

The Enduring Effects of Racial Discrimination on Income and Health[†]

SHARI J. ELI, TREVON D. LOGAN, AND BORIANA MILOUCHEVA*

We investigate the effect of income on the long-standing racial mortality gap in the United States by using evidence from White and Black Civil War veterans who went on to receive postwar pensions. To circumvent endogeneity, we propose an exogenous source of variation in pension income: the judgment of the doctors who certified disability. We find large effects of pension income on longevity; large enough to close the Black–White mortality gap, in principle. However, because physicians discriminated against Blacks when evaluating the existence and severity of disabilities, Blacks received reduced pension benefits that failed to eliminate racial mortality gaps in practice. Our findings shed light on the role of beliefs about race, as opposed to racial animus, in contributing to racial differentials in well-being. (JEL H55, I12, I14, I24, J15, N31)

1. Introduction

Today, life expectancy for Black men trails that of White men by 4.5 years.¹ In 1900, the Black–White life expectancy gap was double the current one—approximately 9

years—and Black life expectancy itself was only 42 years.² While the gap in life expectancy between the races has certainly narrowed over the twentieth century, it persists despite the Black gains in health status and recent declines in longevity among White men (Case and Deaton 2017).

Given longstanding racial disparities in health, there is a large literature that explores the causes and evolution of the mortality gap. One strand of this literature posits that socioeconomic differences between the races explains the gap. Another focuses on the role of public health interventions (Boustan and Margo 2016). There is an emerging literature, however, on the impact of racial beliefs in the medical community. Alsan and Wanamaker (2018) show that the disclosure

*Eli: Department of Economics, University of Toronto, and NBER. Logan: The Ohio State University and NBER. Miloucheva: Department of Economics, University of Toronto. We thank Marcella Alsan, Rodney Andrews, Dora Costa, Gerald Jaynes and seminar participants at the Federal Reserve Bank of Minneapolis, University of Maryland, and Yale University for their comments. We thank William Biscarri, Kathleen Chen, Chris Roudiez, Carlos Villareal, Noelle Yetter, and Andrea Zemp for research assistance. We gratefully acknowledge the financial support of the Social Sciences and Humanities Research Council of Canada, Connaught Fund, and the National Institute on Aging (P01 AG10120). All errors are our own.

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¹Source: <https://www.cdc.gov/nchs/products/databriefs/db244.htm>.

²See Boustan and Margo (2016) for a discussion on best estimates of death rates of Blacks in the period.

of the Tuskegee Study of Untreated Syphilis in the Negro Male in 1972, a national study where Black men with syphilis were untreated for the entirety of the study, increased mistrust of physicians among older Black men, which explains 35 percent of the life expectancy gap between the races in 1980. Recent evidence also shows that Black patients are prescribed fewer pain medications and offered fewer treatments, relative to Whites (Hoffman 2003, Goyal et al. 2015).

In this paper, we investigate the differential effect of income on longevity between the races. To do this, we use historical military records from the cohort of Union Army (UA) veterans who fought for the North during the American Civil War (1861–65). These records contain information on the military, health, and socioeconomic experience of veterans. One benefit of using data on the UA cohort is that we have information on pension income, health status over the lifecycle, date of death, and cause of death.³ Another benefit is that our analysis is not confounded by public health interventions or medical advances, as the UA cohort lived in an era when health status was largely unaffected by these factors.⁴ Instead, the effects of income on health in this period largely operated through improvements in living standards and nutrition. Fogel (2004) and McKeown (1976) have emphasized the role of increases in standards of living, and in particular improvements in nutrition, as having most affected mortality prior to the

introduction of modern medical techniques and medicines such as antibiotics.⁵

In order to investigate the differential effect of pensions (income) on health, we exploit the random assignment of physicians to UA veterans. We provide the first known links of veterans to Pension Bureau physicians by collecting and digitizing new records containing the entire history of physician turnover at the Pension Bureau. Thus, we are able to identify the physicians responsible for each exam and link them to individual diagnostic records, which contain the physicians' beliefs about veterans and their health conditions.

For a given condition, we find that physicians' beliefs, as expressed in pension records, influenced the amount of pension awarded. Furthermore, we find that an additional dollar of monthly pension income, which is equivalent to a 10 percent increase relative to the average pension, led to an additional 0.3 years of life for all veterans. Finally, we find that the disparity in pension income that resulted from physician bias and racial discrimination explains nearly *all* of the gap in health outcomes between the races.

We then investigate whether racial bias among physicians was more prevalent when veterans presented with conditions that were difficult to diagnose (such as a digestive condition) and therefore more sensitive to physician judgment, as opposed to an easily verifiable condition such as a gunshot wound. We show that while physicians were much more likely to comment on the personality traits of Black veterans as opposed to White veterans, there were no racial differences in veteran reports of aches or pain.

³These records originate from the US Pension Bureau and were digitized by the Early Indicators Project at the NBER.

⁴Our study focuses on individuals in *rural* areas from 1897 to 1906. Therefore, individuals in our sample were not subject to *urban* public health interventions of the era such as water purification and filtration (see Alsan and Goldin 2019, Cutler and Miller 2005, Ferrie and Troesken 2008).

⁵Scholarly work using veterans' records from the late nineteenth and early twentieth centuries, has shown that increases in income led White veterans to retire earlier, improve the quality of their living arrangements, and make other behavioral changes to increase longevity and reduce morbidity (Costa 1995, 1997; Eli 2015).

Our empirical investigation of racial discrimination among physicians is in line with and inspired by the medical literature of the late nineteenth century. Indeed, the American medical establishment frequently advanced the position that “Black bodies” were inferior to White ones through scientific study, which led some physicians to believe that the health of Black veterans would not benefit from increased pension income at all.⁶ In our analysis, we show that Pension Bureau physicians, who were White men in this era, were less convinced of the veracity of the symptoms that Black veterans reported.⁷ This disbelief on the part of physicians resulted in smaller pension awards for Blacks relative to Whites and thus in fewer years of life lived.

The results of our work are relevant to the literature on health disparities and racial discrimination today in several important ways. First, the literature on race differentials in health focuses more on access to care and less on the beliefs of physicians when rating and treating subjective conditions such as pain. Second, physicians are still required to certify illnesses and disabilities for veterans seeking pension awards from the Veterans Administration (VA), and the VA still uses a similar rating system as its predecessor—the Union Army Pension Bureau. Third, our work uses a novel historical dataset in which we have information on health conditions spanning an individual’s entire life as well as age at death. Thus, we can observe and measure the profound negative consequences that racial discrimination had on race differentials in health and longevity, since our follow-up periods are considerably longer than those of studies on individuals in the modern era. This allows us to see the lasting

effects of physician bias on racial health disparities.

2. *Historical Background*

2.1 *The War Experience of White and Black Union Army Veterans*

Between 1861 and 1865, over 2.7 million men fought in the US Civil War, and approximately 2.1 million of those men enlisted on the Union side. Within the Union Army, The United States Colored Troops comprised approximately 186,017 Black soldiers, three-quarters of whom were born into slavery, though many were free by the time of enlistment (Humphreys 2008).

The White battle mortality rate (4.5 percent) was significantly higher than that for Blacks (1.8 percent) owing to the fact that Blacks were purposely kept out of battle whenever possible (Humphreys 2008, p. 10). Whites were sent into battle more frequently than Blacks because of common beliefs in the period that Blacks were less “courageous” than Whites. A second reason why Blacks saw fewer battles than Whites was that Blacks were believed to have greater immunity to pernicious diseases of the South, such as malaria, than Northern Whites of the Union Army and were therefore thought to be better used in field posts (*ibid.* p. 45). While Black soldiers were in part recruited for their perceived immunity to disease, they in fact suffered from higher rates of diarrhea, dysentery, pneumonia, tuberculosis, smallpox, and malaria. Therefore, the Black mortality rate during the war was higher despite the fact that Whites saw significantly more battle. Furthermore, even though Blacks suffered higher rates of wartime morbidity and mortality, they had greater difficulty gaining admission to army hospitals than Whites (Humphreys 2013). Even when Blacks were able to get care in hospitals, the condition of Black hospital wards was hardly therapeutic,

⁶See Hoffman (1896) for examples of scientific racism prevalent in the medical community in the period.

⁷Wilson (2010) provides a discussion of this pattern of discrimination by doctors.

as they were unsanitary and lacking in food, clean bedding, clothing, and medicine for their patients (ibid. p. 79).

2.2 *Race Differentials in Pension Receipt among Union Army Veterans*

By the General Pension Act of 1862, veterans could claim pensions if they faced illnesses or disabilities attributable to the war. To prove disability, veterans were required to send their applications to the Pension Bureau and state their health condition. Then, the Bureau assigned each veteran to an examining surgeon⁸ in his local area who certified whether the veteran did, in fact, suffer from the disabilities stated on his application. The examining surgeon then completed a *surgeons' certificate* outlining the disabilities and their relationship to the veteran's war experience, which was sent back to the Pension Bureau for adjudication.

After the passage of the Invalid Pensions Act of 1890, both White and Black veterans could claim pensions for disabilities that were *unrelated* to the war experience. To initiate a pension application, veterans claimed an illness or injury and then were assigned to a physician (or board of three physicians) by the Pension Bureau.⁹ These physicians were tasked with certifying that a veteran did indeed face the illness or injury that he reported in his application. The assignment of a veteran to an examining surgeon was made by the Pension Bureau, which meant that veterans were unable to select a particular physician. Combined with long wait times for a medical examination, the frequent turnovers of the physicians

meant that any attempts to see “more generous” physicians failed (Eli 2015).

While pension legislation did not differ for White and Black veterans, Blacks faced difficulty securing pensions. Between 1861 and 1934, the application success rate for White veterans was 92.6 percent, while the rate for Blacks was 75.4 percent (Shaffer 2004, p. 209). Furthermore, conditional on receiving a pension during the period between 1879 and 1900, the White/Black ratio in pension awards climbed from 1.106 to 1.273 (Wilson 2010). The most common reason for pension denial (or lowered pensions) for Blacks relative to Whites was due to the inability of Black veterans to prove their disabilities. Disabilities deserving of pensions included those that were verifiable during an exam, such as hernias, and those that were diagnosed on the basis of symptoms stated by the veteran, such as chronic diarrhea.¹⁰ Symptom lists from White veterans were more likely to be trusted by examining surgeons, while lists from Black veterans were largely considered suspect. Testimony from Black veterans was considered to be “reliable” by examining surgeons if the veteran displayed appropriate behavior typical of middle-class Whites (Shaffer 2004, p. 130). Racial discrimination toward Black veterans led surgeons to assign lower disability ratings to Blacks as compared to Whites. Since physician reports for Black veterans frequently had lower disability ratings, Pension Bureau adjudicators were more likely to award lower pensions to Black veterans. Indeed, as figure 1 demonstrates, average payouts to Black and White veterans diverged after the enactment of the Invalid Pensions Act

⁸ After 1884, the Pension Bureau hired boards of surgeons instead of single surgeons to perform exams.

⁹ We consider a board of physicians to be equivalent to a single surgeon since only a single physicians' report (or surgeons' certificate) is written by each board.

¹⁰ Wilson (2010) shows that the Black/White approval ratio for pensions when claiming a hernia was 0.896 whereas the rate was 0.404 for diarrhea. For other unverifiable conditions, such as back pain and hearing loss, the Black/White approval rates were 0.397 and 0.216 respectively.

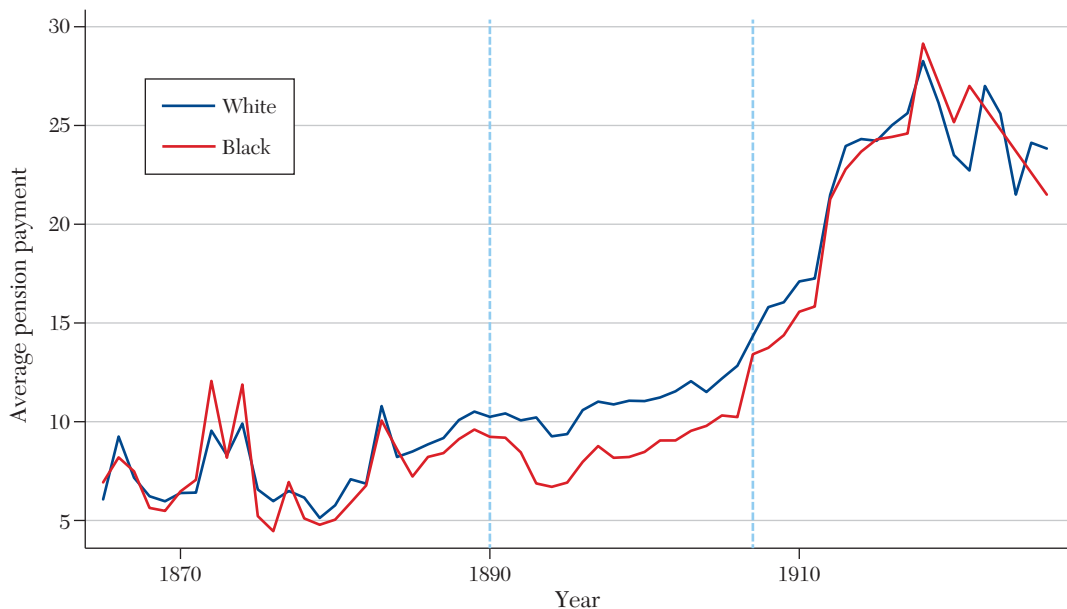


Figure 1. Average Monthly Pension Receipt

Notes: Dashed lines indicate the passage of two laws liberalizing rules for pension receipt: the Invalid Pensions Act of 1890 and the Pension Act of 1907. During this period, there is a divergence in average pension payments to White and Black veterans.

Source: authors' calculations.

of 1890. This is because after 1890 pension adjudicators relied heavily on *subjective* judgments of examining surgeons, whereas previous pension laws mandated that pension awards be paid to veterans based on easily (or objectively) verified illnesses and injuries such as a gunshot wound or loss of a hand.

By the Pension Act of 1907, pensions were awarded to veterans based on proof of their age, rather than disability. The Sherwood Act of 1912 and Veteran's Service Pension Act of 1918 further increased the age-based pensions. Thus, after 1907, it was no longer necessary for the majority of pensioners to undergo exams.

3. Data

3.1 Union Army Data

We use the UA Dataset of White veterans and the United States Colored Troops (USCT) sample of Black veterans as compiled by the Early Indicators Project.¹¹ Information in these datasets comes from three sources: the military, pension and medical records; surgeons' certificates; and census records, which together contain

¹¹UA sample (NIA P01 AG10120, PI: Fogel), and Expanded United States Colored Troops (USCT) sample (NIA P01 AG10120, PI: Costa).

TABLE 1
SUMMARY STATISTICS FOR WHITE AND BLACK UNION ARMY VETERANS BY 1897

	White	Black
Pension received	11.12	7.89
Enlistment records		
Birth year	1839.36	1840.15
First enlistment height	67.8	66.698
Slave status at birth (%)	0	76
War experience		
Initial rank is PVT (%)	91.4	93.5
Number of wounds in battle	0.6	0.2
Disease conditions ever present (%) and death		
Diarrhea	21.8	11.5
Respiratory	14.1	16.5
Infectious	16.4	19.0
Cardiovascular	53.8	47.9
Digestive	23.9	13.8
Endocrine	5.9	2.4
Genitourinary	7.1	7.6
Age at death	75.9	74.1
Number of veterans who apply or on rolls by 1897	2,567	1,438
Number of exams	3,630	2,511

Note: Veterans in the sample include those who applied for the first time as well as those already on the rolls.

socioeconomic and demographic data. In particular, they contain information regarding the recruit's town and state of enlistment as well as his place of birth, which together are used to determine the slave status of Black recruits.¹²

It is unclear whether Black veterans were representative of the average Black male in the United States after the war. By contrast, the sample of veterans contained in the Union Army sample is representative of White men found in the 1900 Census (Costa 2008, p. 2-3). Of the soldiers who fought for the Union Army, the UA Data group collected records for nearly 40,000 White

veterans and 6,187 Black veterans.¹³ Despite being subject to the same laws, Whites were able to secure higher pensions than Blacks. Table 1 shows that Black veterans received an average monthly pension of \$7.89 while Whites received \$11.12. Table 1 also contains summary statistics on age at death, state of residence, and occupation for Black and White veterans. Table 1 shows that White veterans lived longer (consistent with figure 2), but also appear to have suffered more from disease conditions.

¹²Black veterans enlisting from slave states are counted as having been enslaved at enlistment.

¹³We confine our analysis to the subsample of veterans on the pension rolls by 1897 because we only have information on boards of examining surgeons beginning in 1897 (see section 3.2).

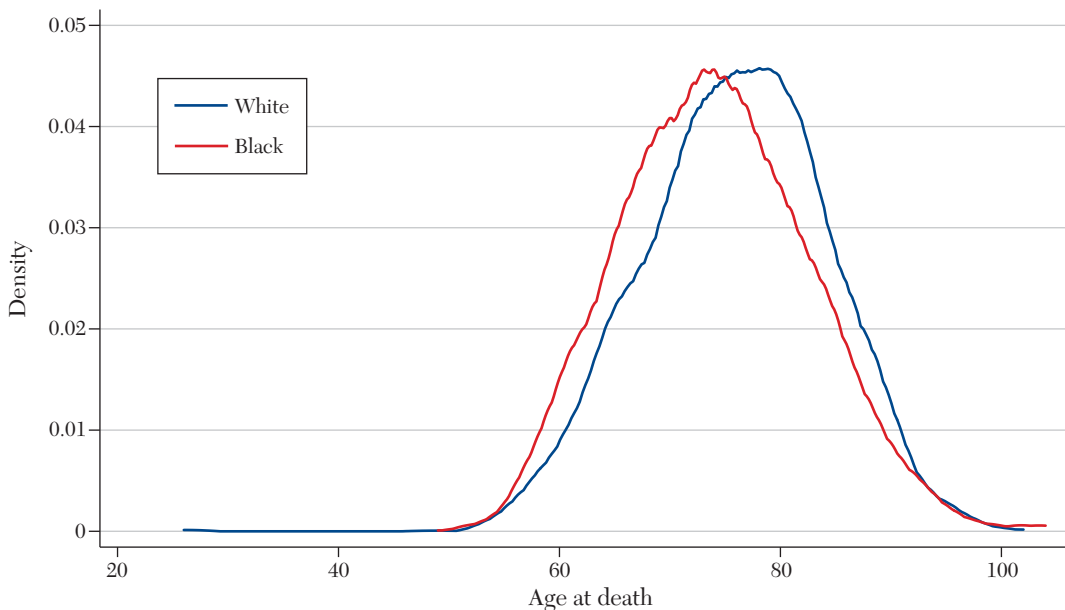


Figure 2. Distribution of Age at Death by Race

Source: authors' calculations.

3.2 Examining Surgeons Dataset

To determine patterns of physician subjectivity, we collected and digitized the Pension Bureau's *Rosters of Examining Surgeons* from 1897 to 1907 found in the National Archives and which contain the following: 1) town, county, and state of exam; 2) the names of surgeons at each exam; 3) reason for the appointment or removal of surgeons from their post.¹⁴ On average, examining surgeons in our sample served for 1.86 years and performed six examinations.

¹⁴The *Roster* contains information on examining surgeons for the years 1892–1928. The roster images for the years 1892–96 are illegible so our data coverage begins in 1897.

We then match the surgeon(s) to veterans for each exam by linking the surgeon's address from the rosters to the address found on each surgeon's certificate. It is not possible to match veterans to surgeons by linking the surgeons' names from the certificates to names in the roster because the Union Army data does not contain the surgeons' names. For this reason, we create links using address. Additionally, because the *Roster of Examining Surgeons* did not consistently contain information on the street address of the physicians, matching an exam to a physician in large cities where multiple physicians served is not possible. Importantly for our analysis, veterans were not necessarily assigned to the surgeon within their town, and thus the geography of surgeons' offices does not dictate our results.

3.3 Controls

First, we include a slave status indicator equal to 1 if the veteran was born in the South. This indicator variable is necessary since early-life disease environments, which differ across free and slave states, can affect later-life disease-specific mortality rates. Then, we control for the veteran's birth year, height at enlistment, the number of battle wounds, and whether the veteran was enlisted in the rank of private, which all characterize the war experience of the veteran and can have impacts on pension income.

To control for health status at the exam, we construct indicator variables equal to 1 if a veteran had an illness described on a surgeons' certificate. We group morbidity conditions into the following categories: respiratory, digestive, diarrhea, infectious, cardiovascular, endocrine, genitourinary.¹⁵ We then construct an index measure of morbidity conditions present at the veterans' previous exam (lagged health index). Thus, we are able to capture changes to the underlying health of the veteran that could also drive changes in pension receipt. Finally, we include a set of regional identifiers (north, south, border, and west regions) to capture broad geographic differences in health outcomes.

4. Empirical Strategy

Prior to 1907, the Pension Bureau awarded payments to veterans based on the degree of their disabilities, which causes pension income to be endogenous with respect to health outcomes. Without instrumenting, the effect of pensions on mortality will be biased, causing it to appear as though pension increases cause higher mortality. The instrument we use is a measure of the subjectivity of the board of examining physicians that the

veteran sees. In particular, we use the average pension rating recommended by a board for all other veterans they examined—the leave-one-out mean (LOOM).

To use the LOOM as an instrument for pensions, we must satisfy the following exclusion restriction: conditional on control variables, the LOOM cannot impact mortality through any other channel except pensions. In particular, the health status of Black veterans must be independent with respect to the average generosity of the physicians. Because veterans did not receive any useful medical treatment from examining surgeons (Eli 2015), this assumption holds. Moreover, it cannot be the case that Black veterans from locations in which examining surgeons had relatively low average pension awards were more likely to apply for pensions than those from high average pension award areas, or vice versa. In our data, more than 85 percent of veterans, both Black and White, do not change their location of residence. Given the high rate of turnover of physicians, this restriction is also valid.

A key assertion for our empirical strategy is the fact that the doctors were, themselves, of varying underlying levels of bias with respect to pension amounts they recommended. To the extent that pension recommendations were largely determined by demonstrable disabilities, physicians had discretion when disabilities were not easily verifiable. Thus, racial bias of physicians provides us with exogenous differences in pension receipt that would not be related to the underlying health of a veteran.

4.1 Econometric Framework

We estimate the effect of an extra dollar of monthly pension on age at death for Black and White UA veterans.¹⁶ However, since

¹⁵For further details on how specific conditions are categorized, see footnote 22 of Eli (2015).

¹⁶The average monthly income for a Midwestern farmer was \$24 in 1900.

pensions were received based on proof of disability during exams, the effect of pensions on the age at death will be biased, making it appear as though increases in pension led to earlier death. To circumvent bias in ordinary least squares (OLS) regressions, we implement an instrumental variables (IV) strategy: we instrument for pensions using a measure of idiosyncratic physician stringency.

Thus, we construct the leave-one-out mean pension in the following way:¹⁷

$$LOOM_{ij} = \frac{\sum_{k \neq j} PensionAwarded_{kj} - PensionAwarded_{ij}}{NumExams_j - 1}$$

where intuitively, $LOOM_{ij}$ measures the average pension rating of the physician j who examines veteran i , for all examinations, k , other than the examination for veteran i himself.¹⁸ Thus, conditional on the random assignment of veterans to physicians, the instrument will be correlated with veteran i 's pension if there is systematic physician subjectivity in rating decisions.

In the first stage, we regress pension received by veteran i in year t on the $LOOM$ for physician j in year t , an indicator for race B_i , the $LOOM$ interacted with race, and a set of controls for health status, age, battle wounds and application (original or renewal).¹⁹

¹⁷Similar instruments are used in Maestas, Mullen, and Strand (2013) and Bhuller et al. (2020).

¹⁸ $Physician_j$ is the average pension rating that the physician assigns to the veteran. In some cases, veterans see a board of three physicians during an exam and so then the notation $Physician_j$ refers to the board's rating. Note: boards only provide one rating (and not three ratings—one from each physician).

¹⁹Two first stages were run. Controls include the $LOOM$, $LOOM$ interacted with Black veteran status, and all other covariates.

$DeathAge_i$

$$= f(\theta_0 + \theta_1 \widehat{Pen}_{ij} + \theta_2 B_i + \theta_3 \widehat{Pen}_{ij} * B_i + \theta_4 X_i + \epsilon_{ij})$$

where $DeathAge_i$ is the age at death, \widehat{Pen}_{ij} is the fitted value of pension received for person i after seeing physician j , and X is the set of controls discussed above. We weight observations according to an inverse-use measure, which accounts for the number of times a veteran is observed during our sample period. In this way, particularly sick or particularly persistent veterans do not drive our results.

5. Results

We first present OLS estimates of longevity in table 2. Since veterans were required to show proof of disability to receive a pension, we would expect the coefficient on pension to be biased. Table 2 shows that the coefficient on *Black* is negative and significant. On average, a White veteran lived more than a year longer than Black veterans. The results also show that pension receipt did not have a differential effect for Black veterans.

5.1 Instrumental Variable Estimates

Tables 3 and 4 report the instrumental variable estimates for our main estimation sample. Table 3 shows that being assigned to a more generous physician is positively associated with an increased pension. A one-dollar increase in the average pension assigned to others by the board is associated with an increase in pension amount that ranges from \$0.23 to \$0.28 depending on the specification. This relationship changes when examining Black veterans, who appear to suffer a pension penalty, although this is not always statistically significant.

Table 4 presents our IV results. Consistent with prior literature, we find that an

TABLE 2
OLS ESTIMATES OF THE EFFECT OF PENSION ON AGE AT DEATH

	(1)	(2)	(3)	(4)
Pension amount	-0.023 (0.024)	-0.030 (0.026)	-0.063 (0.026)	-0.061 (0.026)
Pension amount × Black	0.039 (0.051)	0.066 (0.065)	0.063 (0.062)	0.060 (0.062)
Black	-2.169 (0.632)	-2.456 (0.774)	-2.216 (0.752)	-2.169 (0.754)
Lagged health index	-0.034 (0.044)	-0.024 (0.050)	-0.076 (0.049)	-0.075 (0.049)
Birth year	-0.516 (0.020)	-0.494 (0.022)	-0.528 (0.022)	-0.529 (0.022)
First enlistment height	-0.071 (0.042)	-0.083 (0.049)	-0.083 (0.048)	-0.086 (0.048)
Wounds sustained in battle	0.030 (0.118)	0.124 (0.132)	0.151 (0.130)	0.154 (0.130)
Born in South	0.311 (0.417)	0.514 (0.501)	0.137 (0.492)	0.177 (0.514)
Increase application	0.986 (0.649)	0.454 (0.684)	0.174 (0.676)	0.213 (0.678)
Initial application	1.748 (0.726)	1.185 (0.785)	1.341 (0.777)	1.366 (0.780)
Renewal application	-3.939 (1.307)	-4.725 (1.435)	-3.754 (1.416)	-4.310 (1.346)
Observations	5,489	5,489	5,489	5,489
Weight	—	X	X	X
Year FE	—	—	X	X
Region FE	—	—	—	X

Note: Robust standard errors in parentheses. The dependent variable in each column is age at death.

additional dollar in monthly pension led to 0.31 to 0.42 additional years of life. This is quite a large effect, given that the average monthly pension ranged from \$8 for a Black veteran to \$11 for a White veteran. We find no evidence, however, of a differential effect on mortality for Blacks as a result of pension receipt. As we would expect, disease burden shortens average lifespan, with the notable exception of digestive illness. While this result is perhaps initially counterintuitive, it

is likely driven by the subjectivity of the diagnosis procedure.

Finally, the type of application made appears to matter. Renewal applications, made to restore a veteran to the pension rolls after having been dropped, appear to have a large and negative effect on longevity. This perhaps reflects the health toll resulting from the period of time spent without pension income. By contrast, applicants making an initial application seem to fare better.

TABLE 3
IV FIRST STAGE ESTIMATES

	(1)	(2)	(3)
<i>Panel A. Pension amount</i>			
Leave-out mean	0.284 (0.0388)	0.243 (0.0469)	0.233 (0.0477)
Leave-out mean \times Black	-0.0953 (0.0476)	-0.0723 (0.0566)	-0.0693 (0.0568)
Black	-0.515 (0.496)	-0.626 (0.615)	-0.688 (0.619)
<i>F</i> -stat	39.66	20.73	17.93
<i>Panel B. Pension amount \times Black</i>			
Leave-out mean	-0.078 (0.007)	-0.0643 (0.008)	-0.067 (0.008)
Leave-out mean \times Black	0.402 (0.034)	0.362 (0.0411)	0.356 (0.041)
Black	5.105 (0.348)	5.676 (0.440)	5.723 (0.438)
<i>F</i> -stat	105.31	62.2	63.08
Observations	5,489	5,489	5,489
Weights	—	X	X
Region FE	—	—	X

Notes: The dependent variable in panel A is the pension amount received by the veteran, for panel B pension received \times Black. Panel A presents the first-stage coefficients for the instruments of pension amount. Panel B presents the coefficients for the instruments of pension amount Black. Robust standard errors in parentheses.

Indeed, this indicator likely captures the underlying good health of veterans who were ineligible for the pension in the years prior to their first application. These large differences, however, highlight the need to examine effects by differing application types (see the appendix).

5.2 *Subjectivity and Discretion*

To further investigate the mechanism of physician bias, we restrict our samples to veterans who present with an illness in two broad categories: subjective and externally verifiable (or objective). We take the example of two classes of verifiable illnesses, cardiovascular and infectious, both of which could be diagnosed with the medical

equipment available to examining physicians. A subjective illness, such as digestive illnesses, were (and still are today) less easily verifiable by a physician during the course of an examination. Being subjective, both the presence and the severity of the illness, as recorded by the physician, would be largely due to physician discretion. We then limit the sample to veteran examinations in which at least the given disease condition was identified. Tables 5 and 6 display coefficient estimates from our preferred specification by individual disease categories, some of which are more prone to discriminatory bias.

Table 5 contains our first-stage estimates, which show that assignment to a

TABLE 4
IV SECOND STAGE ESTIMATES OF MAIN ESTIMATING SAMPLE

	(1)	(2)	(3)
Pension amount	0.310 (0.137)	0.360 (0.184)	0.418 (0.201)
Pension amount × Black	0.0628 (0.164)	0.0888 (0.212)	0.0918 (0.221)
Black	-1.713 (1.587)	-1.794 (2.084)	-1.691 (2.152)
Lagged health index	-0.137 (0.0508)	-0.153 (0.0612)	-0.161 (0.0630)
Birth year	-0.475 (0.0339)	-0.452 (0.0424)	-0.442 (0.0449)
First enlistment height	-0.0899 (0.0442)	-0.109 (0.0520)	-0.117 (0.0531)
Wounds sustained in battle	-0.0148 (0.122)	0.0578 (0.142)	0.0482 (0.144)
Born in South	0.200 (0.447)	0.241 (0.540)	0.200 (0.557)
Initial rank is PVT	0.818 (0.451)	0.513 (0.504)	0.477 (0.509)
Increase application	0.213 (0.695)	-0.561 (0.773)	-0.607 (0.792)
Initial application	2.918 (0.897)	2.506 (1.020)	2.671 (1.047)
Renewal application	-2.882 (1.331)	-3.361 (1.434)	-3.906 (1.374)
Observations	5,489	5,489	5,489
Weights	—	X	X
Region FE	—	—	X

Note: Robust standard errors in parentheses. The dependent variable in each column is age at death.

more generous physician is associated with a higher pension for the average veteran. Moreover, physicians are less generous to Black veterans. However, the penalty to Black veterans appears to be significantly larger for more subjective illnesses, particularly digestive diseases. Indeed, the penalty to Black veterans offsets almost half the benefit otherwise received by seeing a more generous physician.

Table 6 presents our second-stage estimates. We find a pattern consistent with our main empirical specification for verifiable conditions. Pension receipt improves longevity, but it does not appear to do so differentially once we account for the bias of the physician. Interestingly however, this pattern appears to change when we restrict our sample to examinations presenting with relatively subjective conditions. We notice

TABLE 5
IV FIRST-STAGE ESTIMATES BY ILLNESS REPORTED

	Subjective conditions			Verifiable conditions					
	Digestive			Cardiovascular			Infectious		
<i>Pension amount</i>									
Leave-out mean	0.326 (0.0594)	0.318 (0.0728)	0.315 (0.0755)	0.346 (0.0690)	0.297 (0.0836)	0.284 (0.0845)	0.380 (0.0905)	0.406 (0.113)	0.388 (0.116)
Leave-out mean \times Black	-0.210 (0.0860)	-0.183 (0.0961)	-0.174 (0.0975)	-0.189 (0.0744)	-0.157 (0.0856)	-0.147 (0.0861)	-0.0266 (0.126)	-0.0828 (0.128)	-0.0845 (0.130)
Black	1.155 (0.962)	0.817 (1.055)	0.738 (1.073)	0.456 (0.815)	0.0871 (0.977)	-0.0663 (0.989)	-1.577 (1.156)	-0.702 (1.299)	-0.746 (1.321)
F-stat	16.17	10.47	9.49	16.91	9.79	8.35	14.87	13.16	10.31
<i>Pension amount \times Black</i>									
Leave-out mean	-0.049 (0.012)	-0.396 (0.012)	-0.040 (0.12)	-0.048 (0.009)	-0.395 (0.008)	-0.042 (0.009)	-0.064 (0.018)	-0.047 (0.018)	-0.047 (0.02)
Leave-out mean \times Black	0.367 (0.069)	0.355 (0.078)	0.351 (0.078)	0.327 (0.044)	0.286 (0.046)	0.283 (0.0468)	0.557 (0.108)	0.477 (0.087)	0.460 (0.086)
Black	5.985 (0.079)	6.14 (0.805)	6.177 (0.799)	6.585 (0.469)	7.043 (0.547)	7.066 (0.55)	3.025 (0.896)	4.043 (0.826)	4.212 (0.813)
F-stat	18.75	11.57	11.73	35.63	24.58	25.94	17.01	16.38	16.04
Observations	1,111	1,111	1,111	2,848	2,848	2,848	957	957	957
Year FE	X	X	X	X	X	X	X	X	X
Weights	—	X	X	—	X	X	—	X	X
Region FE	—	—	X	—	—	X	—	—	X

Notes: Panel A presents the first-stage coefficients for the instruments of pension amount. Panel B presents the coefficients for the instruments of pension amount \times Black. Robust standard errors in parentheses.

TABLE 6
IV SECOND-STAGE ESTIMATES BY ILLNESS REPORTED

	Subjective conditions			Verifiable conditions					
	Digestive			Cardiovascular			Infectious		
Pension amount	0.404 (0.282)	0.397 (0.334)	0.336 (0.341)	0.477 (0.179)	0.547 (0.246)	0.580 (0.267)	0.442 (0.227)	0.417 (0.254)	0.564 (0.286)
Pension amount \times Black	1.118 (0.524)	0.972 (0.505)	0.918 (0.505)	0.178 (0.271)	0.161 (0.357)	0.203 (0.370)	-0.0602 (0.281)	0.116 (0.363)	0.0949 (0.388)
Black	-12.19 (5.215)	-11.08 (5.273)	-10.71 (5.270)	-2.804 (2.786)	-2.625 (3.703)	-2.973 (3.828)	-0.387 (2.801)	-2.872 (3.566)	-2.217 (3.739)
Observations	1,111	1,111	1,111	2,848	2,848	2,848	957	957	957
Year FE	X	X	X	X	X	X	X	X	X
Weights	—	X	X	—	X	X	—	X	X
Region FE	—	—	X	—	—	X	—	—	X

Note: Robust standard errors in parentheses.

TABLE 7
CHANGING PATTERNS OF BOARD COMMENTS OVER TIME

	Pre-1890			1890–1908		
	Black	White	Ratio	Black	White	Ratio
Any comments	15.414	2.346	6.57	15.141	1.899	7.97
Honest	0.178	0.013	13.89	0.12	0.013	9.2
Truthful	0.059	0.008	7.72	0.023	0.002	12.27
Reliable	0.04	0.01	3.86	0.006	0.002	3.07
Industrious	0.059	0.008	7.72	0.029	0.004	7.67
Clever	0	0	—	0.006	0	—
Benefit of the doubt	0	0	—	0	0.004	0
Trustworthy	0	0	—	0.011	0	—
Candid	0	0	—	0.011	0.002	6.13
Ignorant	0.079	0	—	0.057	0.004	15.34
Insane	0.02	0.013	1.54	0.023	0.015	1.53
Stupid	0.02	0	—	0.011	0.002	6.13
Illiterate	0.277	0.01	27.01	2.61	0.022	116.81
Liar	0	0.003	0	0.011	0.007	1.53
Exaggerate	0	0	—	0.006	0.002	3.07
Doubt	0.119	0.018	6.61	0.051	0.02	2.51
Vicious habits	0.89	0.208	4.29	0.982	0.21	4.67
Colored	0.317	0	—	0.451	0	—
Race	0	0	—	0.034	0	—
Number of exams	5,054	38,997		17,509	53,704	

Note: Percent of exams with mention in surgeons' certificate section for general comments.

that pension receipt associated with seeing a more generous physician does differentially improve Black mortality. However, this effect is modest compared to the very substantial Black penalty in this sample. Blacks presenting with at least one digestive condition live, on average, 10 fewer years than their White counterparts. The results of table 5 and table 6 show that variation in doctor discretion appears to play a role in the determination of disability and pension receipt.

To consider the issue of physician bias in more detail, we also analyze the text of the physician reports (*surgeons' certificates*). Table 7 shows the types of words used by physicians in the descriptions on reports. We divide these reports into two periods:

1) pre-1890; and 2) 1890–1908. Therefore, we use information from all available records spanning from 1862 to 1907 (unlike the analysis in earlier sections, which considers the physician reports between 1897–1906). In the pre-1890 period, veterans had to prove that their injuries or illnesses were a direct result of the wartime experience (and physicians had little discretion once a war-related illness was confirmed in military records). In the 1890 and later period, veterans could claim a pension for illnesses or disabilities resulting from any cause, not just those that were war related. However, the physicians had full discretion when rating the *severity* of the disability. When comparing the pre-1890 to the 1890–1908 period, we find a dramatic difference in the rates that *any* comments

TABLE 8
CHANGING PATTERNS OF CLAIMANT STATEMENTS OVER TIME

	Pre-1890			1890–1908		
	Black	White	Ratio	Black	White	Ratio
Any general comments	97.962	77.137	1.27	97.984	97.872	1.001
Pain	26.039	23.674	1.1	29.522	30.804	0.958
Suffering	4.254	2.751	1.546	4.244	2.711	1.565
Aches	1.088	0.862	1.263	1.148	1.181	0.972
Hurt	0.772	0.595	1.297	1.788	1.356	1.319
Diarrhea	7.163	14.865	0.482	9.429	21.393	0.441
Number of exams	5,054	38,997		17,509	53,704	

Note: Percent of exams with mention in surgeons' certificate claimant comments.

were made by physicians. While more exams were for White veterans (because more Whites served than Blacks), Black veterans were between 6.5 and 8 times more likely to receive general physician comments than their White counterparts. The unbalanced rate of commenting between the races likely means that, across every category, Black veterans are more likely to be described using positive terms such as “honest,” “truthful,” or “candid” in order to justify pension receipt. Furthermore, the rate of racial differentiation in commenting is highest in the years with the greatest amount of physician discretion, which are the years between 1890 and 1907. The racial differential in commenting rates, irrespective of the type of comment, is remarkable.²⁰

However, Black veterans were also disproportionately more likely to be described in negative terms. Our results further suggest

that these negative comments were much more likely during the period of our study, when physicians had more discretion. They are over 15 times more likely to be described as “ignorant,” 6 times more likely to be described as “stupid,” and over 100 times more likely to be described as “illiterate.” These comments suggest a clear pattern of discrimination, particularly in light of the fact that none of the descriptive terms are medically relevant, or relevant to the potential outcome of the pension assessment. Nearly all of the negative descriptors used by physicians increased in prevalence after the changing of the pension law in 1890, further emphasizing the role that physician discretion had and the proliferation of discriminatory practices.

It could be the case that veterans themselves presented different conditions driven by the liberalization of pension policy. It could also be the case that these conditions would differ by race if Black veterans were sicker than White veterans, on average.²¹ To explore this possibility, we turn to the attestations from veterans themselves regarding

²⁰The discussion of “vicious habits” (such as venereal diseases) is especially interesting since they are objectively verifiable. Often, physicians discussed a *lack* of “vicious habits” when rating a Black veteran’s disability to *help* the veteran receive a larger pension. However, the fact that “vicious habits” (or the lack of them) is discussed at a higher rate for Blacks than Whites, in itself, is evidence of physician discrimination.

²¹On illness among African Americans after the Civil War, see Downs (2012).

the illnesses and disabilities that they faced. In table 8, we present an empirical analysis of the text contained in veteran reports to the physicians during their examinations. We find that veteran attestations to physicians do not appear to change between the pre-1890 and 1890–1908 period. In particular, there is no discernible difference in the rate at which Black and White veterans reported diarrhea, hurt, suffering, or pain before and after pension liberalization. This is further evidence that physician inferences from veteran statements, and the degree to which they believed some veterans more than others, was the cause of differential physician ratings and resulting pension awards.²²

6. Conclusion

Still today, physician discrimination costs the Black population in access to care, disability payments, and longevity. For instance, one of the leading causes of disability among veterans and in the general population is chronic obstructive pulmonary disease (COPD), which includes emphysema, chronic bronchitis, and nonreversible asthma. The machine used to assess breathlessness caused by COPD—the spirometer—requires physicians to “eyeball” the race of the patient, since lung capacity is still assumed to be different across races, as was first described in an 1869 study of UA veterans themselves.²³ Because the spirometer calibrates a lower lung capacity for Blacks as opposed to Whites, Blacks today are rated as less disabled than Whites when applying for disability pensions even when they have the same diagnostic scores as Whites (Goyal et al. 2015).

²²We present several robustness checks of our main results in the appendix.

²³See Gould (1869) on UA and USCT soldiers for the US Sanitary Commission.

Another important example of race differences in medicine today lies in differences in the prescription of pain medication for surgical patients. For instance, Case and Deaton (2017) note that opioids were more likely to be prescribed to Whites than Blacks due to physician beliefs about addiction in the Black population. This could also be driven by physician bias in pain ratings. Indeed, recent studies have documented that physicians believe that Blacks experience less pain and have shown that physicians still maintain racially biased beliefs about the Black body (Hoffman et al. 2016). Therefore, even though many medical theories rooted in scientific racism from the late nineteenth century, such as the belief that the “Black body” is stronger or weaker, are no longer espoused by physicians, discrimination still underlies the medical system and becomes pernicious when rating disability based on subjective symptoms. Our study finds that similar types of bias have been a longstanding feature of American medicine and may be a key driver in the persistence of racial health disparities. Since our work uses a novel historical dataset in which we can observe the health experience of individuals over their lifetimes, our work highlights the need for further research on racial discrimination in medicine, both past and present.

REFERENCES

- Alsan, Marcella, and Claudia Goldin. 2019. “Watersheds in Child Mortality: The Role of Effective Water and Sewerage Infrastructure, 1880–1920.” *Journal of Political Economy* 127 (2): 586–638.
- Alsan, Marcella, and Marianne Wanamaker. 2018. “Tuskegee and the Health of Black Men.” *Quarterly Journal of Economics* 133 (1): 407–55.
- Bhuller, Manudeep, Gordon B. Dahl, Katrine V. Løken, and Magne Mogstad. 2020. “Incarceration, Recidivism and Employment.” *Journal of Political Economy* 128 (4): 1269–1324.
- Boustan, Leah Platt, and Robert A. Margo. 2016. “Racial Differences in Health in the United States: A Long-Run Perspective.” In *The Oxford Handbook*

- on *Economics and Biology*, edited by John Komlos and Inas R. Kelly, 730–50. Oxford: Oxford University Press.
- Case, Anne, and Angus Deaton. 2017. “Mortality and Morbidity in the 21st Century.” *Brookings Papers on Economic Activity* 48 (1): 397–476.
- Costa, Dora L. 1995. “Pensions and Retirement: Evidence from Union Army Veterans.” *Quarterly Journal of Economics* 110 (2): 297–319.
- Costa, Dora L. 1997. “Displacing The Family: Union Army Pensions and Elderly Living Arrangements.” *Journal of Political Economy* 105 (6): 1269–92.
- Cutler, David, and Grant Miller. 2005. “The Role of Public Health Improvements in Health Advances: The Twentieth-Century United States.” *Demography* 42 (1): 1–22.
- Downs, Jim. 2012. *Sick from Freedom: African-American Illness and Suffering during the Civil War and Reconstruction*. New York: Oxford University Press.
- Eli, Shari. 2015. “Income Effects on Health: Evidence from Union Army Pensions.” *Journal of Economic History* 75 (2): 448–78.
- Ferrie, Joseph P., and Werner Troesken. 2008. “Death and the City: Chicago’s Mortality Transition, 1850–1925.” *Explorations in Economic History* 45 (1): 1–16.
- Fogel, Robert William. 2004. *The Escape from Hunger and Premature Death, 1700–2100: Europe, America, and the Third World*. New York: Cambridge University Press.
- Gould, Benjamin Apthorp. 1869. *Investigations in the Military and Anthropological Statistics of American Soldiers*, Vol 2. Washington, DC: US Sanitary Commission.
- Goyal, Monika K., Nathan Kuppermann, Sean D. Cleary, Stephen J. Teach, and James M. Chamberlain. 2015. “Racial Disparities in Pain Management of Children with Appendicitis in Emergency Departments.” *JAMA Pediatrics* 169 (11): 996–1002.
- Hoffman, Beatrix. 2003. “Scientific Racism, Insurance, and Opposition to the Welfare State: Frederick L. Hoffman’s Transatlantic Journey.” *Journal of the Gilded Age and Progressive Era* 2 (2): 150–90.
- Hoffman, Frederick L. 1896. “Race Traits and Tendencies of the American Negro.” *American Economic Association* 11 (1–3): 1–329.
- Hoffman, Kelly M., Sophie Trawalter, Jordan R. Axt, and M. Norman Oliver. 2016. “Racial Bias in Pain Assessment and Treatment Recommendations, and False Beliefs about Biological Differences between Blacks and Whites.” *Proceedings of the National Academy of Sciences* 113 (16): 4296–4301.
- Humphreys, Margaret. 2008. *Intensely Human: The Health of the Black Soldier in the American Civil War*. Baltimore: Johns Hopkins University Press.
- Humphreys, Margaret. 2013. *Marrow of Tragedy: The Health Crisis of the American Civil War*. Baltimore: Johns Hopkins University Press.
- Maestas, Nicole, Kathleen J. Mullen, and Alexander Strand. 2013. “Does Disability Insurance Receipt Discourage Work? Using Examiner Assignment to Estimate Causal Effects of SSDI Receipt.” *American Economic Review* 103 (5): 1797–1829.
- McKeown, Thomas. 1976. *The Modern Rise of Population*. New York: Academic Press.
- Shaffer, Donald R. 2004. *After The Glory: The Struggles of Black Civil War Veterans*. Lawrence, KS: University Press of Kansas.
- Wilson, Sven E. 2010. “Prejudice and Policy Racial Discrimination in the Union Army Disability Pension System, 1865–1906.” *American Journal of Public Health* 100 (S1): S56–65.