occupational mobility in the United States, 1969 to 2011. *American Sociological Review, 82,* 568–599.
Kalleberg, A. L. (2003). Flexible firms and labor market segmentation effects of workplace restructuring on jobs and workers. *Work and Occupations, 30,* 154–175.
Kalleberg, A. L. (2009). Precarious work, insecure workers: Employment relations in transition. *American Sociological Review, 74,* 1–22.
Kim, C. H., & Sakamoto, A. (2008). The rise of intra-occupational wage inequality in the United States, 1983 to 2002. *American Sociological Review, 73,* 129–157.
Kim, C. H., & Sakamoto, A. (2010). Assessing the consequences of declining unionization and public sector employment: A density decomposition of rising inequality from 1983 to 2005. *Work and Occupations, 37,* 119–161.
Kim, C. H., & Tamborini, C. R. (2006). The continuing significance of race in the occupational attainment of whites and blacks: A segmented labor market analysis. *Sociological Inquiry, 76,* 23–51.
Kim, C. H., & Tamborini, C. R. (2012). Do survey data estimate earnings inequality correctly? Measurement errors among black and white male workers. *Social Forces, 90,* 1157–1181.
Leicht, K. T. (2008). Broken down by race and gender? Sociological explanations of new sources of earnings inequality. *Annual Review of Sociology, 34,* 237–255.
Lichter, D. T. (1988). Racial differences in underemployment in American cities. *American Journal of Sociology, 93,* 771–792.
Massey, D. S., & Denton, N. A. (1993). *American apartheid: Segregation and the making of the underclass*. Cambridge: Harvard University Press.
Maxwell, N. L. (1994). The effect on black-white wage differences of differences in the quantity and quality of education. *Industrial and Labor Relations Review, 47,* 249–264.
Morgan, S. L., & Tang, Z. (2007). Social class and workers' rent, 1983–2001. *Research in Social Stratification and Mobility, 25,* 273–293.
Mouw, T. (2016). The impact of immigration on the labor market outcomes of native workers: Evidence using longitudinal data from the LEHD. US Census Bureau Center for Economic Studies Paper No. CES-WP-16-56.
Owens, A., Reardon, S. F., & Jencks, C. (2016). Income segregation between schools and school districts. In press at *American Education Research Journal.*
Pager, D., & Shepherd, H. (2008). The sociology of discrimination: Racial discrimination in employment, housing, credit, and consumer markets. *Annual Review of Sociology, 34,* 181–209.
Pager, D., Western, B., & Bonikowski, B. (2009). Discrimination in a low-wage labor market: A field experiment. *American Sociological Review, 74,* 777–799.
Pais, J. (2014). Cumulative structural disadvantage and racial health disparities: The pathways of childhood socioeconomic influence. *Demography, 51,* 1729–1753.
Pettit, B. (2012). *Invisible men: Mass incarceration and the myth of black progress*. New York: Russell Sage Foundation.
Pettit, B., & Western, B. (2004). Mass imprisonment and the life course: Race and class inequality in U.S. incarceration. *American Sociological Review, 69,* 151–169.
Quillian, L. (2003). The decline of male employment in low-income black neighborhoods, 1950–1990. *Social Science Research, 32,* 220–250.
Reardon, Sean F., & Bischoff, Kendra. (2011). Income Inequality and Income Segregation. *American Journal of Sociology, 116,* 1092–1153.
Ruggles, S., Genadek, K., Goeken, R., Grover, J., & Sobek, M. (2015). *Integrated public use microdata series: Version 6.0* [dataset]. Minneapolis: University of Minnesota. http://doi.org/10.18128/D010.V6.0.
Sakamoto, A., & Kim, C. H. (2014). Bringing productivity back in: Rising inequality and economic rents in the U.S. manufacturing sector, 1971 to 2001. *The Sociological Quarterly, 55,* 282–314.
Sakamoto, A., & Wang, S. X. (2017). Occupational and organizational effects on wages among college-educated workers in 2003 and 2010. *Social Currents, 4,* 175–195.

Sum, A., Khatiwada, I., McLaughlin, J., & Palma, S. (2011). No country for young men: Deteriorating labor market prospects for low-skilled men in the United States. *The Annals of the American Academy of Political and Social Science, 635,* 24–55.

Takei, I., & Sakamoto, A. (2008). Do college-educated, native-born Asian Americans face a glass ceiling in obtaining managerial authority. *Asian American Policy Review, 17,* 73–85.

Tamborini, C. R., Kim, C. H., & Sakamoto, A. (2015). Education and lifetime earnings in the United States. *Demography, 52,* 1383–1407.

Tomaskovic-Devey, D., Thomas, M., & Johnson, K. (2005). Race and the accumulation of human capital across the career: A theoretical model and fixed-effects application. *American Journal of Sociology, 111,* 58–89.

Wakefield, S., & Uggen, C. (2010). Incarceration and stratification. *Annual Review of Sociology, 36,* 387–406.

Weeden, K. A., & Grusky, D. B. (2005). The case for a new class map. *American Journal of Sociology, 111,* 141–212.

Western, B. (2002). The impact of incarceration on wage mobility and inequality. *American Sociological Review, 67,* 526–546.

Western, B., & Pettit, B. (2005). Black-white wage inequality, employment rates, and incarceration. *American Journal of Sociology, 111,* 553–578.

Wilson, W. J. (1987). *The truly disadvantaged*. Chicago: University of Chicago Press.

Wilson, W. J. (1996). *When work disappears*. New York: Vintage.

Wilson, V., & Rodgers III, W. M. (2016). *Black-white wage gaps expand with rising wage inequality*. Economic Policy Institute. Retrieved from http://www.epi.org/files/pdf/101972.pdf.

Wilson, F. D., Tienda, M., & Wu, L. (1995). Race and unemployment: Labor market experiences of black and white men, 1968-1988. *Work and Occupations, 22,* 245–270.

Zajacova, A., Montez, J. K., & Herd, P. (2014). Socioeconomic disparities in health among older adults and the implications for the retirement age debate: A brief report. *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 69,* 973–978.