Lifetime Earnings Differences across Black and White Individuals: Years Worked Matter

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U nderstanding differences in earnings between Black and white individuals is important to designing policies and programs aimed at reducing these differences. Most research on this topic has focused on differences in earnings across individuals at a point in time—for example, over the course of a month or a year. However, this approach may understate labor market inequality between Black and white individuals, especially if their lifetime employment differs. Indeed, a large body of research has shown that unemployment rates of Black and white workers differ substantially and persistently over the business cycle. Differences in the incidence of unemployment may translate into differences in years worked over an entire career. Thus, entire lifetime earnings histories may provide a more accurate picture of labor market inequality.

In this article, we go beyond point-in-time measures of earnings and examine lifetime earnings differences between Black and white individuals. We find that, on average, Black individuals earn about one-third less than white individuals over the course of their lifetime (a difference equivalent to about $550,000), though the size of this gap varies by sex and education level. Differences in years worked are an important contributor to this average Black-white earnings gap as well as the gaps between Black and white individuals of different sexes or educational backgrounds. For example, on average, college-educated Black women have higher lifetime earnings than college-educated white women because Black women work more years over the course of their lives. In addition, Black men without a high school degree have lower lifetime earnings than similarly educated white men; fewer years worked among Black men explains the majority of this gap. Overall, these examples highlight how differences in years worked, which are not captured by point-in-time measures, contribute substantially to earnings differences between Black and white individuals.

Section I briefly describes the data and how lifetime earnings are measured. Section II documents the overall Black-white lifetime earnings gap. Section III breaks down the overall gap by sex, education, and the interaction of the two, and reveals how the gap and its drivers change depending on the characteristics of the population in question.

I.   Defining and Measuring the Black-White Lifetime Earnings Gap

Earnings trajectories can differ across individuals for reasons we cannot easily measure, and these differences have consequences over a lifetime. For example, two individuals with identical demographic characteristics and with the same starting pay may experience different earnings trajectories throughout their careers. Over the course of a lifetime, these differences in earnings growth accumulate and lead to differences in lifetime earnings.

Importantly, these trajectories can differ across individuals with different demographic characteristics. For example, earnings trajectories may differ across men and women if women are more likely to leave the labor force to have or raise children. Aside from sex, earnings trajectories can also differ by education. For example, high school graduates tend to enter the

workforce earlier than college graduates and thus begin earning sooner. Finally, even after accounting for sex and education, earnings trajectories can differ by race. Focusing on average hourly earnings (that is, point-in-time measures), Daly, Hobijn, and Pedtke (2017) find that nearly half of the Black-white earnings gap cannot be explained by easily observable factors such as sex or education.

To observe individuals' entire lifetime earnings trajectories as well as demographic characteristics such as race, we use data from the U.S. Census Bureau's Survey of Income and Program Participation Synthetic Beta (SSB). These data combine the strength of survey-based and administrative data by linking individuals surveyed in the Survey of Income and Program Participation (SIPP) to earnings data based on records from the Social Security Administration (SSA) and the Internal Revenue Service (IRS). The SIPP is a nationally representative longitudinal survey that captures a host of demographic characteristics (such as race and education) that are typically not available in administrative data alone. By linking individuals in this survey to earnings data from the SSA and IRS, the SSB allows us to construct lifetime earnings histories for a large sample of individuals with little to no reporting error—a sample that we can then decompose by sex and education.

Sample selection, variable definitions, and methodology

To ensure we capture individuals' entire lifetime earnings histories, we impose some restrictions on our sample. First, we examine only individuals whom we can track for many years. Specifically, we restrict our attention to those who were age 18–25 in 1978, when our sample starts. We then follow these individuals through 2014, the last year for which data are available, when they were age 54–61.[1] We further restrict our sample to individuals with at least two years of positive earnings. We consider "positive" earnings as earnings exceeding $7,000 in a year, which roughly corresponds to working part-time (20 hours per week) at the federal minimum wage ($7.25 in 2018) over the course of 50 weeks. Because our sample is based on individuals with SSA records, most individuals have at least some earnings; thus, these restrictions do not significantly affect our main results.

The two key variables of interest in our dataset are race and lifetime earnings. In the SSB, race is coded as Black, white, or other. We exclude the "other" category from our analysis as it only comprises about 5 percent

of respondents. As we have no information on ethnicity, our "white" category includes both white Hispanic and white non-Hispanic individuals. We construct lifetime earnings by summing up annual earnings at the individual level (adjusted for inflation in 2018 constant dollars). Additional details of our variable construction appear in the appendix.

Using this sample, we measure the gaps in lifetime earnings between Black and white individuals both in dollar and percentage terms. A positive gap in dollars reflects how many fewer dollars a Black individual earns compared with their white counterparts. Similarly, a positive gap in percentage reflects how much less Black individuals earn compared with their white counterparts (calculated as white minus Black earnings divided by white earnings).

In addition to measuring the size of these gaps, we also provide a basic framework to assess what drives them. As a pure matter of accounting, lifetime earnings are the product of years worked and average earnings per year. In our analysis, we measure years worked as the number of years in which an individual has positive earnings (specifically, earnings above the $7,000 threshold discussed previously).

Because lifetime earnings are the product of years worked and average earnings per year, our accounting framework ascribes differences in lifetime earnings to three factors: differences in the number of years worked, differences in earnings per year, and the combined effects of differences in both years worked and earnings per year, which can be thought of as a residual. First, differences in the number of years worked across individuals (holding earnings per year fixed) may reflect, among other things, differences in health or family structures. For example, some individuals may temporarily leave the labor force to have or care for children, reducing their total number of years worked. Second, differences in earnings per year (holding years worked fixed) may reflect differences in individuals' skills or specific occupations. For example, neurosurgeons may work the same number of years as primary care physicians but earn more due to specialization. Third, once we allow for both years worked and earnings per year to vary, the combination of these two differences helps explain the remaining dispersion in lifetime earnings differences. For example, college graduates have higher lifetime earnings than high school graduates not only because they tend to work more years, but also because they earn additional pay over a high school graduate during

those years. Thus, this third factor captures the combined or cumulative effect of working more years at a higher pay rate.

This accounting framework clearly highlights why point-in-time (or cross-sectional) earnings measures understate earnings differences across individuals relative to lifetime earnings measures. Critically, point-in-time measures do not account for differences in years worked. Therefore, they cannot account for the first and third factors in our decomposition. Although combining point-in-time measures with some measure of employment history can help address this issue, this procedure is likely to yield imprecise estimates, as it does not account for the way individuals' earnings change over the course of their careers. Earnings tend to grow with age (or time in the labor market), and the rates of growth differ across individuals.[2] Our lifetime earnings measure, by contrast, includes earnings from all years of an individual's career, thus requiring us to make no assumptions about earnings growth.

II.   A First Look at the Black-White Lifetime Earnings Gap

Using our data source, we first assess the size and drivers of the overall Black-white lifetime earnings gap. The first column of Table 1 shows that the Black-white lifetime earnings gap is about $550,000 dollars. Equivalently, Black individuals earn 34 percent less than what white individuals earn over an entire lifetime, as seen in the parentheses. To put this lifetime earnings gap in context, Wilson and Rodgers (2016) estimate a Black-white hourly wage gap of roughly 22 percent between 1979 and 2015. Our reported lifetime earnings gap is 34 percent, suggesting Black-white earnings differences at a point in time (that is, cross-sectional differences) accumulate and lead to even larger differences over an entire lifetime.

As discussed previously, this earnings gap can arise due to differences in the number of years worked, differences in earnings per year, or a combination of the two. To provide some initial insight into these potential drivers, the second and third columns in Table 1 show the size (in levels and percent) of differences in years worked and earnings per year across Black and white individuals. The second column shows that Black individuals on average work 2.3 fewer years than white individuals (or 8 percent less). Meanwhile, the third column shows that Black individuals on average earn about $16,000 fewer dollars per year

Table 1

Black-White Gap in Lifetime Earnings, Years Worked, and Earnings per Year

	Lifetime earnings gap	Difference in years worked	Difference in earnings per year
	(1)	(2)	(3)
Overall Black-white gap	$550,000 (34 percent)	2.3 (8 percent)	$16,000 (28 percent)

Note: Percent figures in parentheses represent the corresponding gap in percent relative to white individuals.
Sources: SIPP Synthetic Beta and authors' calculations.

Chart 1

Contributions to Black-White Lifetime Earnings Gap
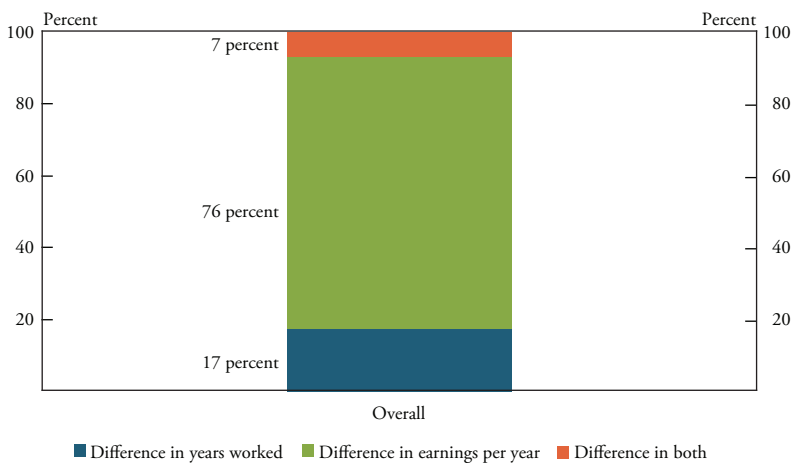
Sources: SIPP Synthetic Beta and authors' calculations.

worked (or 28 percent less) compared with white individuals. Although these differences are large, their relative importance in shaping the overall gap is not clear.

To answer that question, Chart 1 displays how differences in years worked, earnings per year, and the combination of the two contribute to the overall gap. As represented by the stacked green bar, differences in average earnings per year worked between Black and white individuals account for the majority of the gap, or roughly 76 percent. Meanwhile, differences in years worked, the blue bar, explain about 17 percent of the gap. Finally, the combination of more years worked at higher earnings per year accounts for the remaining 7 percent of the gap.

This result emphasizes that focusing only on earnings per year, and not years worked, understates the Black-white earnings gap. Specifically, ignoring differences in years worked across Black and white individuals understates the gap by 24 percent, reducing it in dollar terms from $550,000 to $417,000. Thus, lifetime earnings appear to provide a more complete measure of labor market inequality than point-in-time earnings.

III. Breaking Down the Black-White Lifetime Earnings Gap by Sex and Education

Although the overall Black-white earnings gap is large, the size of the gap as well as its drivers are likely to vary by sex and education levels. To account for potential differences, we next examine the Black-white lifetime earnings gap for men and women separately and then further decompose each group into four education groups: those with less than a high school diploma, those with a high school diploma only, those with some college (for example, an associate degree or unfinished bachelor's degree), and those with a bachelor's degree or higher.

Black-white lifetime earnings gap among women by education

Table 2 displays how lifetime earnings differ by education among Black and white women. The top row of the table shows that restricting the sample to just women reduces the Black-white lifetime earnings gap from $550,000 (or 34 percent) to $154,000 (or 14 percent). This reduction is partially due to a smaller difference in the number of years worked between Black and white women. The middle column of Table 2 shows the gap in years worked between Black and white women is only 0.3 years (or about four months), much smaller than the 2.3-year difference in years worked between Black and white workers overall.

The remaining rows of this table show that the lifetime earnings gap between Black and white women varies significantly by education level. For example, the difference in lifetime earnings between Black and white women without a high school diploma is $31,000 (or 7 percent). This gap rises to nearly $90,000 (or 8 percent) among women with some college. Most strikingly, the gap reverses sign to –$27,000 among women with a bachelor's degree or higher, suggesting Black women with a bachelor's degree or higher tend to earn more over their lifetimes than similarly educated white women. The main driver for

Table 2
Black-White Gaps in Lifetime Earnings, Years Worked, and Earnings per Year among Women by Education

Education level	Lifetime earnings gap	Difference in years worked	Difference in earnings per year
All women	$154,000 (14 percent)	0.3 (1 percent)	$5,500 (13 percent)
Less than high school	$31,000 (7 percent)	0.1 (1 percent)	$1,600 (7 percent)
High school	$83,000 (10 percent)	0.6 (2 percent)	$2,600 (8 percent)
Some college	$87,000 (8 percent)	0 (0 percent)	$3,400 (8 percent)
Bachelor's degree or higher	–$27,000 (–2 percent)	–2.5 (–9 percent)	$4,000 (7 percent)

Note: Numbers in parentheses represent the corresponding gap in percent relative to white individuals.
Sources: SIPP Synthetic Beta and authors' calculations.

this negative gap is that Black women with a bachelor's degree or higher work nearly 2.5 years more over their lifetimes than similarly educated white women despite receiving lower earnings per year. As a result, Black women earn more compared with white women over their entire lifetimes even though point-in-time data would suggest the opposite.

Although it is hard to know exactly what might be driving the greater number of years worked among Black women with a bachelor's degree, this finding is consistent with other research. For example, work by Li (2022) documents that the "child penalty" (that is, the reduction in labor market income after childbirth) is lower among Black women than white women. In particular, she finds that the smaller child penalty among high-wage Black women is because their labor force participation rate barely moves in the years following the birth of their first child, whereas the participation rate of high-wage white women declines. This observation is consistent with our finding of more years worked among Black women with a bachelor's degree than white women. More broadly, however, our result once again highlights the importance of using data on lifetime earnings rather than point-in-time measures. Point-in-time measures do not capture the higher lifetime labor supply of Black women with a bachelor's degree, which is a critical force in accounting for their higher lifetime earnings.

Black-white lifetime earnings gap among men by education

In contrast with the results for women, the top row of Table 3 shows that the lifetime earnings gap between Black and white men is much larger than the overall gap. Specifically, the lifetime earnings gap grows from $550,000 (or 34 percent) for Black and white workers overall to $917,000 (or 42 percent) for Black and white men. Again, differences in years worked appear to contribute to this gap: the gap in years worked rises from about two years for Black and white workers overall to four years for Black and white men.

Even after accounting for educational differences across Black and white men, the lifetime earnings gaps remain large, with no reversal in any of the educational categories. In percentage terms, the lifetime earnings gap never falls below 30 percent and reaches a maximum of 41 percent for Black and white men with a bachelor's degree or higher.

Although differences in lifetime earnings among men do not vary in a clear and systematic fashion with educational attainment, differences in years worked and earnings per year do. The middle column of Table 3 shows that the gap in years worked among Black and white men narrows with education: although years worked rise along with educational attainment for both Black and white men, they tend to rise more among Black men. For example, among men with less than a high school diploma, Black men work roughly 21 years, whereas white men work 26 years. For men with a bachelor's degree or higher, Black men work 30 years, whereas white men work 33 years. Accordingly, the percentage rise in years worked across these two educational categories is 43 percent for Black men and only 27 percent for white men. Because of this dynamic, differences in years worked between Black and white men fall from 21 percent (for men with less than a high school education) to 8 percent (for men with a bachelor's degree or higher).

However, in contrast to the narrowing in years worked, differences in earnings per year tend to increase with education. Indeed, although earnings per year rise along with educational attainment for both racial groups, they rise by less for Black men compared with their white counterparts. For example, among men with less than a high school diploma, Black men earn a little over $32,000 per year, whereas white men earn $39,000 per year. Among men with a bachelor's degree or higher, Black men earn slightly more than $69,000 per year, whereas

Table 3
Black-White Gaps in Lifetime Earnings, Years Worked, and Earnings per Year among Men by Education

Education level	Lifetime earnings gap	Difference in years worked	Difference in earnings per year
All men	$917,000 (42 percent)	4.1 (13 percent)	$23,300 (34 percent)
Less than high school	$358,000 (35 percent)	5.5 (21 percent)	$6,900 (18 percent)
High school	$533,000 (33 percent)	3.7 (12 percent)	$12,500 (24 percent)
Some college	$585,000 (31 percent)	3.6 (11 percent)	$13,000 (22 percent)
Bachelor's degree or higher	$1,440,000 (41 percent)	2.7 (8 percent)	$38,300 (36 percent)

Note: Numbers in parentheses represent the corresponding gap in percent relative to white individuals.
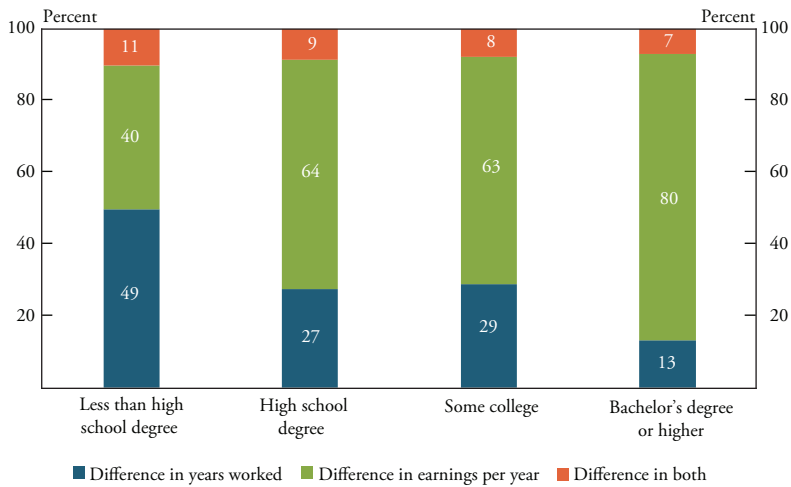Sources: SIPP Synthetic Beta and authors' calculations.

white men earn close to $108,000 per year. The according percentage increase in earnings per year across these two educational categories is 115 percent for Black men but 177 percent for white men. As a result, differences in earnings per year rise from 18 percent (for men with less than a high school diploma) to 36 percent (for men with a bachelor's degree or more).

As a consequence of these two trends, the contributors to the lifetime earnings gap for men across educational categories show some systematic patterns. The blue bars in Chart 2 show that the contribution of differences in years worked decreases with educational attainment, falling from roughly 50 percent for men with less than a high school degree to 13 percent for men with a bachelor's degree or higher. In contrast, the green bars show that the contribution of differences in earnings per year increases with educational attainment, rising from 40 percent for men with less than a high school degree to 80 percent for men with a bachelor's degree or higher.

A key implication of this decomposition is that point-in-time estimates would fail to capture a substantial portion of lifetime earnings differences across Black and white men. Indeed, the portion of the gap that is not solely due to earnings per year (that is, the sum of the blue and orange bars) ranges from 20 percent (among men with a bachelor's degree or higher) to 60 percent (among men with less than a high

Chart 2

Contributions of Black-White Lifetime Earnings Gap among Men by Education

Sources: SIPP Synthetic Beta and authors' calculations.

school diploma). This finding reiterates the usefulness of lifetime earnings measures for a more holistic understanding of earnings differences between Black and white individuals.

Our finding that Black men have fewer years with positive earnings than white men is consistent with several recent studies highlighting differences in employment outcomes between Black and white men. Using data from the American Community Survey, Bayer and Charles (2018) document that since the 1970s, Black men have become systematically more likely than white men to report that they are "not currently working."[3] Relatedly, Cajner and others (2017) document using data from the Current Population Survey that the low labor force participation rate of Black men is largely unexplained by observables. Thus, these positive earnings differences may reflect hard-to-measure factors such as school quality or pre-market skills (Neal and Johnson 1996). They may also be related to the disproportionate rise in incarceration rates of Black men (Bayer and Charles 2018; Neal and Rick 2014). Additionally, Bertrand and Mullainathan (2004) and Kline, Rose, and Walters (2022) have found large differences in callback rates for job applicants based on signals of race, suggesting discrimination in

hiring could also be driving the persistently large differences in years worked between Black and white men.

Discussion

Our results emphasize that point-in-time measures of earnings likely understate labor market inequalities, as differences in years worked play an important role in explaining the Black-white lifetime earnings gap for both men and women. Indeed, among Black women with a bachelor's degree, years worked are so important that they offset the fact that Black women earn less per year than their white counterparts. Moreover, for men, differences in years worked are so important that they account for up to 60 percent of the lifetime earnings gap between Black and white men with less than a high school diploma.

However, our data and analysis may themselves understate the quantitative importance of employment differences across Black and white individuals for two reasons. First, because our data are collected at an annual frequency, they are silent about periods of nonemployment that last only a few weeks or months. Indeed, even though Black unemployment rates are systematically much higher than white unemployment rates, spells of unemployment or nonemployment that resolve themselves within a year are not easily detectable within our data. Thus, our measure of average earnings per year worked potentially encodes high-frequency (for example, daily, weekly, or monthly) differences in nonemployment across races. A broader measure of employment or nonemployment would encompass both our measure of years worked and, for example, weeks within the year worked.

Second, our decomposition is an accounting rather than causal framework. In other words, it cannot determine whether differences in years worked affect differences in earnings per year (and vice versa) or whether a third factor is affecting both. To this point, Bayer and Charles (2018) highlight the importance of educational attainment, particularly among men, in determining their chances of being employed. According to their estimates, college-educated men are roughly 22 percentage points more likely to work than men with less than a high school degree. At the same time, several studies have documented that the labor market returns to schooling are large (Lemieux 2006; Juhn, Murphy, and Pierce 1993). Thus, education affects both years worked and earnings per year.

Conclusion

Understanding disparate labor market outcomes across racial groups is a topic of perennial interest. Much of the previous work on earnings differences by race has focused on documenting and understanding relative earnings differences at a point in time between Black and white individuals. We quantify differences over an entire lifetime and find that they are large and, in fact, larger than those implied by point-in-time measures. Black and white individuals work a different number of years across their productive lifetimes, and point-in-time measures do not capture these differences.

We also find that these differences depend heavily on sex and education. For example, Black women with a bachelor's degree or higher, on average, work nearly three more years over their lifetimes than similarly educated white women. These extra years of work lead Black women with a bachelor's degree to out-earn their white counterparts—even though they have lower earnings per year. At the other extreme, Black men with less than a high school diploma work nearly six fewer years than similarly educated white men. This vast difference in years worked accounts for up to 60 percent of the measured lifetime earnings gap between these two groups.

The importance of years worked to Black-white earnings differentials provides empirical support to Federal Reserve policy aimed at reducing the unemployment rate and keeping people employed in a context of price stability. Focusing specifically on race, Aaronson and others (2019) and Hotchkiss and Moore (2022) have shown that a hot labor market is generally associated with disproportionately large declines in the unemployment rates of Black and Hispanic women and men. Our analysis suggests declines in unemployment can have economically meaningful effects on lifetime earnings of Black workers to the extent that the declines in unemployment can be sustained.

Appendix

Dataset and Variable Creation

This data appendix provides a more detailed discussion of the dataset used in the analysis along with information on the creation of our variables.

The SIPP Synthetic Beta (SSB) version 7.0

Version 7.0 of the SSB was released in December 2018 and combines standardized variables from nine panels of the Survey of Income and Program Participation (SIPP) with administrative W-2 earnings records and benefit information.[4] This combined dataset includes the 1984, 1990, 1991, 1992, 1993, 1996, 2001, 2004, and 2008 panels and is called the SIPP Gold Standard File (GSF).

From the GSF, the Census Bureau created four entirely synthetic versions of the SSB. They also synthesized a missing data pattern for each implicate consistent with the data missing in the original dataset.[5] These four synthetic implicates were housed for public use in Cornell University's virtual Research Data Center. Our analysis code, while constructed and tested using the four synthetic implicates, was run on the GSF by the Census Bureau. The output from this code was released to us and are the results presented in the paper.

Variable definitions

While our dataset features all the earnings and demographic data we need for our analysis, we still must create our own variables that match our preferred definitions. This can mean combining variables or recoding the values in variables we already have. We construct some of our most important variables as follows:

Lifetime earnings. We follow Mustre-del-Río and Pollard (2019) in constructing annual earnings variables. Specifically, we add together total earnings from FICA-covered jobs and total earnings from non-FICA jobs for each person for each year and convert these values into real 2018 dollars using the seasonally adjusted annual CPI-U all-items series.

In our analysis, we focus on years worked and earnings per year worked. Therefore, it is particularly important to define what a year worked really means. Because we do not want to include years with minimal labor market attachment, we exclude years in which a person's

real annual earnings were $7,000 or less in real 2018 dollars when calculating their lifetime earnings. The $7,000 threshold is close to what an individual would have made if they had worked 20 hours a week at the federal minimum wage in 2018. Consequently, to generate a lifetime earnings variable, we add up all real annual earnings exceeding $7,000 over the entire sample for each person. We also create a variable for years worked by counting up the number of years in which a person's real annual earnings are greater than $7,000.

Demographic variables. Besides lifetime earnings information, our analysis also requires a range of demographic information. We use the sex, race, and education variables from the SSB. The sex variable has two values in the SSB: male and female. The race variable has three values: white, Black, and other. Finally, the education variable has five categories: less than a high school diploma, high school diploma, some college (for example, an associate degree or unfinished bachelor's degree), college degree (defined as a bachelor's degree), and graduate degree. We combine college degree and graduate degree into a single category.

Endnotes

[1]We exclude all individuals who died while in the sample.

[2]See, for example, Guvenen (2009) for evidence on differences in the growth rate of earnings across individuals.

[3]While in 1970 Black men were roughly 10 percentage points more likely to report "not currently working" compared with white men, by 2010 this measure essentially doubled.

[4]To learn more about the SSB version 7.0, please see Benedetto, Stanley, and Totty (2018).

[5]For this version of the SSB, the Census Bureau left missing values as missing in the GSF rather than imputing missing values as in previous versions. This results in one GSF and four synthetic implicates as opposed to the four GSFs and 16 synthetic implicates present in version 6.0.

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