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An aerial photograph of a large cable-stayed bridge with two tall pylons and numerous stay cables. The bridge spans a wide river. Below the bridge, a multi-lane road with several cars is visible. The entire image is overlaid with a semi-transparent white filter.

# The Cries of the Harvesters: a Natural Experiment on the Multigenerational Effects of Slavery

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# The Cries of the Harvesters: a Natural Experiment on the Multigenerational Effects of Slavery\*

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## Abstract

We examine the causal effect of slavery on the formation of African American human capital by taking advantage of the natural experiment provided by emancipation. After the end of the Civil War, African Americans of all ages became free for reasons unrelated to their age, which can be seen as their having been exogenously assigned periods of enslavement of different durations. Using linked census data from 1870-1930 to explore the multigenerational effect of slavery, we find that the causal effect of one's grandfather spending an additional year as a slave reduces the probability of being literate and of being in school by roughly half a percentage point.

**JEL Classification Codes:**

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Slavery is indefensible and economically bad, especially for the non-slaveholders in the slave States; but it had its educational advantages for the blacks, as Stanley or any other man who knows the negroes of Africa and also those of the United States will say. They have been taught to labor, they have been taught Christian civilization, and to speak the noble English language instead of some African gibberish. The account is square with the ex-slaves.

- *The Chicago Tribune*, August 12, 1891<sup>1</sup>

One cannot escape the question [of reparations for slavery] by hand-waving at the past, disavowing the acts of one's ancestors, nor by citing a recent date of ancestral immigration. The last slaveholder has been dead for a very long time. The last soldier to endure Valley Forge has been dead much longer. To proudly claim the veteran and disown the slaveholder is patriotism à la carte... If Thomas Jefferson's genius matters, then so does his taking of Sally Hemings's body.

- Ta-Nehisi Coates, *The Atlantic Magazine*, June 2014<sup>2</sup>

## 1 Introduction

Guilt and redemption from slavery, what some commentators have dubbed the original sin of the United States, is an issue to which public discourse goes back often. Whether it is brought up as one of the salient causes of present-day injustices against African Americans, or to argue that it has been transcended by time or by the nation's moral progress, debates over slavery and its consequences remain ubiquitous. Informing the dialogue over the effects of slavery in the United States, then, requires the knowledge of just how much damage has been done due to its practice.

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<sup>1</sup><http://archives.chicagotribune.com/1891/08/12/page/4/article/pensioning-the-ex-slaves> (last accessed May 2, 2017)

<sup>2</sup><https://www.theatlantic.com/magazine/archive/2014/06/the-case-for-reparations/361631/> (last accessed May 2, 2017)

The concern with the remaining effects of slavery extends to the scholarly literature, which has seen human capital as one of the main channels through which its legacy was perpetuated. [Smith \(1984\)](#) constructed an income index for the occupations reported in census data from 1890 onward. He used the index to demonstrate that the job market outcomes of African Americans have tracked their educational level, and that both their income and human capital stagnated well below those of whites throughout the first half of the twentieth century, starting to rise in relative terms only in the 1940s. In his economic history of race and schooling in the South, [Margo \(1990\)](#) argued that an important source of the black educational and wage gap was what he termed ‘intergenerational drag.’ According to Margo, “Poverty and high rates of adult illiteracy, as much as the poor quality of the schools, kept black children out of the classroom. These family background effects, in turn, can be partly traced to educational backwardness in the nineteenth century and ultimately to slavery.”

Sheer discrimination can compound the effects of a human capital deficit and make it harder to overcome. [Darity, Dietrich and Guilkey \(2001\)](#) found that job market discrimination against several ethnic groups was largely explained by the discrimination they experienced a century ago, despite their having acquired substantial amounts of human capital relative to whites since. The institutional legacy of slavery can also matter: for instance, [Bertocchi and Dimico \(2012\)](#) have shown that in counties which had a higher share of slaves in 1860, income inequality is higher today. The inequality is driven by interracial inequality, not by inequality amongst whites or blacks. In another paper, they find that the educational gap between blacks and whites observed from 1940 to 2000 is explained to a large extent by the share of slaves living in that county in 1860 ([Bertocchi and Dimico, 2014](#)).

Against this backdrop, the literature on the intergenerational transmission of income often concludes that one’s income depends significantly on one’s parents’ income, and, by extension, on factors such as their human capital. However, the usual corollary is that the income and human capital of one’s grandparents and more distant ancestors is not very

relevant, because income follows an AR(1) process and its effects become insignificant after two or more generations. Sacerdote (2002, 2005) looks at the legacy of slavery through this lens, and he concludes that the effects of slavery on human capital faded early in the twentieth century.

Our paper contributes to the discussion of whether the effects of slavery (as distinct and separate from those of racial discrimination) soon became a historical relic, or whether they persisted beyond the first generation after emancipation. In doing so, we add to the growing literature on multigenerational mobility, which is examining anew whether one's income and human capital depend significantly on those of the generations preceding one's parents' (Solon, 2015). We pay close attention to design as we examine the extent to which slavery had a negative effect on the formation of human capital for the descendants of slaves.

Our approach is to point out that when the emancipation of African-American slaves took place, slaves of all ages became free for reasons unrelated to their age. Therefore, emancipation can be seen as having exogenously assigned periods of enslavement of different durations to the African-American population. We exploit this natural experiment in order to estimate the causal effect of an additional year of slavery on human capital formation. We find that an additional year of enslavement reduces the probability of having literate children by half a percentage point, and of having literate grandchildren by roughly the same amount: this totals to an average reduction of 13 percentage points in the likelihood that a black child would know how to read and write. It can be attributed directly to slavery and it persisted unabated for at least two generations. We find similar results for the probability of children and grandchildren of slaves attending school.

The work of Sacerdote (2002, 2005) is particularly closely related to ours. He uses census data to compare the literacy and school attendance outcomes of slaves and non-slaves, and he concludes that slavery (as distinct from race, which continued to be a source of discrimination against African-Americans) had an effect that was initially large but faded quickly after a couple of generations. By contrast, we find a smaller initial effect of slavery on the literacy of

the children of slaves. However, unlike Sacerdote, we find that the South's *peculiar institution* had a persistent and stable effect across generations.

Our results innovate on Sacerdote's work in four ways. First, we take a new approach to design and fully exploit the natural experiment provided by emancipation. Second, we take advantage of a richer data set: we use the IPUMS linked household data, which allows us to establish precisely the year of birth of an individual's father and grandfather, improving the identification of former slave status of an individual's forebears. Our data also enable us to look at several characteristics of an individual's forebears, and we can do so even for individuals who no longer live with their parents or their grandparents. While Sacerdote does use some data linking the 1880 and 1920 censuses, we incorporate data linking non-overlapping samples of households living in 1870, 1900, 1910, 1920, and 1930 with the full-count data of the 1880 census. Third, we use the information we have on the characteristics of an individual's father and grandfather (age and literacy, in particular) to examine and control for the channels through which human capital is transmitted. Lastly, we conduct robustness checks to see how sensitive the results are to the fact that slaves are not perfectly identified in the data.

The remainder of the paper is organized as follows. Section 2 describes the institutional framework of the transmission of human capital in the South. The data are described in Section 3. We conduct the empirical analysis and test the robustness of the results in Section 4. We close with a discussion section assessing the persistent effect of slavery on human capital in the United States in Section 5.

## 2 Institutional Framework

Slave owners in the American South strongly discouraged slaves from becoming educated. It is not obvious that this should have been the case, as slave owners in societies such as ancient Rome benefited from the labor of highly educated slaves. But in the South, the expected cost

of having well-educated or even literate slaves were thought to have outweighed the benefit. It was believed that discontent with slavery would be greater among educated slaves than among uneducated ones, and masters feared that literate slaves could forge passes like the ones carried by free blacks and escape to the North. There were laws throughout the South that criminalized teaching a slave how to read and write, and these laws only became more strict with time (Margo, 1990; Collins and Margo, 2006). In this context, it is not surprising that the end of slavery brought about significant changes in the formation of human capital for African Americans. Freed from the restrictions of slavery, African-Americans in the South availed themselves of the opportunity to accumulate more human capital.

We speculate that it must have been a challenging task for a largely illiterate population to start building the human capital of their children. For example, not knowing how to read or write makes it more difficult to ensure that one's children learn to do so than it is for literate people, since knowledge acquisition benefits from skills that are transmitted from parent to child. We are interested in exploring whether these difficulties were overcome easily or if they had an impact over several generations.

To measure the intergenerational effect of slavery on human capital we resort to the available data from the US Census, which has two useful albeit limited measures: literacy and school attendance.

Literacy is an imperfect measure of human capital, especially when measured in a binary fashion. There are surveys of American adults that recorded both their literacy and formal schooling in the early and mid-twentieth century. They showed that people with less than a third grade education were largely unable to read and write, but that the majority of those with even slightly more schooling were literate (Collins and Margo, 2006). Therefore, even if our results showed that the causal effect of slavery on the literacy of the descendants of slaves waned after a couple of generations, we could not conclude that its effects on human capital formation had completely disappeared. That hypothetical scenario would just imply that the descendants of slaves had attained a level of education roughly equivalent to the

third grade, but others could have attained and surpassed the same level of education, and this would not be reflected on the data. On the other hand, if we do find that there are decreases on an educational competence as basic as literacy even after two generations, this would be a sign that slavery had an enduring and harmful effect.

There are no data on years of schooling in census data prior to 1940. For the period that concerns us, we have to make do with an indicator for whether someone is currently attending school or not, and a child was generally counted as having attended school if he or she was in school for at least one day during the preceding school period (Margo, 1990). What is known about schools in the Reconstruction era and beyond suggests that the average black child attended schools with a shorter school year, larger class sizes, and a substantial lack of funding (Collins and Margo, 2006). In southern black schools, expenditure per child on teacher salaries was only 29 cents for every dollar spent per child in white schools (Margo, 1990). The fact that we can only measure whether the descendants of slaves were in school or not keeps us from finding out whether those with less exposure to slavery were able to obtain a better education, which they could have done even within a segregated system. Even if the black level of school attendance had quickly reached the white level after the war, substantial effects of slavery could persist and go unmeasured. Conversely, if we found that the descendants of slaves were systematically disadvantaged using this very rough measure of human capital accumulation, that would indicate a rather severe lack of opportunities for them.

In sum, not finding an intergenerational effect of slavery on literacy or school attendance cannot be taken to imply that the effect of slavery had been completely overcome, but finding one at all suggests that the effect was particularly pernicious. We find the latter to be the case. Even the basic indicators of human capital accumulation that we have at our disposal reflect substantial disadvantages of the descendants of slaves when compared to others whose exposure to this institution was limited or nonexistent.



### 3 Data

Our data come from the Integrated Public Use Microdata Series (IPUMS). We use representative samples of all males appearing in two given census years in the United States, as well as the members of their households. Specifically, we look at the households of males appearing in the census in both 1870 and 1880, 1880 and 1900, 1880 and 1910, 1880 and 1920, and 1880 and 1930. For example, if a sampled boy was living with his parents and siblings in 1880 but by 1900 he had left his parents' home, gotten married and had kids, then the boy, his parents, his siblings, his wife and his children would be part of the data set. However, his sisters are only observed in 1880 because they lived with him at that time; if his sisters were still alive in 1900 but did not live in their brother's household, we would have no data on them in 1900. Suppose now that the boy died in between the two census years under consideration: in this case, he would never have been a part of the sample, and neither him nor the members of the household he was a part of would appear in the 1880-1900 data.

The reason IPUMS cannot produce a representative sample of all men and women appearing in two census years is that women change their name at marriage. This makes it impossible to track women from one census to another unless they remain single or are already married.<sup>3</sup> For example, if a woman lived with her parents during a census year, and by the next census she had left her parents' household, gotten married, and had children, we would not be able to link those children with the characteristics of their maternal grandparents. Therefore, we focus on patrilineal descent to study the transmission of human capital.

Slaves are not identified in the data as being slaves. We define an observation as being a slave if they are black and were born in a slave state before 1865.<sup>4</sup> This identification is not

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<sup>3</sup>IPUMS has datasets with representative samples of women who do not change their name and appear in two census years. However, because they are not ideal for our goal of examining the effect of parent and grandparent characteristics on children, we do not use them.

<sup>4</sup>The list of slave states in the antebellum south is as follows: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

perfect; about 5% of people fitting this description were instead born free.<sup>5</sup>

We first analyze the children of slaves by looking at the linked 1870-1880 data set, then focus on the grandchildren of slaves by looking at the 1880-1900, 1880-1910, 1880-1920, and 1880-1930 linked census data sets. Panel A of Table 1 contains the descriptive statistics of the population of children ages 6-15 in 1880. The children in the sample are approximately 11 years old on average, and their fathers are 46. The sample is roughly 14 percent black and 42 percent female. Those born in a slave state account for 32 percent of the sample, and the fathers of the children in the sample spent on average 24 years as slaves. We cannot directly observe the father's former slave status, so we impute it to all the blacks born in a slave state before 1865, and we impute the father's years of slavery as 1865 minus the father's year of birth. For school-age children (ages 6-12) the data show that 59 percent are in school, and 84 percent of the sample are literate. Panel B shows the same statistics for the sample of grandchildren of slaves. A noticeable difference is the marked increase in literacy (all the way up to 97 percent) and school attendance (93 percent), resulting from the expansion of schooling for children of all races in the early twentieth century.

## 4 Empirical Analysis

### 4.1 Results

We take advantage of the natural experiment provided by emancipation in the United States to estimate the causal effect of slavery on the formation of African-American human capital. By the end of the Civil War in 1865, formerly enslaved African-Americans of all ages became free. This can be seen as their having been exogenously assigned periods of enslavement ranging from zero to 85 years. We compare the literacy, school attendance, and occupation of the children and grandchildren of African-Americans who were enslaved for

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<sup>5</sup>The robustness tests described in the next section demonstrate that imputing slave status and years of slavery in this way do not affect the results or our conclusions.

periods of different durations with those of African-Americans (and others) who were never enslaved.

We control for age of the father or grandfather to ensure that our results are not simply an artifact of older parents being better at raising children to be literate. Because most blacks were the (grand) children of slaves, the number of years of slavery of their (grand) parents was highly correlated with race. Race was the source of differential treatment for blacks in ways that could negatively affect the likelihood of learning how to read and write – for example, access to public libraries was limited for blacks – so our estimates of the intergenerational transmission of human capital require that we control for race to avoid biased results. We also control for sex, age, year, and county fixed effects. We use the following model to estimate the causal effect of slavery on the human capital of slave descendants:

$$\begin{aligned}
Y_{ict} = & \alpha + \beta_0 \times (\textit{grand})\textit{father}'s \textit{years of slavery}_{ict} \\
& + \beta_1 \times (\textit{grand})\textit{father}'s \textit{age}_{ict} \\
& + \beta_2 \times \textit{black}_{ict} \\
& + \beta_3 \times \textit{female}_{ict} \\
& + \beta_4 \times \textit{age}_{ict} \\
& + \mathbf{X}'\gamma + \eta_t + \mu_c + \epsilon_{ict}
\end{aligned} \tag{1}$$

Where  $Y_{ict}$  is either a measure of human capital (literacy or in-school status) or a job market outcome (being part of the labor force or an occupational income score calculated by IPUMS) for individual  $i$  from county  $c$  in year  $t$ ;  $(\textit{grand})\textit{father}'s \textit{years of slavery}_{ict}$  is equal to 1865 minus the year of birth of individual  $i$ 's father (or grandfather, depending on the specification);  $(\textit{grand})\textit{father}'s \textit{age}_{ict}$  is the age of the (grand)father;  $\textit{black}_{ict}$  and  $\textit{female}_{ict}$  are dummy variables for race and sex, and  $\textit{age}_{ict}$  is the individual's age in year  $t$ . Depending on the specification, the vector  $\mathbf{X}$  includes the father's or grandfather's literacy. We include time fixed effects  $\eta_t$  and county fixed effects  $\mu_c$ , and  $\epsilon_{ict}$  is the usual random error term.

Table 2 shows the estimates of the intergenerational effect of slavery on literacy. Column

(1) uses the 1870-1880 linked household data to estimate the effect of an additional year of slavery on the literacy of the children of former slaves. An additional year of slavery of the father reduces the probability that a child will know how to read and write by slightly over half a percentage point, a result that is statistically significant at the 1 percent level. Because the average number of years of slavery of the fathers of the black children we observe in 1880 is 24.4 years, the overall effect of slavery is to reduce the probability that these children knew how to read and write by 13 percentage points. Older fathers were more likely to have literate children, with the probability of the child's literacy increasing by 1.6 tenths of a percentage point per additional year of age of the father. Being black reduced the probability of being literate by 35 percentage points, and being female increased it by 1.7 percentage points. Older children are, not surprisingly, more likely to be literate than younger ones, with a 1.4 percentage point increase in literacy per year of age. All these results are statistically significant at the 1 percent level, and heteroskedasticity robust errors are used throughout.

In general, slaves were discouraged from learning how to read and write; as a result, fathers who spent more time as slaves would have been less likely to have literate offspring because they could not teach them how to read and write. Therefore, while exogenously assigning periods of slavery of varying durations, emancipation also assigned a probability of literacy to the former slaves that was negatively correlated with how long they were enslaved. It follows that our initial estimates and the ones in [Sacerdote \(2002, 2005\)](#) may be capturing, to a significant extent, the effect of having an illiterate father. We could perhaps expect that all black children born of literate parents would have had the same chance of learning how to read and write, regardless of whether their father was a former slave. That expectation would be wrong. In column (2), we control for father's literacy, and we find that the effect of an additional year of father's slavery is nonetheless still negative, close to two tenths of a percentage point, and significant at the 1 percent level. This figure implies that, on average, the children of formerly enslaved literate blacks had a probability of knowing how to read and write that was 5 percentage points lower than if their father had not been a slave. We

conclude from this that slavery of the father did not only affect black children’s literacy through the father’s own ability to read and write, but through other channels as well.

Father’s literacy was not the only channel through which slavery affected children born after 1865, but it was still important: we find that the probability of being literate was 70 percentage points higher if one’s father knew how to read and write. In all specifications, the controls we include imply that these comparisons are made between people of the same race, sex, age, and living in the same county.

The effect of slavery on the literacy of the descendants of slaves was not only significant, it was also persistent. To estimate the effect of grandfather’s years of slavery on grandchildren’s literacy, we pool data on the grandchildren of slaves aged 6 to 15 obtained from the 1880-1900, 1880-1910, 1880-1920, and 1880-1930 linked census datasets.<sup>6</sup> Column (3) reports the results of estimating Equation 1 using grandfather’s years of slavery as the treatment. The effect of an additional year spent by one’s grandfather as a slave was virtually the same in 1900-1930 as the effect that an additional year of slavery had on the children of slaves in 1880.

Column (4) shows that controlling for the literacy of the father and the grandfather accounts for some of the effect of slavery on the literacy of slave descendants, but not for all of it. The negative effect of an additional year of grandfather’s slavery is still large at somewhat under four tenths of a percentage point, and it is significant at the 1 percent level. Interestingly, including these controls causes the coefficient on race to become statistically insignificant. This is plausible enough: in an era when literacy was growing rapidly among people of all races, the likelihood of literacy for a black child from a literate family was the same as that for a white child of the same sex, age, and from the same county. They were the same, that is, unless the black child’s grandfather was a slave.

Table 3 examines the intergenerational effect of slavery on school attendance. The dependent variable is an indicator for whether a child attends school or not; the independent

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<sup>6</sup>Using this age range guarantees that we do not have any overlap between the waves and that we are making an “apples to apples” comparison by comparing people of the same age across each wave



variables, the specifications, and the samples mirror the ones in Table 2. The results are very similar to the ones obtained for literacy: column (1) shows that, in 1880, the causal effect of an additional year of father's slavery is a reduction of around four tenths of a percentage point in the probability of attending school, and the estimate is significant at the 1 percent level. When we control for father's literacy in column (2), the effect falls to around three tenths of a percentage point, and we learn that the children of literate parents are 22 percentage points likelier to attend school than the children of illiterate parents. Perhaps because the relationship between father's literacy and children's school attendance is more tenuous than the relationship between a father's and his children's literacy, controlling for father's literacy does not lead to a large change in the main coefficient of interest. Columns (3) and (4) repeat this analysis with the pooled sample of children in 1900, 1910, 1920, and 1930. The effect of grandfather's years of slavery on school attendance is not appreciably different from the effect of father's years of slavery. When controlling for father's and grandfather's literacy in column (4), it loses statistical significance and the estimate shrinks by more than half.

Like literacy, in-school status as a measure of human capital cannot tell the whole story about the long-term effects of slavery on African-American human capital. The late nineteenth and early twentieth centuries saw the expansion of formal (albeit racially segregated) schooling for blacks and whites, and universal coverage was eventually attained. The year dummies in columns (3) and (4) attest to this fact: the more recent the year, the larger they are, implying higher enrollment rates. It is almost certain that if we linked more generations to their pre-Civil War ancestors we would find that slavery eventually had no effect on their in-school status, because in time schooling of some sort became available to all. However, it would be incorrect to conclude from this that the legacy of slavery was left behind, since wages or alternative measures of human capital might still pick up an effect.

In Table 4, we look for any effects that father's years of slavery might have had on labor force participation and income (measured by an occupational income score) of people ages

13-34 in 1900.<sup>7</sup> We do not find any evidence that slavery significantly affected the rate. Note that this is a precisely estimated zero: using the lower bound estimate of the coefficient, 11.93 years of slavery would reduce labor force participation by 1 percentage point. This means it is likely that slavery did not adversely affect labor force participation.

Examining the occupational income score, which represents the median of total income in hundreds of 1950 dollars for the individual's stated occupation, it would take approximately 25 years to reduce household income by \$100. At the lower end of the 95% confidence interval, each year of slavery corresponds to a loss of approximately \$10; as the median annual household income in the United States in 1950 was \$4,237 (in 1950 dollars), a year of slavery would reduce it by approximately 0.2%. While the coefficients for father's years of slavery are not economically significant in both specifications, we believe they understate the level of harm slavery could have caused to incomes because institutional restrictions (such as, *inter alia*, a generally lower quality of education and difficulty in obtaining high-paying jobs) effectively censored the top of the distribution of earnings for African Americans in the early 20th century.

In sum, the evidence we provide strongly suggests that the detrimental consequences of slavery on the human capital formation of African-Americans continued unabated even two generations after the end of the Civil War.

## 4.2 Robustness

The observations in this paper suffer from a misclassification problem: that all blacks born in the Confederate south are automatically classified as slaves in this analysis when the figure is instead closer to 95% means that approximately 5% of the observations that are being assigned years of slavery have in reality not experienced it. To see the effect this problem has on the regression results of columns (1) and (2) of Table [2](#), we perform a

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<sup>7</sup>We choose age 13 as the starting age since free schooling ended after grade 6 in this time period, and age 34 as the top end of this range since people who were 35 or older would have been born before 1865 and thus have been born into slavery.

Monte Carlo simulation with 1000 repetitions. For each repetition, 5% of observations that are classified as slaves are randomly reassigned to instead have 0 years of slavery, and we run regression (1) once with and once without the father's literacy control. The results of this experiment are displayed in Figure 1. In the regression without the father's literacy control, we see that the estimated effect falls, with the median estimate being approximately 0.43 percentage points per year of slavery. When father's literacy is included, the estimate again falls, but only by a small amount; the median estimate for this simulation is -0.00168. For both simulations, even the minimum value of the t-statistic is above the threshold for significance at the 1% level. While these simulations assume that the classification error is completely random, the fact that even the worst case scenarios give statistically significant results of the same sign allows us to be confident that classification error does not appear to appreciably affect the conclusions we reach in our analysis.

## 5 Discussion

It would not be remarkable if a few generations later than we observed there were no differences in literacy or schooling between the descendants of black slaves, free blacks, and whites. After all, the movement for universal literacy and universal schooling did away with the differences in literacy and schooling that we can observe in census data. But because human capital accumulation goes far beyond just literacy and schooling, closing the literacy and school attendance gap between blacks and whites would only be the beginning of erasing the legacy of slavery on human capital accumulation.

It should give us pause, then, that slavery affected these very basic measures of human capital for over half a century. Because the metric is imperfect and basic, and useful only to measure the lowest levels of educational attainment - akin to measuring someone's health by looking exclusively at their height - it probably fails to capture the entire harm done to the human capital of slaves and their descendants.

We find that the effect of an additional year of slavery of the father was a reduction of around half a percentage point in the probability that his children would know how to read and write. This effect continues unabated two generations after slavery: if one's grandfather spend an additional year of slavery, one's probability of being literate is roughly half a percentage point lower. Given the average number of years of enslavement of the black population after the civil war, this totals up to a reduction in the probability of being literate that is 13 percentage points lower than if one's African-American father (or grandfather) had been free his whole life. The figures are very similar for the probability of being in school. Even when we account for father's and grandfather's literacy, the causal effect of slavery on the human capital of slave descendants is significant and negative. The scope of our research is necessarily limited because the data currently available do not allow us to look into the effects of slavery beyond the early twentieth century. However, the release of new, full-count linked data sets may well show that the damage caused by slave owners persisted even a century after the end of the Civil War.

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Table 1: Descriptive Statistics, Children Age 6-15

Variable	N	Mean	Std. Dev.
A. 1880			
Age	35767	10.72	2.80
Father's Age	30339	46.05	8.81
Black	35767	0.14	0.35
Female	35767	0.42	0.49
Father Born in a Slave State	30339	0.32	0.47
Father's Years of Slavery (if Black)	3732	24.39	14.38
In School (If Aged 6-12)	24261	0.59	0.49
Literate	23143	0.84	0.37
B. 1900, 1910, 1920, 1930			
Age	17312	12.46	1.70
Father's Age	17312	45.41	7.18
Black	17312	0.05	0.22
Female	17312	0.50	0.50
Grandfather Born in a Slave State	17312	0.29	0.45
Grandfather's Years of Slavery (if Black)	912	24.70	14.72
In School (If Aged 6-12)	8822	0.93	0.25
Literate	17312	0.97	0.18

*Notes.* A: The data come from a representative sample of the households that had at least one male who appeared in both the 1870 and the 1880 census. Age is age of the child in 1880. Father's years of slavery are imputed as 1865 minus the father's year of birth, or zero if that value is negative. B: The data are pooled from representative samples of the following: a) households that had at least one male who appeared in both the 1880 and the 1900 census; b) households that had at least one male who appeared in both the 1880 and the 1910 census; c) households that had at least one male who appeared in both the 1880 and the 1920 census; and d) households that had at least one male who appeared in both the 1880 and the 1930 census. Age is age of the child in the latter census where he or she appears. Grandfather's years of slavery are imputed as 1865 minus the grandfather's year of birth, or zero if that value is negative.

Table 2: Literacy in Children Ages 6-15

Dependent variable is literacy	1880		Pooled 1900, 1910, 1920, 1930	
	(1)	(2)	(3)	(4)
Father's years of slavery	-0.00530*** (0.000709)	-0.00198*** (0.000576)		
Father is literate		0.705*** (0.0104)		0.851*** (0.0135)
Father's age	0.00158*** (0.000303)	0.000957*** (0.000269)		
Grandfather's years of slavery			-0.00595*** (0.000856)	-0.00358*** (0.000765)
Grandfather was literate				0.0464*** (0.00651)
Grandfather's age (in 1880)			0.000604*** (0.000133)	0.000408*** (0.000125)
Black	-0.354*** (0.0208)	-0.191*** (0.0175)	-0.0669*** (0.0213)	-0.0308 (0.0191)
Female	0.0168*** (0.00472)	0.0174*** (0.00422)	0.0139*** (0.00259)	0.0121*** (0.00234)
Age	0.0141*** (0.00141)	0.0135*** (0.00128)	0.00430*** (0.000789)	0.00398*** (0.000714)
1910			0.0240*** (0.00492)	0.0159*** (0.00446)
1920			0.0488*** (0.00494)	0.0351*** (0.00451)
1930			0.0561*** (0.00536)	0.0388*** (0.00495)
Constant	0.641*** (0.0216)	-0.0177 (0.0213)	0.857*** (0.0124)	-0.00946 (0.0164)
County fixed effects	Yes	Yes	Yes	Yes
Observations	19,225	19,225	17,312	16,814
R-squared	0.248	0.386	0.132	0.286

The data in (1) and (2) come from a representative sample of the households that had at least one male who appeared in both the 1870 and the 1880 census. The data in (3) and (4) are pooled from representative samples of the following: a) households that had at least one male who appeared in both the 1880 and the 1900 census; b) households that had at least one male who appeared in both the 1880 and the 1910 census; c) households that had at least one male who appeared in both the 1880 and the 1920 census; and d) households that had at least one male who appeared in both the 1880 and the 1930 census. Age is age of the child in the latter census where he or she appears. Father's (grandfather's) years of slavery are imputed as 1865 minus the father's (grandfather's) year of birth, or zero if that value is negative. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3: School Attendance for Children Ages 6-15

Dependent variable is in-school status	1880		Pooled 1900, 1910, 1920, 1930	
	(1)	(2)	(3)	(4)
Father's years of slavery	-0.00372*** (0.000649)	-0.00274*** (0.000636)		
Father's literacy		0.225*** (0.0145)		0.556*** (0.0548)
Father's age	3.78e-05 (0.000377)	-0.000289 (0.000375)		
Grandfather's years of slavery			-0.00341*** (0.00126)	-0.00135 (0.00123)
Grandfather's age (in 1880)			0.000408 (0.000273)	0.000314 (0.000271)
Age	0.0529*** (0.00159)	0.0526*** (0.00158)	-0.000986 (0.00320)	-0.00169 (0.00315)
Black	-0.263*** (0.0184)	-0.198*** (0.0186)	-0.0648* (0.0335)	-0.0385 (0.0346)
Female	0.00472 (0.00634)	0.00489 (0.00630)	0.00788 (0.00525)	0.00578 (0.00513)
Grandfather was literate				0.0517*** (0.0124)
1910			0.0414*** (0.00881)	0.0384*** (0.00868)
1920			0.0717*** (0.00910)	0.0652*** (0.00896)
1930			0.0858*** (0.0101)	0.0746*** (0.0101)
Constant	0.185*** (0.0214)	-0.0191 (0.0247)	0.880*** (0.0383)	0.297*** (0.0671)
County fixed effects	Yes	Yes	Yes	Yes
Observations	21,062	21,062	8,822	8,566
R-squared	0.141	0.151	0.104	0.148

The data in (1) and (2) come from a representative sample of the households that had at least one male who appeared in both the 1870 and the 1880 census. The data in (3) and (4) are pooled from representative samples of the following: a) households that had at least one male who appeared in both the 1880 and the 1900 census; b) households that had at least one male who appeared in both the 1880 and the 1910 census; c) households that had at least one male who appeared in both the 1880 and the 1920 census; and d) households that had at least one male who appeared in both the 1880 and the 1930 census. Age is age of the child in the latter census where he or she appears. Father's (grandfather's) years of slavery are imputed as 1865 minus the father's (grandfather's) year of birth, or zero if that value is negative. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

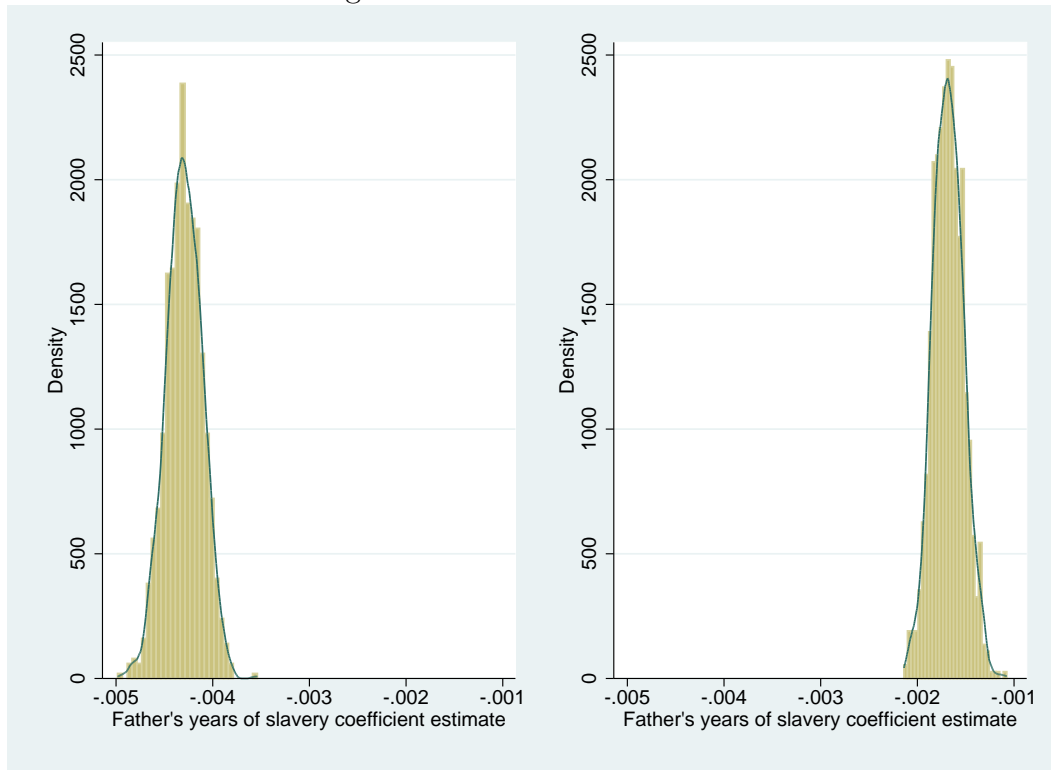
Table 4: Labor outcomes Ages 13-34 in 1900

Dependent variable	In labor force		Occupational income score	
	(1)	(2)	(3)	(4)
Father's years of slavery	-8.17e-05 (0.000409)	-5.11e-05 (0.000401)	-0.0422 (0.0288)	-0.0370 (0.0294)
Father is literate		0.0226 (0.0220)		3.828*** (0.763)
Father's age	0.000125 (0.000227)	0.000127 (0.000227)	-0.00899 (0.0205)	-0.00875 (0.0204)
Age	0.000263 (0.000642)	0.000235 (0.000642)	0.247*** (0.0490)	0.242*** (0.0490)
Black	0.00234 (0.0124)	0.00566 (0.0130)	-5.309*** (0.760)	-4.746*** (0.777)
Female	-0.329** (0.157)	-0.327** (0.158)	-10.04*** (3.235)	-9.722*** (3.386)
Constant	0.971*** (0.0169)	0.949*** (0.0264)	15.29*** (1.299)	11.63*** (1.465)
County fixed effects	Yes	Yes	Yes	Yes
Observations	4,248	4,248	4,248	4,248
R-squared	0.044	0.045	0.105	0.107

The data come from a representative sample of the households that had at least one male who appeared in both the 1880 and the 1900 census. Age is age of the child in the latter census where he or she appears. Father's years of slavery are imputed as 1865 minus the father's year of birth, or zero if that value is negative. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Figure 1: Distribution of Coefficients



Notes: Simulated coefficients of regressions using father's years of slavery. The panel on the left does not include a control for father's literacy, while the one on the right does.