ONLINE APPENDIX

"Jim Crow and Black Economic Progress After Slavery"
Lukas Althoff & Hugo Reichardt

A. ROBUSTNESS CHECKS

A.1 Adjusting Estimates for Misclassification Bias

Potential misclassification of ancestors' enslavement status could bias our estimates of the Free-Enslaved gap towards zero. It is valuable to distinguish two kinds of misclassification: false negatives, which refer to individuals incorrectly classified as formerly Enslaved despite having free paternal ancestry (due to imperfect linking rates); and false positives, which refer to individuals incorrectly classified as Free when their paternal ancestry was enslaved until the Civil War (due to incorrect links to the 1850 or 1860 census).

To mitigate misclassification bias, we use an instrumental variable (IV) approach designed to correct for both false negatives and false positives. We use our surname-based measure as an instrument for the linking-based measure. The resulting IV estimates offer an unbiased assessment of the Free-Enslaved gap, contingent upon the measurement errors in the linking-based measure being uncorrelated with the surname-based measure (Ashenfelter and Krueger, 1994; Angrist and Pischke, 2008). This assumption is plausible given that our surname-based measure is independent of census-linking methods.

The IV results suggest that measurement error reduces our initial estimates of the Free-Enslaved gap by an average of 9 percent across various outcomes (see Appendix Table A.5). For instance, the education gap, as estimated via the IV approach, is 1.67 years—a 5 percent increase compared to the OLS estimate of 1.59 years.

We also separately address potential bias from false negatives, which is more likely to be significant due to the conservative nature of our linking approach that makes false positives unlikely. The linking criteria require both uniqueness within and matches across two census waves, based on several attributes including name, year and state of birth, sex, and race. Our methodology may incorrectly categorize many Black families as descendants of the Enslaved, particularly if they originated in slave states with a significant pre-Civil War free Black population. For instance, in Maryland, approximately 50 percent of Black Americans were free before the Civil War according to the 1860 census. In our sample, 70 percent of Black Americans with ancestors from Maryland are classified as descendants of the Enslaved in 1940—20 points more than expected.

We adjust our estimates for bias that may arise from this type of misclassification. We use that our original estimates are a weighted average of the (unknown) unbiased estimate and the non-causal estimate for free Black Americans:

$$\widehat{\beta}_{\text{original}} = \frac{\text{Enslaved}_{s,\text{links}}}{\text{Enslaved}_{s,1860}} \cdot \widehat{\beta}_{\text{unbiased}} + \left(1 - \frac{\text{Enslaved}_{s,\text{links}}}{\text{Enslaved}_{s,1860}}\right) \cdot \widehat{\beta}_{\text{free}}, \qquad (10)$$

where $\text{Enslaved}_{s,\text{links}}$ is the share of Black Americans who descend from the Enslaved of state s according to our classification in 1940, $\text{Enslaved}_{s,1860}$ is the true share of Black Americans who descend from the Enslaved of state s according to the 1860 census, and $\widehat{\beta}_{\text{free}}$ is the non-causal estimate for outcomes of those with ancestors from state s.

We find that adjusting for the gap between the actual proportion of free Black individuals before the Civil War and our smaller classified share has a small impact on our Free-Enslaved gap estimates. Appendix Figure A.8 shows that the share of Black Americans who descend from the Enslaved only deviates from our classification for three small slave states. Accordingly, adjusting our original estimates of the causal effect of each

state barely affects our estimates. Even when excluding states with a high pre-Civil War free Black population, our gap estimate remains largely unchanged (see Appendix Figure A.9).

A.2 Adjusting Estimates for Intermarriage

We distinguish between two estimands in our analysis: 1) the Free-Enslaved gap based on paternal enslavement ancestry, and 2) the variation in economic status of a Black individual based on the *share* of their maternal and paternal ancestors who were Free vs. Enslaved.

The Free-Enslaved gap accurately captures the former estimand, i.e., differences between Black Americans whose male ancestry line goes back to people enslaved until the Civil War vs. Black Americans whose male ancestry line goes back to people free before the Civil War.

The second estimand is more difficult to quantify and depends on the frequency of Free-Enslaved intermarriages. Some individuals who we identify as descending from the Free or Enslaved via their paternal ancestry line may descend from the opposite group via other ancestry lines. However, our estimates of the Free-Enslaved gap can be informative about this second estimand depending on intermarriage levels.

Estimating intermarriage directly is not feasible without census links for women. As an approximation, we use a person's state of birth as a proxy for their enslavement status. Using this proxy, we estimate that intermarriage was relatively rare. Specifically, the probability of a Black person's mother being born in a slave state, given that their father was also born in a slave state, is between 98 and 100 percent throughout 1870 to 1940. Conversely, for fathers born in free states, the probability that the mother was also from a free state ranges between 64 and 86 percent (while free Black Americans in free states only account for 5 percent of the Black population).

This analysis has two limitations. First, some intermarriages between ancestor regions may actually be marriages within, not across, Free-Enslaved status. For example, we show that free Black Americans in the South have a far higher likelihood to migrate North before 1940 than descendants of the enslaved. Thus, many marriages between Southern-born and Northern-born Black Americans may be Free-Free marriages, not Free-Enslaved intermarriage as classified by the birthplace proxy. Our approximation could therefore *overstate* the actual frequency of intermarriages. Second, Free-Enslaved intermarriages may also occur within region of origin, not just across those regions. Our approximation could therefore *understate* the actual frequency of intermarriages. However, the small geographic overlap between the two groups makes such intermarriage within locations less likely to be quantitatively important.

While data challenges limit our ability to provide conclusive quantitative evidence of Free-Enslaved intermarriages, historical accounts support the notion that such intermarriages were relatively rare, even within location. After the Civil War, Black Americans free before the Civil War maintained a distinct social and cultural identity, often isolating themselves from the majority of people enslaved until the Civil War:

> *"After the Civil War, the free mulatto class continued to hold itself aloof from the masses of freedmen. In Louisiana, the hostility of some members of this class to the newly emancipated blacks was so great that they opposed giving political rights to the freedmen. [...] Even in their religious affiliations, the descendants of the free mulattoes held aloof from the Negro masses. [...] The descendants of the free mulattoes became, after the Civil War, the core of a small upper class which undertook to maintain the American pattern of family life and conventional sex mores. In some small communities in the South, a single family with this social and cultural background would live in complete isolation rather than associate with the masses of Negroes"* (Frazier, 1957)

In conclusion, the limited available evidence suggests that intermarriages across Free-Enslaved status were relatively uncommon, primarily due to geographic and socioeconomic divides. While the Free-Enslaved gap we estimate based on paternal ancestry provides important insights, we acknowledge that in later generations, quantifying the exact share of ancestors enslaved until the Civil War poses empirical challenges.

Formally, in addition to the Free-Enslaved gap, estimated via $y_i = \alpha + \beta \cdot s_i + \varepsilon_i$, we may also be interested in $y_i = a + b \cdot share_i + e_i$, where $share_i$ is the share of i's ancestors who were slave until the Civil War. For our estimate of the Free-Enslaved gap, we have

$$\hat{\beta} \xrightarrow{p} \mathbb{E}[y|s=1] - \mathbb{E}[y|s=0] = b \cdot (\mathbb{E}[share_i|s=1] - \mathbb{E}[share_i|s=0]). \qquad (11)$$

In the following sections, we use this expression to derive the attenuation bias that makes the Free-Enslaved gap a lower bound for the group differences between families with high vs. low shares of ancestors enslaved.

A.2.1 First generation after slavery

For the first generation of descendants, we know that

$$
\begin{aligned}
\mathbb{E}[share_{i,1}|s=1] &= 1 \cdot \mathbb{P}(share_{i,1}=1|s_i=1) + 0.5 \cdot \mathbb{P}(share_{i,1}=0.5|s_i=1) + 0 \\
&= 1 \cdot \mathbb{P}(\text{mother slave|father slave}) + 0.5 \cdot \mathbb{P}(\text{mother free|father slave}) \\
\mathbb{E}[share_{i,1}|s=0] &= 1 \cdot \mathbb{P}(share_{i,1}=1|s_i=0) + 0.5 \cdot \mathbb{P}(share_{i,1}=0.5|s_i=0) + 0 \\
&= 0.5 \cdot \mathbb{P}(\text{mother slave|father free})
\end{aligned}
$$

Therefore, we have

$$\hat{\beta} \xrightarrow{p} b_1 \cdot [0.5 + 0.5 \cdot \mathbb{P}(\text{mother slave|father slave}) - 0.5 \cdot \mathbb{P}(\text{mother slave|father free})].$$

If there was no intermarriage, we would have $\hat{\beta} \xrightarrow{p} b_1$.[24] If marriage between formerly enslaved families and free Black families were random—in the sense that free and enslaved fathers have an equal probability of marrying an enslaved mother—we would have $\hat{\beta} \xrightarrow{p} 0.5 \cdot b_1$.[25] Given that it is implausible that free Black men were more likely than

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[24]Without intermarriage: $\mathbb{P}(\text{mother slave|father slave}) = 1$ and $\mathbb{P}(\text{mother slave|father free}) = 0$.

[25]With random intermarriage: $\mathbb{P}(\text{mother slave|father free}) = \mathbb{P}(\text{mother slave|father slave}) = \mathbb{P}(\text{mother slave})$.

formerly enslaved Black men to marry formerly enslaved women, it seems reasonable that $b_1 \in [\hat{\beta}, 2 \cdot \hat{\beta}]$.

We empirically assess this bias by analyzing the likelihood that a Black person descends from one parent born in a slave state and another parent born in a free state for 20-40 year old Americans in the 1910 census (whose parents were likely born towards the end of slavery). We are not able to quantify intermarriage between the formerly Enslaved and Free within state of origin because we do not have information on women's enslavement status beyond her birthplace.

We estimate that in 1910,

$$\begin{aligned} \widehat{\mathbb{P}}(\text{mother slave}|\text{father slave}) &= 0.99 \\ \widehat{\mathbb{P}}(\text{mother slave}|\text{father free}) &= 0.20, \end{aligned}$$

suggesting that the gap between individuals whose grandparents are either all formerly Enslaved or all Free could be 1.1 times as large as the Free-Enslaved gap.

A.2.2 Second generation after slavery

If there was no intermarriage, we would have $\hat{\beta} \xrightarrow{p} b_2$. If marriage between formerly enslaved families and free Black families were random we would have $\hat{\beta} \xrightarrow{p} 0.25 \cdot b_2$. Thus, $b_2 \in [\hat{\beta}, 4 \cdot \hat{\beta}]$. The details of the derivation are available upon request.

We empirically assess this bias by analyzing the likelihood of having parents born in slave or free states for married couples between 20 and 40 years old in the 1910 census (whose parents were likely born towards the end of slavery). Our estimates suggest that the gap between individuals whose grandparents are either all formerly Enslaved or all Free could be 1.5 times as large as the Free-Enslaved gap.

A.2.3 n^{th} generation after slavery

Generally, if there was no intermarriage, we would have $\hat{\beta} \xrightarrow{p} b_n$. If marriage between formerly enslaved families and free Black families were random we would have $\hat{\beta} \xrightarrow{p} 2^{-n} \cdot b_n$. Thus, $b_n \in [\hat{\beta}, 2^n \cdot \hat{\beta}]$.

Our geographic ancestry analysis from 1880 to 1940 indicates little intermarriage between slave and non-slave states even in the latest decades of our sample period. Specifically, the probability of a Black person's mother being born in a slave state, given that their father was also born in a slave state, is between 98 and 100 percent throughout this period. Conversely, for fathers born in free states, the probability that the mother was also from a free state ranges between 64 and 86 percent (while free Black Americans in free states only account for 5 percent of the Black population).

A.3 Placebo Exercises

In two types of placebo exercises, we test our method of quantifying the Free-Enslaved gap. First, we estimate the placebo Free-Enslaved gap for white Americans. White families who cannot be linked to the 1850 or 1860 censuses are classified as (placebo) descendants of the Enslaved. The (placebo) Free-Enslaved gaps for white Americans are

economically insignificant, especially in comparison to the actual Free-Enslaved gaps estimated on the Black population (see Appendix Figure A.7). This also holds for a wider range of variables observed in 1940 (see Appendix Table A.3). Note that this exercise may not yield pure placebo estimates because white families immigrating after 1860 may be different from those who immigrated earlier.

Second, we estimate the Free-Enslaved gap on the Black population using 1875 as the (placebo) end of slavery. Appendix Table A.4 shows that this placebo Free-Enslaved gap is economically negligible. This finding is consistent with Figure 2 which shows that there are no gaps between Black Americans who can be linked back to 1880 (but not 1870 or earlier) and those who can be linked back to 1870 or earlier.

A.4 The Direct Effect of Locations After Accounting for Migration

Our estimates of how being freed in a given location affected the economic progress of Black families reflects both the effect of the original location and the expected effects of future locations conditional on the 1870 location. Under a mild assumption, we can recover the treatment effect of each destination location.

Assumption 2 (No direct long-run effect of enslavement location). *The pre-1865 effect of enslavement location ℓ ceases to directly affect a family's descendants by 1940. That is,*

$$\rho \gamma_c^0 = 0$$

where ρ is the intergenerational elasticity from 1865 to 1940 and γ_ℓ^0 is the effect that location ℓ had on Black families who lived there.

This assumption is plausible for two reasons. First, the vast majority of enslaved people were freed from slavery with little to no measured physical or human capital with little variation across locations. Second, plausible values for ρ are likely small given the high intergenerational mobility of Black Americans following the end of slavery and the amount of time that elapsed until 1940.

Under this assumption, we can recover a state's treatment effect from the originally estimated intent-to-treat (ITT) using standard instrumental variable methods in settings with multiple treatments under imperfect compliance—each treatment being a potential state of birth and non-compliance arising through migration. As described in Section 6.1, the ITT effect of location ℓ, η_ℓ, is the average of all potential future locations' treatment effects, $\gamma_{\ell'}^1$, weighted by the probability of migrating from ℓ to ℓ'. We invert the migration probability matrix to recover the effect of living in each state until 1940.

We find that the original *ITT effect* of living in a state after 1865, estimated as the causal effect of being born into slavery in that state, is almost identical to the *treatment effect* of living in the state after 1865 (see Appendix Figure A.11). In essence, this finding results from high "compliance rates" due to limited geographic mobility in the Deep South before 1940.

A.5 Empirical Bayes Shrinkage

When estimating place effects with many geographic units (counties), a common problem is that some estimates may be noisy. While these estimates are unbiased, they are

on average further from the truth—in a total squared error sense—than optimal (Efron, 2010). Shrinkage techniques address this problem.

Empirical Bayes methods have become a popular means to shrink noisy estimates (e.g., Angrist et al., 2017; Chetty and Hendren, 2018). The method is motivated by the fact that under the assumption of place effects resulting from a common (unknown) distribution, the optimal point estimator has the form of a Bayesian posterior mean (Armstrong et al., 2022). One does not need to make any assumptions on the specific distribution that the place effects result from.

We apply an empirical Bayes shrinkage to our baseline county effects. We provide two forms of shrinkage estimates. The first set does not use covariates, shrinking the baseline estimates toward a common mean. The second set includes covariates, shrinking the baseline estimates toward the place effect predicted by the covariates.

Appendix Figure A.12 shows the place effects before and after shrinkage. While the negative effects are concentrated in the Lower South before *and* after, the shrunk estimates are more spatially correlated. Appendix Figure A.13 shows the correlation of causal place effects on Black economic progress with the same places' (non-causal) effects on the outcomes of white and free Black Americans. Before and after shrinkage, there is no correlation between the effects for descendants of the Enslaved and white Americans, but a strong positive correlation between those for descendants of the Enslaved and the Free.

A.6 Assessing Linking Bias

Any study that uses automated linking methods faces the problem that individuals who can be linked across decades may not represent the overall population. For example, families with a high socioeconomic status may choose more unique names for their children, making it easier to create a unique match across census records. A socioeconomic gap between two sub-populations is only biased if the linking procedure differentially selects them into the sample. Appendix Table A.1 shows that, if anything, the linking procedure biases the Free-Enslaved gap toward zero.

In addition, a family's socioeconomic status may affect not only *whether* they can be linked across decades but also *over how many decades* they can be linked. For example, children who grow up with single mothers can typically not be linked to their grandparents because women cannot be linked due to name changes at marriage. Our classification algorithm identifies descendants of the Free mainly through whether they can be linked back to 1850 or 1860, which could lead to an almost mechanically higher socioeconomic status. We addressed this concern in Section 3.4 (see Figure 2).

One may be also concerned that the outcomes of Black men in the 1940 census depend on whether they can be linked to ancestors in the 1850 to 1880 censuses. However, Table A.6 alleviates those concerns by showing that our linked sample of Black prime-age men is comparable to the general population of Black prime-age men. We present means both with and without conditioning on having US-born parents, the former excluding recent immigrants to maximize comparability to our linked sample. The observable characteristics of our linked sample closely align with these populations, with the exception of slightly higher labor force participation in our sample (91.7%) compared to the population's average (88.8%–90.6%).

Last, one may be concerned that the effect of place in 1870 on outcomes in 1940 may

be biased by differences in linking rates across those locations. In particular, areas with large Black populations may have lower linking rates because the linking relies on the *uniqueness* of a person's identifying characteristics. Lower linking rates may imply that only individuals with particularly rare names—and therefore potentially different socioeconomic statuses—are selected into the sample. Appendix Figure A.10 addresses this concern by showing counties' average likelihood of a resident in 1870 being linkable to the 1940 census. Linking rates are similar across the country except for the most sparsely populated counties in the North (which do not contribute to our causal analysis).
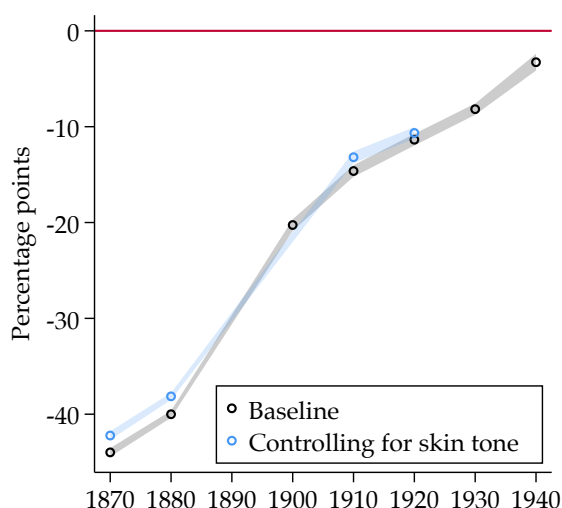
A.7 Figures

FIGURE A.1: Benchmark for Speed of Convergence—White Americans Whose Ancestors Did vs. Did Not Have Any Physical or Human Capital

(A) Literacy
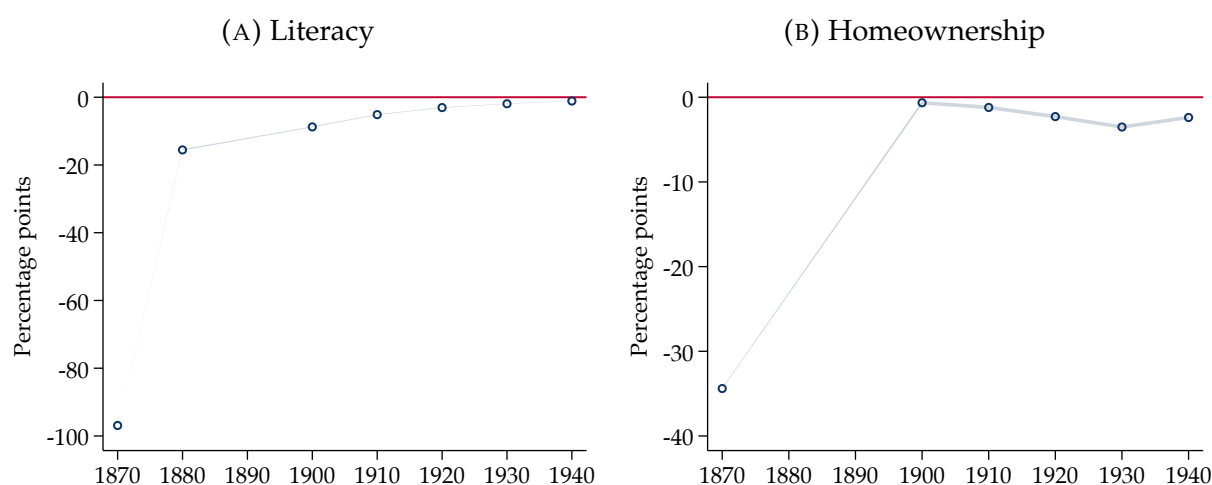
(B) Homeownership

Notes: This figure shows the gaps in literacy and homeownership among white prime-age (20-54) male descendants of ancestors with vs. without any physical or human capital in 1870. Physical capital is measured in terms of real and personal property; Human capital is measured in terms of literacy. The comparison yields a benchmark for the convergence of large economic gaps from 1870 to 1940. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. All estimates control for a quadratic function in age and include 95 percent confidence bands that are clustered at the family level. See Data Appendix B for details on the sample and data.

FIGURE A.2: Free-Enslaved Gap in Literacy Conditional on "Mulatto"-Status

Notes: This figure shows the Free-Enslaved gap in literacy before and after including a dummy for whether a person is classified as "Mulatto" (instead of "Black") in the census. This classification does not exist in the 1900 census or any census after 1920. The sample includes both the South and North of the US. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. The sample includes only Black prime-age (20–54) men whose ancestors can be located in 1870. See Data Appendix B for details on the sample and data.

FIGURE A.3: Southern Counties' Distance to State Borders
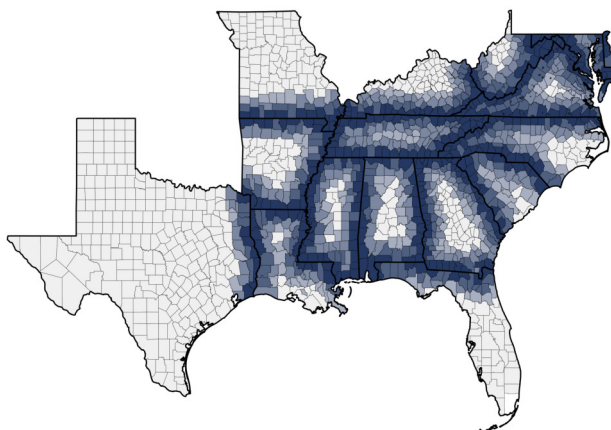

Notes: This map shows each county's distance to the closest state border within the South. Darker shades correspond to closer proximity to a border. Distances are measured from a county's centroid to the border. In our main analysis, we limit our analysis to counties within 100 kilometers (62 miles) of any border but show that our results are robust to other cutoffs.

FIGURE A.4: RD Estimates Using Different Sets of Control Variables

(A) Controls: demographics

(B) Controls: demographics, crops, economic
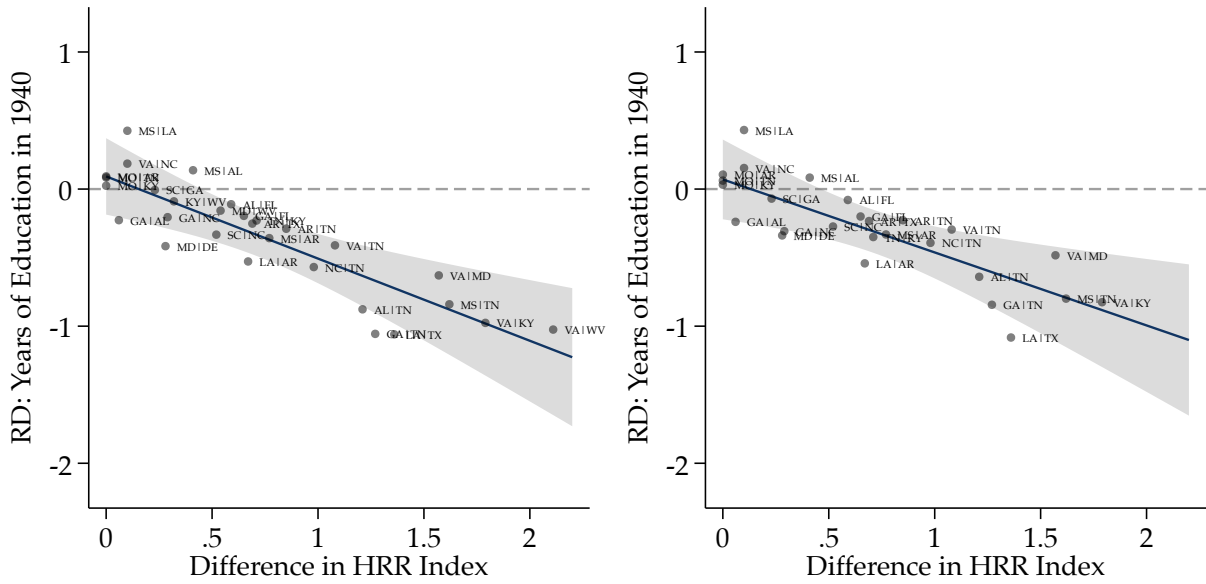
Notes: This figure shows each separate RD estimate in 1940 years of education for Black families freed across state borders with different Jim Crow intensity in 1865 after controlling for different sets of county-level variables in 1860. Panel A includes controls for the fraction Black; the fraction free among Black persons; and the age and sex of enslaved persons. Panel B includes controls for the farm share; wealth; population density; share Black; migration cost to the North; per-capita tobacco, cotton, and cane sugar output; farm values; and share slaveholders. Each label shows the more oppressive before the less oppressive state. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). For point estimates, we use a 350km bandwidth and empirical Bayesian shrinkage as described in Appendix A.5. See Data Appendix B for details on the sample and data.

FIGURE A.5: RD Estimates Using Alternative Jim Crow Intensity Measures

(A) Black Americans
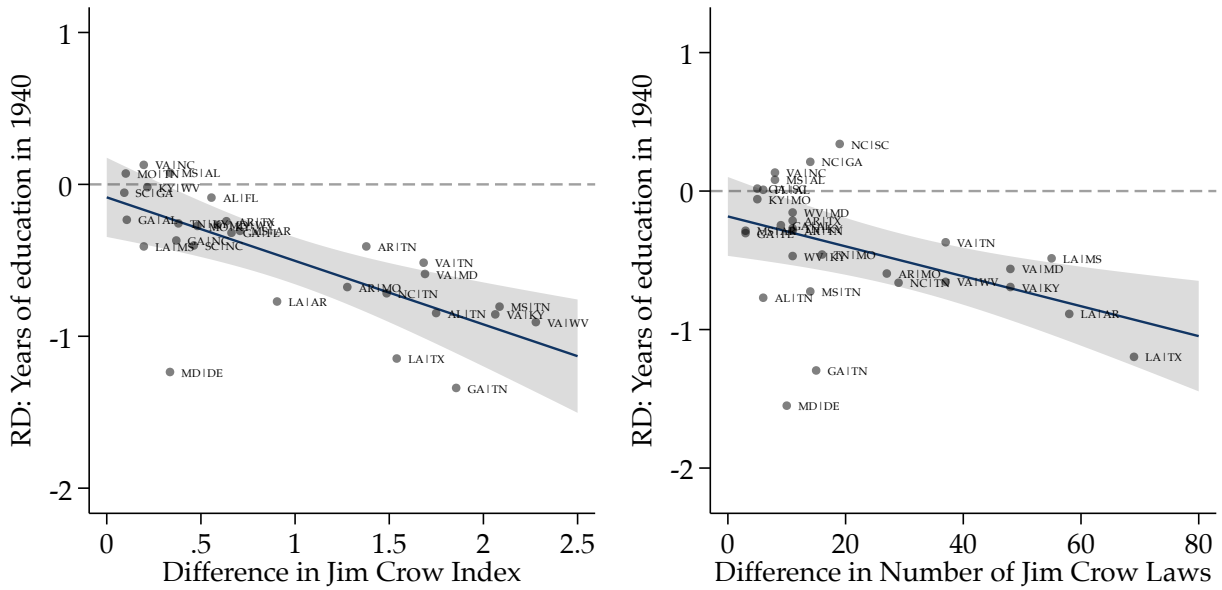
(B) White Americans
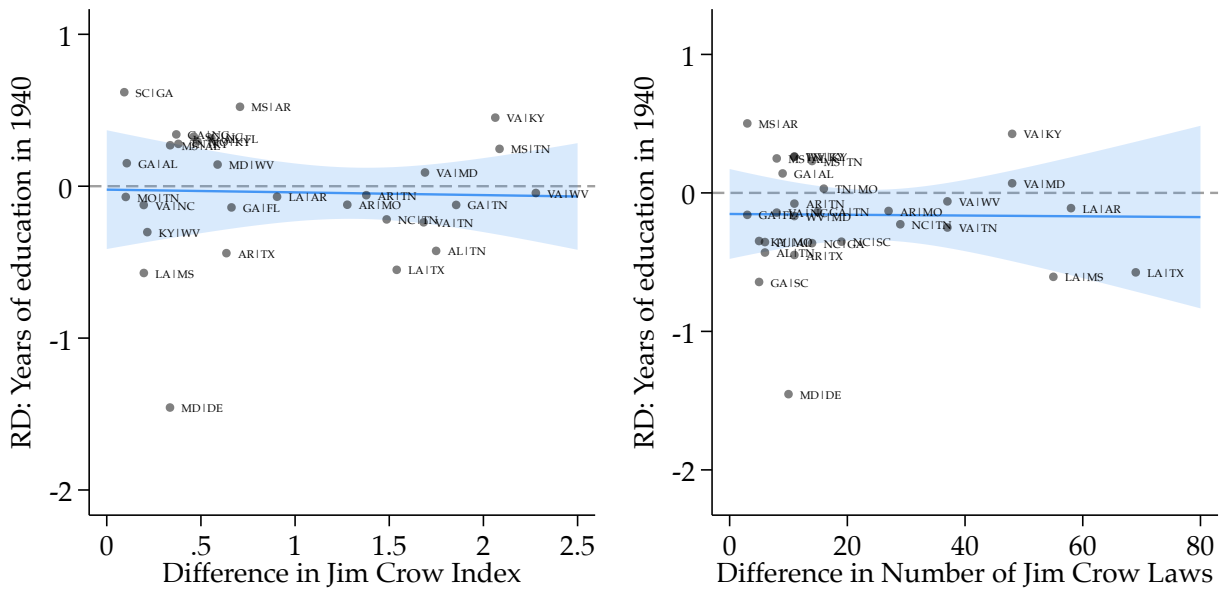
Notes: Panel A of this figure shows each separate RD estimate in 1940 years of education for Black families whose ancestors were freed on different sides of state borders in 1865. Panel B shows the same for white families depending on where their ancestors lived in 1870. Each label shows the more oppressive before the less oppressive state. Negative estimates reflect lower education in more oppressive states. Lines show the best linear fit between RD estimates and the differences in Jim Crow intensity, weighted by the inverse of the estimates' standard error. Shaded areas represent robust 95 percent confidence bands. For point estimates, we use a 350km bandwidth and empirical Bayesian shrinkage as described in Appendix A.5. See Data Appendix B for details on the sample and data.

FIGURE A.6: Different Bandwidths for Pooled RD Estimates
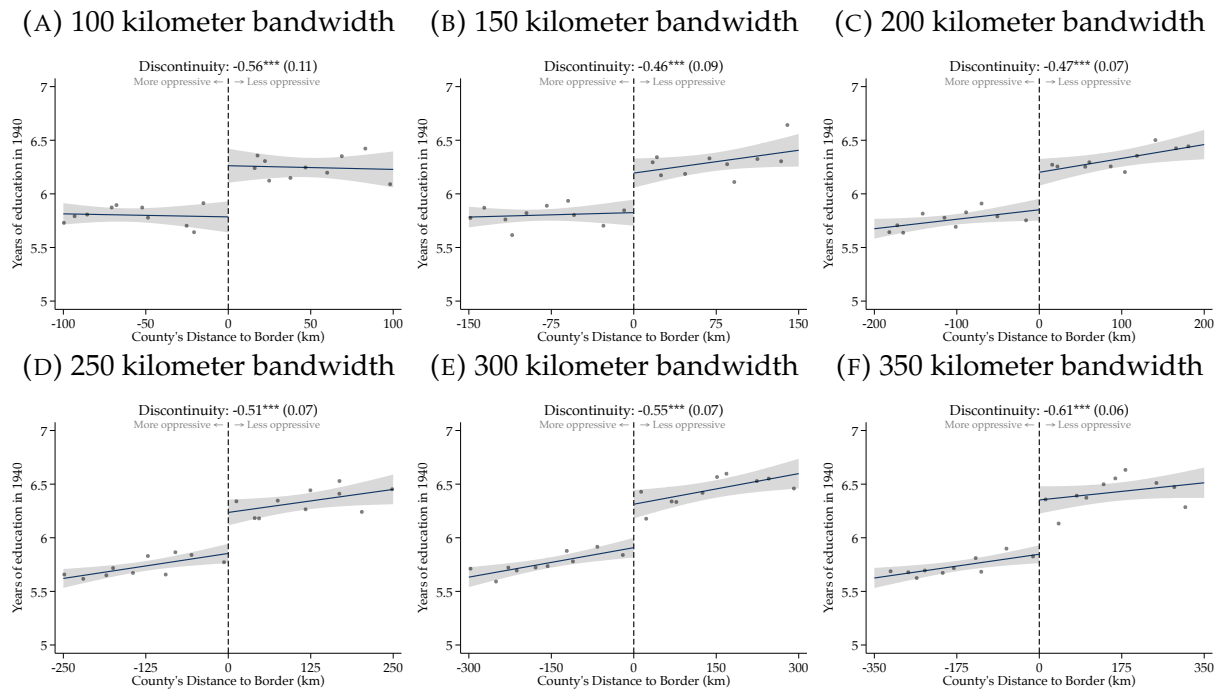
(A) 100 kilometer bandwidth

(B) 150 kilometer bandwidth

(C) 200 kilometer bandwidth

(D) 250 kilometer bandwidth


(E) 300 kilometer bandwidth

(F) 350 kilometer bandwidth

Notes: This figure shows the RD estimate in 1940 years of education for Black families freed across state borders with different Jim Crow intensity in 1865. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). The analysis is limited to "high-contrast borders" where Jim Crow intensity differs more than across the median border (above 0.71 HRR index points, with differences averaging 1.30 HRR index points). Panels (A) to (D) show 100, 150, 200, 250, 300, and 350 kilometer bandwidths respectively. The left half of each panel represents more oppressive states; the right half less oppressive states. Each dot is the average across a decile of the border population. Lines show the best linear fit. Shaded areas represent 95 percent confidence bands clustered at the 1870 county level. See Data Appendix B for details on the sample and data.

FIGURE A.7: Free-Enslaved Gap (1870–1940) vs. Placebo for White Americans

(A) Literacy

(B) Occupational skill
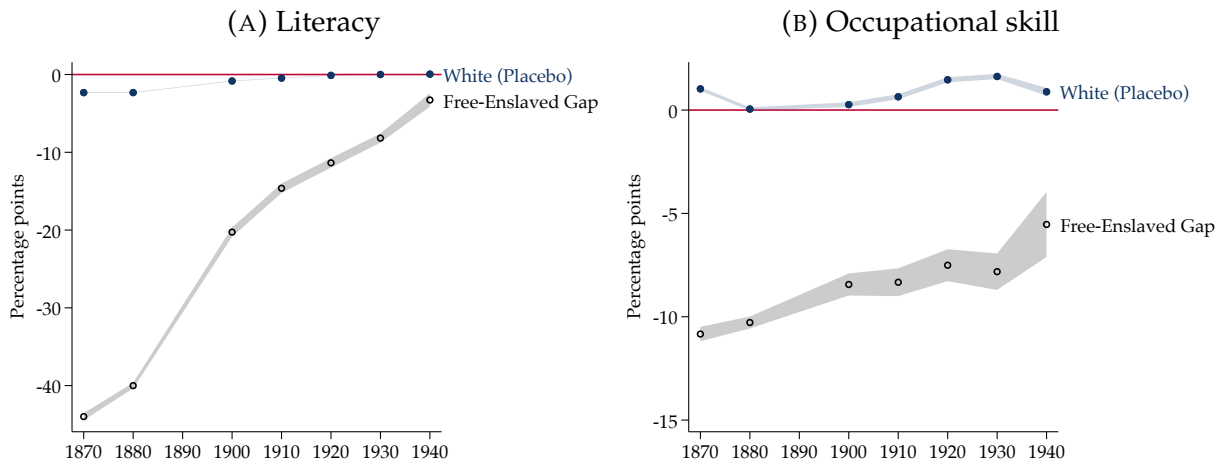
Notes: This figure shows the true and placebo gaps in literacy rates and occupation skill levels among prime-age (20-54) male descendants of enslaved vs. free Black Americans in each census decade. The placebo applies the exact same procedure to the sample of white Americans. The comparison shows that some linking bias may affect results in early periods, but all of it vanishes over time. The sample includes both the South and North of the US. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. We assign "skilled" to occupations classified as "medium skilled workers" or above by the HISCLASS scheme (Van Leeuwen and Maas, 2011); and "unskilled" to others. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. All estimates control for a quadratic function in age and include 95 percent confidence bands that are clustered at the family level. See Data Appendix B for details on the sample and data.

FIGURE A.8: Misclassification and Bias

(A) Rate of misclassification

(B) Minimal bias due to misclassification
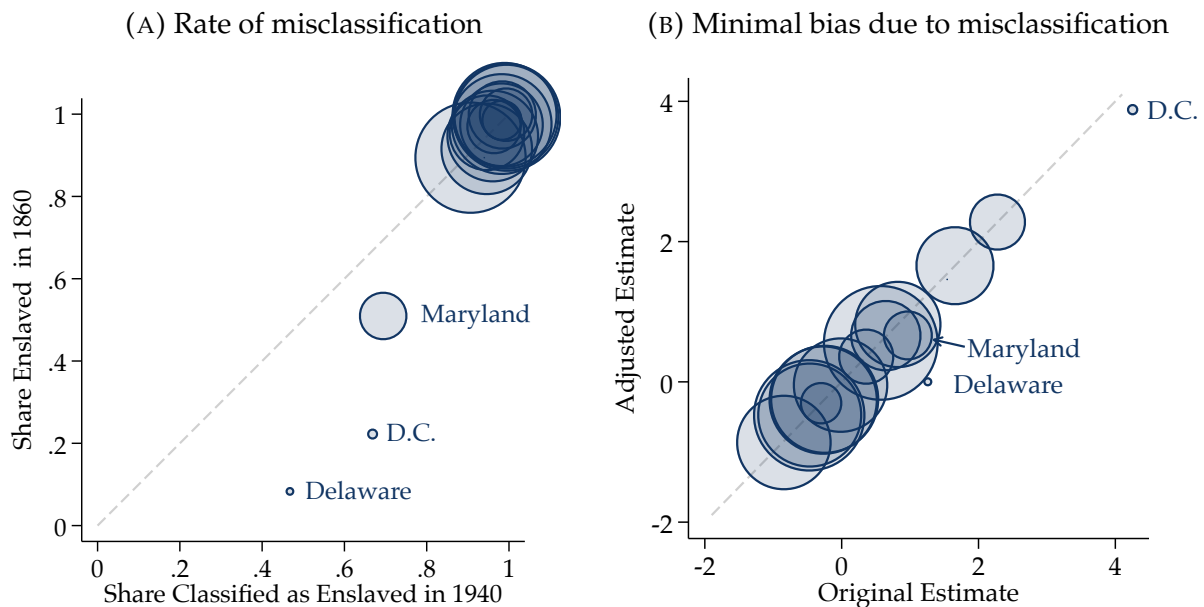
Notes: This figure assesses on misclassification of the Free-Enslaved status and the impact misclassification has on our estimates. Panel A shows the extent of misclassification as descendants of the Enslaved or the Free among Black Americans in 1940 with ancestors born in a given state before 1870. Panel B shows our causal estimates of living in each state before and after adjusting for misclassification bias. The sample includes the South of the US. See Data Appendix B for details on the sample and data.

FIGURE A.9: Free-Enslaved Gap in Literacy (1870–1940)
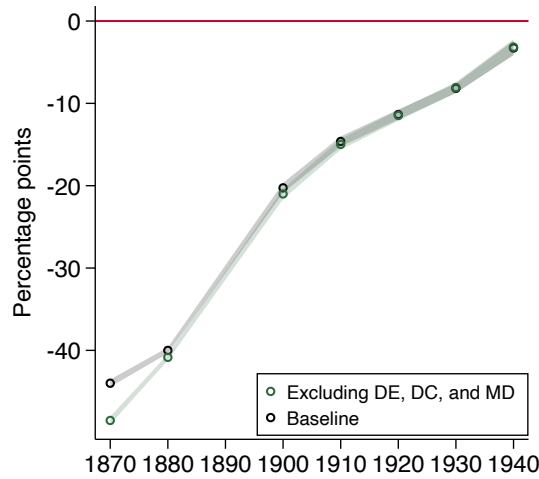
Notes: This figure shows the gaps in literacy among prime-age (20-54) male descendants of enslaved vs. free Black Americans in each census decade before and after excluding Delaware, DC, and Maryland. The sample includes both the South and North of the US. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. We restrict the sample to observations linked to ancestors in 1850, 1860, 1870, or 1880. We control for a quadratic function in age and include 95 percent confidence bands clustered at the family level. See Data Appendix B for details on the sample and data.

FIGURE A.10: Linking Rates by County from 1870 to 1940
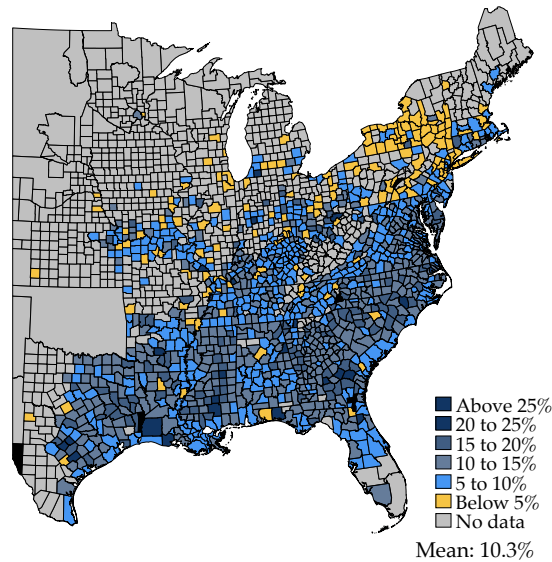

Notes: This figure shows the average linking rate for Black prime-age (20–54) men in 1870 to 1940. Only counties with a Black population of at least 50 prime-age men in 1870 are included.

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FIGURE A.11: ITT Effect and Treatment Effect of Living in Each Southern State (1870–1940) on Years of Education in 1940
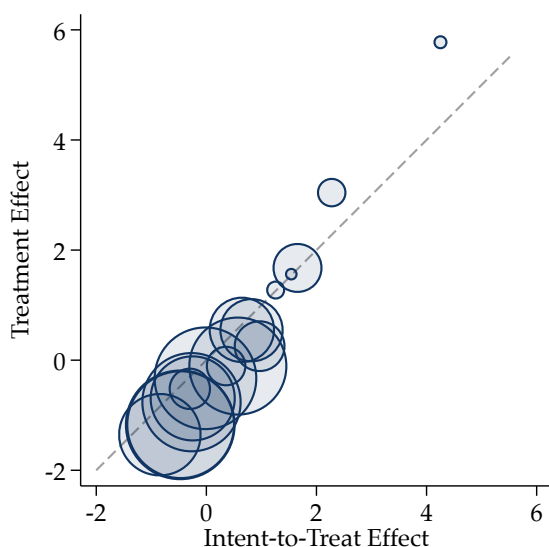
Notes: This figure compares our original (ITT) estimates of how being freed in a given state affected a Black family's economic progress to the direct treatment effect that living in that state had. The estimates are in years of education in 1940. See Data Appendix B for details on the sample and data.

FIGURE A.12: Causal Place Effects on 1940 Years of Education

(A) Preliminary Estimates   (B) Shrinkage (No Covariates)   (C) Shrinkage (Covariates)
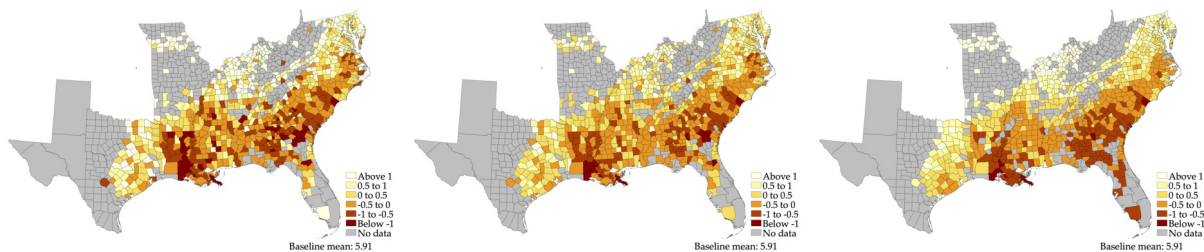
Notes: This figure shows the 1870 ancestor county fixed effect (FE) estimates on 1940 years of education for descendants of the Enslaved. Panel A shows the preliminary estimates. Panel B shows the estimates after shrinking them to their common mean. Panel C shows the estimates after shrinking them to the regression line based on various covariates. See Data Appendix B for details on the sample and data.

FIGURE A.13: Place Effects Across Groups Before and After Shrinkage

(A) Preliminary estimates

(B) Shrinkage

(C) Preliminary estimates

(D) Shrinkage
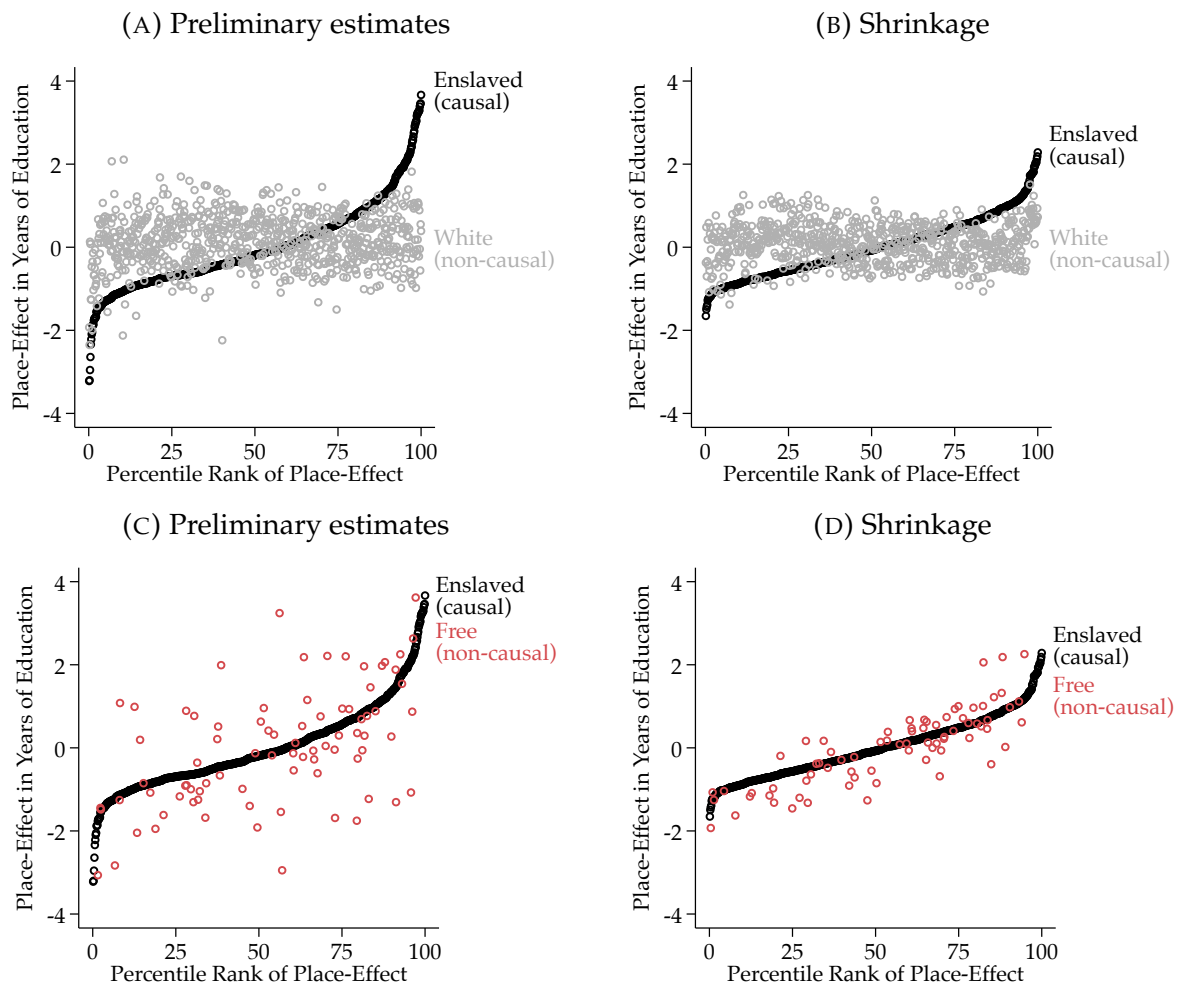
Notes: This figure compares the 1870 ancestor county fixed effect estimates on years of education in 1940 for descendants of the Enslaved (causal) with those of white Americans and descendants of free Black Americans (non-causal). Panels (A) and (C) show the estimates before shrinkage, Panels (B) and (D) show the shrinkage estimates. The shrinkage does not preserve a county's original rank. County-fixed effects based on ten observations or fewer are discarded. See Data Appendix B for details on the sample and data.

TABLE A.1: Assessing Linking Bias

	Free (1860)			Enslaved (1870)		
	Linked	Population	Δ	Linked	Population	Δ
Literacy (%)	65.1	66.8	-3%	20.4	20.4	0%
Occupation Score	6.0	6.1	-1%	3.7	3.8	-1%
Real property ($)	1,217	1,230	-1%	1,400	1,270	10%
Personal property ($)	312	316	-1%	312	293	6%
Lives in North (%)	45.1	52.1	-13%	7.8	8.2	-4%
Lives on Farm (%)	21.2	18.2	17%	23.8	23.2	3%
Observations	20,994	79,374		190,676	726,667	

Notes: This table shows that there is little selection into the linked sample. If anything, the linked sample is negatively selected for the Free and positively selected for the formerly Enslaved, attenuating the Free-Enslaved gap toward zero. The left panel compares the Free who can be linked to any future decade to the entire 1860 population (which only contains free Black Americans). The right panel compares our linked sample to the 1870 population (89 percent of whom were enslaved until 1865).

A.8 Tables

TABLE A.2: Free-Enslaved Gap Based on the Distribution of Surnames (1940)

	Education (Years) Mean: 5.70		Wage Income (USD) Mean: 588.60		Homeownership (%) Mean: 21.53		House Value (USD) Mean: 1,616.81	
P(Ancestor Enslaved until Civil War)	-1.25***	-1.40***	-88.36***	-113.15***	-1.95**	-2.31**	-1,098.68***	-1,194.53***
	(0.07)	(0.09)	(21.22)	(25.50)	(0.87)	(1.05)	(237.09)	(282.83)
Name-measure	Exact	NYSIIS	Exact	NYSIIS	Exact	NYSIIS	Exact	NYSIIS
Controls (age, age^2)	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.03	0.03	0.01	0.01	0.01	0.01	0.00	0.00
Observations	2,598,739		2,842,572		2,618,795		556,422	

Notes: This table repeats Table 1 showing the gap in years of education, total income, homeownership, and house value among prime-age (20-54) male descendants of enslaved vs. free Black Americans in 1940. Without record linkage, we cannot assure that all Black families in the sample were present in the US during both slavery and Jim Crow. However, we weight observations in the 1940 census to hold the distribution of surnames constant at its 1870 level. The sample includes both the South and North of the US. The sample includes the entire universe of prime-age Black men, not just those linkable. The coefficients can be interpreted as a 100 percentage point increase in the likelihood of descending from the Enslaved based on their (exact) surname. House values are measured conditional on ownership. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Robust standard errors are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A.3: Placebo Free-Enslaved Gap (1940) for White Americans

	Education (Years) Mean: 9.76	Wage Income (USD) Mean: 892.68	Home Ownership (%) Mean: 49.74	House Value (USD) Mean: 3,284.56
Placebo	**-0.17*****	**-1.68**	**0.09**	**12.17**
	(0.00)	(1.04)	(0.05)	(9.63)
Baseline Free-Enslaved gap	-1.59***	-145.92***	-7.24***	-694.69***
Controls (age, age^2)	Y	Y	Y	Y
Adjusted R^2	0.03	0.06	0.01	0.00
Observations	5,015,270	4,770,969	5,012,884	2,425,204
Ancestor Free	*3,158,604*	*3,001,138*	*3,155,980*	*1,536,909*

Notes: This table shows the placebo gaps in years of education, total income, homeownership, and house value among prime-age (20-54) male white Americans in 1940. The placebo applies our linking-based method to measure a person's (placebo) Free-Enslaved status. The sample includes both the South and North of the US. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. House values are measured conditional on ownership. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A.4: Placebo Free-Enslaved Gap (1940)

	Education (Years) Mean: 5.99	Wage Income (USD) Mean: 380.61	Home Ownership (%) Mean: 29.21	House Value (USD) Mean: 1,368.20
Placebo	**0.04***	**-6.84*****	**-0.01**	**-76.89****
	(0.02)	(2.44)	(0.26)	(30.66)
Baseline Free-Enslaved gap	-1.59***	-145.92***	-7.24***	-694.69***
Controls (age, age^2)	Y	Y	Y	Y
Adjusted R^2	0.03	0.04	0.01	0.00
Observations	162,387	153,368	163,195	46,574
Ancestor Free	*75,583*	*71,474*	*76,048*	*21,873*

Notes: This table shows the placebo gaps in years of education, total income, homeownership, and house value among prime-age (20-54) male Black Americans in 1940. The placebo uses 1875 as the (placebo) year of Emancipation, applying our linking-based method to measure a person's Free-Enslaved status. The sample includes both the South and North of the US. Only observations that can be linked to the 1870 or 1880 census are included. House values are measured conditional on ownership. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A.5: Free-Enslaved Gap (1940): IV Design to Reduce Measurement Error in Enslavement Status

	Education (Years) Mean: 6.08	Wage Income (USD) Mean: 390.18	Home Ownership (%) Mean: 29.71	House Value (USD) Mean: 1,422.37
IV: Ancestor Enslaved until Civil War	**-1.67*** (0.15)	**-170.12*** (17.69)	**-9.69*** (1.89)	**-554.68*** (149.68)
OLS: Ancestor Enslaved	-1.59***	-145.92***	-7.24***	-694.69***
Controls (age, age^2)	Y	Y	Y	Y
F-Statistic (weak id.)	2,077.22	1,998.63	2,049.38	994.86
Adjusted R^2	0.05	0.05	0.01	0.01
Observations	158,032	149,252	158,787	45,311
Ancestor Free	*9,078*	*8,551*	*9,070*	*3,227*

Notes: This table shows instrumental variable (IV) estimates of the gap in years of education, wage income, homeownership, and house value (conditional on ownership) among prime-age (20–54) male descendants of enslaved vs. free Black Americans in 1940. We use our surname-based measure of a Free-Enslaved status as an instrument for our linking-based measure. The sample includes both the South and North of the US. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A.6: Sample Balance of 1940 Sample Linked to Ancestors 1850–1880

	Linked Sample	Population	
	Black prime-age men linked to ancestors 1850–80	Black prime-age men with US-born parents	Black prime-age men
Literacy (%)	91.5	92.5	89.9
Years of education	6.0	6.4	5.7
LFP (%)	91.7	88.8	90.6
Wage income ($)	381.2	296.3	399.7
Occupation Score	4.9	4.6	4.9
Homeownership (%)	29.3	31.4	21.8
House value ($)	1,372.0	1,288.4	1,632.2
Urban (%)	47.0	44.4	53.7
Lives in North (%)	22.3	20.6	25.5
Lives on Farm (%)	36.1	39.7	29.2
Observations	168,138	327,393	3,000,331

Notes: This table compares our sample of Black prime-age (20–54) men linked to ancestors in 1850, 1860, 1870, and/or 1880 to the overall population of Black prime-age men in the census. The first population column conditions on having US-born parents according to the 1940 census; the second column includes all Black prime-age men. Note that in the 1940 census, parents' birthplace was a "sample-line" feature, available only for a random subset of the population.

B. Data Appendix

B.1 Individual-Level Outcome Variables

Our main outcome variables can be categorized as (proxies of) income, education, or wealth. Most individual-level data draw on census records provided through IPUMS (Ruggles et al., 2020). We use additional individual-level data from a major US credit bureau to extend our results to 2023.

Income

- **Occupational income scores, 1850–1940 (census).** Because the census does not include any continuous measure of income before 1940, researchers have instead relied on occupational income scores. The most popular version, "occscore," reflects the median total income of a person in that occupation in 1950.

- **Lido income scores, 1850–1940 (Saavedra and Twinam, 2020).** Occupational income scores do not contain any age-, sex-, or race-specific information. The recent literature has used regression and machine learning techniques to improve on the traditional occupational income score (e.g., Saavedra and Twinam, 2020; Abramitzky et al., 2021b). We use the Lido score constructed by Saavedra and Twinam (2020). The authors constructed it using machine learning techniques using 1950 and 2000 census data to validate their results against occscore in the 1915 Iowa census. According to Abramitzky et al. (2021b), the Lido score has a correlation of 0.99 with their own measure.

- **Occupational skill, 1850–1940 (Van Leeuwen and Maas, 2011).** We use HISCLASS, a classification to compare occupations based on the skill they typically required. The classification ranges from "higher managers" to "unskilled farm workers." We coarsen this classification by assigning "skilled" to every occupation classified as "medium skilled workers" or above and "unskilled" to everyone else.

- **Wage income, 1940 (census).** We use wage income for 1940, the only year it is available for in our sample period.

- **Predicted total income, 2019–2023 (credit bureau).** Measures a household's gross total compensation for the most recent year reported. This measure is estimated based on proprietary data and prediction models. For more details, see Appendix B.3.

- **Predicted disposable income, 2019–2023 (credit bureau).** Measures a household's income available to spend, invest, or save after accounting for fixed expenses. This measure is estimated based on proprietary data and prediction models. For more details, see Appendix B.3.

- **Hourly job, 2019–2023 (credit bureau).** Measures whether a person is employed as an hourly or salary worker.

Education

- **Literacy, 1850–1940 (census).** We use literacy for all years. In 1940, literacy becomes unavailable, and instead the census starts to include educational attainment. We proxy for literacy by having completed at least the second grade. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate.

- **Years of education, 1940 (census).** We impute years of education from the highest educational level attained ("educd").

- **High school, 1940 (census).** We impute whether a person holds a high school degree based on whether they completed at least 12 years of schooling ("educd").

- **College, 1940 (census).** We impute whether a person holds a college degree based on whether they completed at least 16 years of schooling ("educd").

- **Graduate, 1940 (census).** We impute whether a person holds a graduate degree based on whether they completed at least 17 years of schooling ("educd").

Wealth

- **Personal property, 1860–1870 (census).** Measures "the contemporary dollar value of all stocks, bonds, mortgages, notes, livestock, plate, jewels, and furniture" as reported to the census. It is not clear whether zeros indicate missing values or true zero personal property, and therefore we replace zeros with "missing."

- **Real property, 1850–1870 (census).** Measures "the contemporary dollar value of any real estate owned by the respondent" as reported to the census. It is not clear whether zeros indicate missing values or true zero personal property, and therefore we replace zeros with "missing."

- **Homeownership, 1850–1940 (census).** Measures whether the individual rents or owns their home. For 1900 to 1940, the census reports homeownership directly. For 1850 to 1870, we follow Collins and Margo (2011) in imputing homeownership status using information on wealth, where every household with positive real property is classified as owner-occupied. Collins and Margo (2011) exempt households who live in multi-family homes from this classification but the information necessary to follow them in doing so is not included in the full-count version of the census we use. However, creating homeownership proxies using their and our method yields a correlation of 0.9733 in the 1 percent sample.

- **House value, 1930–1940 (census).** Measures the house value conditional on owning the house.

- **Credit score, 2019–2023 (credit bureau).** The VantageScore® 3.0 measures a person's credit health. The score takes into account a rich set of indicators on a person's financial situation. It ranges from 300 to 850. Scores above 700 are typically considered "good" and scores below 550 "very poor."

B.2 Neighborhood-Level Outcome Variables

While we cannot link our data to censuses after 1940, we can link the 1940 census to administrative mortality records from 1988 and 2007 using the CenSoc-Numident file (Goldstein et al., 2021). Importantly, the mortality records contain the nine-digit ZIP codes of residence at the time of death. We link these codes to statistical census geographic areas, i.e., census tracts, block groups, and blocks (see Section B.7 for more detail on the procedure). Census tracts contain between 1,200 and 8,000 people and are designed to be "relatively homogeneous units with respect to population characteristics, economic status, and living conditions" (Census Bureau, 2017). Block groups (between 600 and 3,000 people) and blocks are subdivisions of a census tract.

We assigned to each decedent various economic characteristics based on these statistical areas at the time of death. Since the sample is about evenly split between deaths before 2000 and deaths after 2000, we used the aggregated census data for the year 2000 from the NHGIS database. For variables from other sources, we selected the data to refer to a period as close to 2000 as availability allowed.

One potential concern with this data may be that many people live in retirement homes, possibly making the neighborhood a less precise proxy of a person's economic status. To assess this potential issue, we compare the density of deaths with a ZIP code's population density and find that the two are highly correlated ($\rho = 0.91$). Our results are robust to excluding ZIP codes that have far higher rates of deaths than predicted by their population density.

Income

- **Income, 2000 (NHGIS).** The median household income by race of householder. Available by ZCTA, census tracts, and block groups.

Wealth

- **House value, 2000 (NHGIS).** The median value of owner-occupied housing units by race of householder. Available by ZCTA and census tracts.

- **Homeownership, 2000 (NHGIS).** The share of occupied housing units that is occupied by the owner (relative to a renter) by race. Available by ZCTA, census tracts, block groups, and blocks.

Education

- **High school degree, 2000 (NHGIS).** The share of the population over 25 years old by race and sex who hold a high school degree. Available by ZCTA, census tracts, and block groups.

- **College degree, 2000 (NHGIS).** The share of the population over 25 years old by race and sex who hold a college degree. Available by ZCTA, census tracts, and block groups.

Demographics

- **Age at death, 1988–2007 (BUNMD, Goldstein et al., 2021).** The median age at death by race and sex. Available by five-digit ZIP code, census tracts, block groups, and block.

- **Percentage Black, 2000 (NHGIS).** The share of the population that is Black. Available by ZCTA, census tracts, block groups, and blocks.

B.3 Credit Bureau Sample

We analyze data from a major US credit bureau, which includes comprehensive monthly credit reports for individuals from January 2010 to the present. These reports, updated on the final Tuesday of each month, contain information from various sources, such as financial institutions, debt collection agencies, and public records, along with proprietary data. Our focus is on the March 2023 snapshot.

Our sample is restricted to Black prime-age (20-54) men. The credit bureau uses a predictive method to determine race, based on 1) a person's first and last name and 2) their detailed neighborhood (nine-digit ZIP code). Names are analyzed both in terms of their frequency across racial groups as well as for prefixes and suffixes that may contain information about the ethnic origin of a person. A person's neighborhood of residence allows the credit bureau to leverage information on the racial composition of the neighborhood.

This method, given the detailed geographic information it leverages, is far more accurate than common proxies that rely solely on surnames. Using a separate dataset—our Social Security mortality records—we find that surnames capture 22 percent of the variation in whether a person is Black or not; nine-digit ZIP codes capture 76 percent; and both combined capture 90 percent.

Despite our efforts to minimize racial misclassification, some misclassification may persist, potentially affecting our estimates. This could manifest in two main ways: the exclusion of higher socioeconomic status Black individuals who live in predominantly white neighborhoods or have traditionally white surnames, and the inclusion of lower socioeconomic status white individuals residing in predominantly Black neighborhoods or having traditionally Black surnames. The impact these types of misclassification have on our estimates of the Free-Enslaved gap is ambiguous. Excluded high-status Black individuals may disproportionately represent free Black Americans, potentially leading to an underestimate of the Free-Enslaved gap. Conversely, incorrectly included White individuals could enter either the formerly enslaved or free Black American samples. They could be more likely to be classified as formerly enslaved if they share surnames with white former slaveholders, which many freed individuals adopted. Alternatively, they could be more likely to be classified as free Black Americans given that the surnames of formerly enslaved families are sometimes distinct to that group (e.g., "Freedman"). Overall, the net effect of misclassification on the Free-Enslaved gap remains ambiguous.

To minimize the impact of immigrants, we weight the sample to maintain the 1870 surname distribution. This weighting will, for example, strongly down-weight observations of Black African immigrants, many of whose surnames were likely not present in the US in substantial numbers in 1870. In addition to this weighting procedure, the credit bureau's race classification differentiates between individuals who are likely of American descent and individuals who are likely of foreign descent (again, based on first and last

names). We limit the sample to those classified as Black Americans (aiming to exclude Black immigrants). Despite both of these measures, our sample may include some immigrants. We believe that those immigrants are more likely to be classified as descendants of free Black Americans due to the fact that formerly enslaved individuals often chose names that are somewhat specific to the US context (e.g., "Freedmen" or "Washington"). To the extent that those immigrants enter our sample as free Black Americans and given that Black immigrants tend to have a relatively high socioeconomic status, this may bias our estimates towards finding a larger gap between free and enslaved descendants.

The bureau combined our probabilistic surname-based classification of Free-Enslaved status of Black individuals with their credit reports, subsequently anonymizing the data. We access these anonymized individual-level credit reports for around 550,000 Black prime-age men whose names were successfully merged to our Free-Enslaved classification via a secure server, allowing real-time estimation of the Free-Enslaved gap in employment and credit. Based on our continuous surname-based measure of ancestors' enslavement status, the average likelihood of descending from free Black Americans across our credit bureau sample is 9.5 percent—close to the share of Black Americans recorded as free in the 1860 census: 11 percent.

The credit bureau predicts individual income using a comprehensive set of demographic, financial, and property data aggregated from various sources, including banks and insurance providers. Because this income prediction relies on models and data proprietary to the credit bureau, our ability to validate the predictions are limited. However, recent work using similar credit bureau data validate the accuracy of these predictions using payroll records (Mello, 2023). The credit bureau's income prediction model consists of two main components. First, predicted salary is based on the credit bureau's proprietary database of payroll records. Second, predicted financial income, which includes income from investments, businesses, and retirement, is estimated using various data from the credit bureau and its partners. The credit bureau's internal validation exercises show that predicted incomes are predictive of individuals' consumption patterns, such as purchasing a luxury car. Moreover, the distribution of predicted incomes aligns with the income distribution documented by the census.

B.4 Jim Crow Database

We build a rich dataset on states' Jim Crow regimes by combining newly collected information on Jim Crow laws and existing data on states' institutions and outcomes directly affected by those institutions, including voter participation and educational resources.

B.4.1 Jim Crow Index

As an alternative to the Historical Racial Regime (HRR) index to measure the intensity of each state's Jim Crow regime, we introduce a composite metric—the "Jim Crow index." This index is constructed using principal component analysis and encompasses multiple factors, each serving as a proxy for specific aspects of anti-Black institutions. Our index builds on the HRR index from Baker (2022) but focuses on institutional factors and the Jim Crow era specifically.

Our new Jim Crow index is based on five factors. The first factor is the anti-Black share of race-related laws a state passed until 1950. For this measure, we collected new infor-

mation on laws that mention race or color and classify those laws as to whether they are anti-Black discriminatory or not (see next section). The second factor is a state's number of disenfranchisement devices (i.e., literary tests, poll tax, grandfather clause, and white primary; Walton et al., 2012; Baker, 2022). The third factor is a state's share of congressional delegates that signed the Southern Manifesto (Baker, 2022). The fourth factor is the racial gap in states' school year lengths—i.e., the legislative term length of Black schools relative to that of white schools (Card and Krueger, 1992). The fifth and final factor is the year in which a state introduced legislation for minimum teacher pay—legislation central to narrowing the large wage penalty historically suffered by Black teachers (Card et al., 2022; Cascio and Lewis, 2024).

Appendix Table B.3 presents each state's Jim Crow index alongside the corresponding input variables. The Deep South—Mississippi, Louisiana, Georgia, South Carolina, and Alabama—emerge as the most oppressive according to our index. Notably, Louisiana ranks in the top quartile of most oppressive states across all measures. In contrast, the border states—Delaware, West Virginia, Kentucky, Maryland, and Missouri—are categorized as the least oppressive.

We consider a variety of alternative measures for states' Jim Crow intensity. Figure B.4 shows the correlations between different proxies of Jim Crow intensity (discussed in the following two sections). While these measures are very different in nature and capture both de jure and de facto aspects of Jim Crow, they are correlated and using them, we consistently arrive at the same conclusions. Key outcomes directly affected by Jim Crow institutions are also highly correlated with our Jim Crow index: overall votes cast per adult male between 1900 and 1940 ($\rho = -0.89$, not available by race) and our causal effects on long-run economic progress of Black families ($\rho = -0.93$).

B.4.2 New Database on Jim Crow Laws

We collect information from 800 Jim Crow laws from four sources, covering both race-specific and "race-blind" Jim Crow laws. We first digitize a comprehensive collection of laws that refer to race and color by state in 1950 Murray (1950). We categorize the laws as discriminatory, anti-discriminatory, or neutral. We restrict our sample to discriminatory laws and further categorize the domain they pertain to, such as education, suffrage, or employment. Our remaining sources add Jim Crow laws that made no explicit mention of race. We collect laws that limited geographic mobility and regulated employment arrangements from Roback (1984) and Cohen (1991). We further collect laws that restricted suffrage from Walton et al. (2012). Appendix Figure B.10 shows the number of total Jim Crow laws passed by each state until 1950. Appendix Figure B.11 shows the distribution over years in which Southern governments passed laws of different types.

B.4.3 Other Data on Jim Crow Regimes

Historical Racial Regime (HRR) Index. As our main measure of a state's Jim Crow intensity, we use the HRR index (Baker, 2022). This index "measures different manifestations of the US racial regime across different historical periods—slavery and Jim Crow—and is based on state-level institutions including slavery, sharecropping, disfranchisement, and segregation." It is a principal component of four factors: a state's share of the population enslaved in 1860, its number of disenfranchisement devices, the share of sharecroppers who were Black in 1930, and the share of Congressional delegates who signed the South-

ern Manifesto.

Votes cast per adult male. As a second alternative measure for the intensity of Jim Crow regimes, we compute a county's aggregate votes cast per adult male in decennial presidential elections in the South from 1900 to 1940 (ICPSR, 1999; Bernini et al., 2023). We divide the total number of votes cast in each election by a county's total population (see panel A of Appendix Figure B.7). Data on the number of votes cast by race are not available. Panel A of Appendix Figure C.14 shows border discontinuities in votes cast per adult male.

Black school quality index. Last, as a third alternative measure for the intensity of Jim Crow regimes, we construct an aggregate measure of Black school quality in the South (Card and Krueger, 1992). We extract a principal component from three measures of Black school quality by state prior to 1940: student-teacher ratios, term lengths, and teacher wages. We also use individual-level data on Black teachers' wages from the 1940 census to assess whether or not Black school quality differed sharply across state borders (see panel B of Appendix Figure B.7). Appendix Figure C.13 shows border discontinuity estimates in Black teachers' education and wages.

B.5 Identifying Descendants of the Free and Enslaved

B.5.1 Main Method: Linking Historical Census Records

Figure B.12 illustrates our new method to identify descendants of the Free and descendants of the Enslaved in census records between 1870 and 1940. It mainly relies on census-linking methods (Abramitzky et al., 2021a) but also uses information on place and year of birth.

The method consists of three steps. First, we identify the Free themselves before identifying their descendants. In 1850 and 1860, the enslaved population was excluded from the individual-level censuses. By definition, every Black American included in the census was therefore free before 1865. We link the 1850 and 1860 censuses forward to all census decades between 1870 and 1940 and then classify every Black American who can be linked to 1850 or 1860 as free.

In addition to linking, we use information on place and year of birth in our classification algorithm. All Northern states had begun banning or restricting slavery by 1804—some of them decades earlier. Any Black person born in those states was either free upon birth or would be emancipated by a certain age (typically in their 20s). While the latter case opens up the possibility of a Northern-born Black person being sold into slavery in other states before their emancipation, this possibility was ruled out by law.

In Appendix Table B.4, we compare the de jure to the de facto status of slavery in the North. As a de facto measure, we show the number of slaves in the state in absolute numbers and as a fraction of the state's Black population. Based on this evidence, we classify any Black American born outside of the slave states after 1804 and before 1865 as Free. In addition, we use the state-specific years in which slavery was abolished or restricted in non-slave states to go even further back in time.

Second, we identify the *descendants* of the Free by using information on the relationship between individuals within census households. Specifically, we classify Black people with a free Black American *ancestor* as being descendants of the Free. Any person without a free ancestor is classified as a descendant of the Enslaved. In 1940, the final

year of our sample, we identify 9,400 descendants of the Free and 155,800 descendants of the Enslaved. Because we can only link men, the descendant classification is determined exclusively through the male ancestry line.

We estimate that the average free Black family was free 50 to 65 years before the Civil War. Our methodology involves comparing the actual population of free Black Americans to the projected population based on assumed growth rates from 1790 to 1860. This comparison allows us to estimate the number of individuals freed each year and, consequently, calculate the average year of emancipation. We conduct this analysis using two distinct assumptions for the natural population growth rate among free Black Americans, providing a range of estimates to account for potential variations in demographic trends. We provide this analysis for all free Black Americans (see Table B.5) and free Black Americans in the South alone (see Table B.6).

B.5.2 Alternative Method of Free-Enslaved Classification: Distribution of Surnames

While our main method provides a high-accuracy classification of descendants of the Free and Enslaved, accuracy comes at the cost of reduced sample sizes due to imperfect linking rates across the decades. To use the full census sample of Black Americans after 1870, rather than a linked sub-sample thereof, we develop an additional strategy for identifying descendants of the Free and Enslaved based on surnames. Figure B.2 shows that the name-based measures are highly correlated with the Free-Enslaved status based on our preferred measure, though they are attenuated as expected.

Our alternative classification algorithm uses changes in the distribution of surnames from 1850–1860 to 1870–1880. Before 1865, the census only included free Black Americans—after, it also included the formerly Enslaved and their descendants. Census pooling (1850 and 1860; 1870 and 1880) reduces the impact of imperfect coverage in any given decade.

We compute the relative frequency of each surname before and after 1865. We then create a measure of how likely a person is to descend from the Free by dividing their surname's relative frequency before 1865 by its relative frequency after 1865. For example, the surname Du Bois appears with relatively high frequency in the 1850 and 1860 censuses, while Freedman does not appear at all. After the four million formerly enslaved individuals entered the census sample in 1870 and 1880, the name Du Bois is far less (one-tenth) frequent, whereas a substantial number of individuals entered the sample with the surname Freedman for the first time. These changes suggest that anyone named Du Bois after 1865 likely descends from the Free, whereas anyone named Freedman likely descends from the Enslaved. Note that not all names give us a good idea of whether a person descends from the Enslaved or not. Some names very common among Black Americans before 1865, such as Johnson, Brown, or Smith, remain very common after 1865. Other names such as Washington did exist among Black Americans before 1865 but became more common after many newly freed enslaved people chose this name in honor of the country's first president.

Formally, using the example of the surname Du Bois, we estimate the name-specific

likelihood of descending from free Black Americans defined as

$$
\begin{aligned}
P(Free_{it} = 1 | Name_i = \#DuBois_t) &= \frac{P(Free_{it} = 1, Name_{it} = \#DuBois_t)}{P(Name_{it} = \#DuBois_t)} \\
&= \frac{P(Free_{i,1860} = 1, Name_{i,1860} = \#DuBois_t)}{P(Name_{i,1870} = \#DuBois_t)} \\
&= \frac{P(Name_{i,1860} = \#DuBois_t)}{P(Name_{i,1870} = \#DuBois_t)},
\end{aligned}
$$

where the second equation follows from assuming that a surname conveys a constant probability of descending from free Black Americans. The last equation follows from the fact that the 1860 census only contained free Black Americans. This equation can be approximated by

$$
\widehat{P}(Free_{it} = 1 | Name_{it} = \#DuBois_t) = \frac{\#(\#DuBois_t)_{1860}/BlackPop_{1860}}{\#(\#DuBois_t)_{1870}/BlackPop_{1870}},
$$

where $\#DuBois_t$ is the number of individuals with the surname Du Bois in a given year and $BlackPop_t$ is the population of all Black Americans (free and enslaved). Before 1865, we compute the population by adding up the census sample size (the Free) and the number of the Enslaved (Berlin, 1974). We truncate our estimated probability by 0 and 1. Names that only appear pre-1865 but not post-1865 are assigned probability 1; those that only appear post-1865 are assigned probability 0. Appendix Table B.1 shows a Black person's probability of descending from ancestors who were enslaved until 1865, given their surname.

To allow for misspellings, we also compute this measure based on the phonetics of surnames. Specifically, we transform surnames using the New York State Identification and Intelligence System (NYSIIS) phonetic code. For example, the surnames "Browne" and "Brown" both become "Bran." For placebo exercises, we also compute the above measure as a pseudo-probability of being free for white Americans as well as for 1875 as a time placebo for Emancipation.

Our estimates of the Free-Enslaved gap using this surname-based measure rely on the assumption that surnames are not associated with outcomes conditional on Free-Enslaved status. If surnames of formerly enslaved individuals correlate with lower socioeconomic status, our surname-based estimates may conflate general surname-related socioeconomic differences with the Free-Enslaved gap, potentially leading to overestimation. Alleviating this concern, our results for 1940 show that the linking approach and the surname-based approach yield quantitatively similar results, which would not be the case if the exclusion restriction were strongly violated in 1940 (we cannot test the identification assumption directly in the credit bureau data). Appendix Table B.7 provides more direct evidence that this assumption is likely satisfied by showing that the surname-based measure does not significantly predict socioeconomic outcomes conditional on our linking-based Free-Enslaved classification.

B.6   County Characteristics

We compile a dataset on county characteristics combining data from the IPUMS National Historical Geographic Information System (NHGIS, Manson et al., 2021), the census

(Ruggles et al., 2020), and various other sources.

- **Age of enslaved people, 1860 (NHGIS).** Enslaved people's average age within a county.

- **Agricultural output, 1860 (NHGIS).** County's value of total agricultural output in USD per capita.

- **Share of Black population, 1860 (NHGIS).** Share of county's 1860 population that is Black.

- **Distance to the North, East (NHGIS).** County's distance to the North and the East is proxied by its centroid's latitude and longitude.

- **Farm share, 1870 (NHGIS).** Fraction of county's population living on a farm in 1870.

- **Farm value, 1860 (NHGIS).** County's value of farms in USD.

- **Free share, 1860 (NHGIS).** Percentage of county's 1860 Black population that is free.

- **Intergenerational mobility, 1996–2012 (Chetty and Hendren, 2018).** Causal effect of a county on the expected rank in the national income distribution conditional on one's parents' income ranking at the 25th percentile during childhood.

- **Intergenerational mobility, 1994–2015 (Chetty et al., 2020).** Non-causal effect of a commuting zone on the expected rank in the national income distribution conditional on one's parents' income ranking at the 25th percentile during childhood. We use estimates specific to Black Americans.

- **Lynchings, 1883–1941 (Seguin and Rigby, 2019).** Number of lynchings that occurred in a county between 1883 and 1941.

- **Migration cost North, 1870 (Donaldson and Hornbeck, 2016).** Transportation cost through land and water ways from a given county to the Northern cities that were the main destinations of the Great Migration: Chicago, Detroit, Pittsburgh, and New York. The migration cost estimates are based on the 1870 railroad network.

- **Occupational income, 1860 (census).** County's average occupational income score among prime age (20-54) men.

- **Plantation crop share, 1860 (NHGIS).** County's value of cotton, tobacco, sugar, and rice output as a share of the total value of agricultural output.

- **Population density, 1870 (NHGIS).** County's 1870 population per square kilometer area.

- **School, 1870 (NHGIS).** Fraction of county's Black children (ages 6–16) attending school in 1870.

- **Slaves per capita, 1860 (NHGIS)**. Average number of enslaved people per capita.

- **Tobacco, cotton, rice, and sugar, 1860 (NHGIS).** Value of a county's tobacco, cotton, rice, or sugar output in USD per capita in 1860.

- **Top-1% wealth share, 1860 (census).** County's top-1% share of white Americans' wealth, including real property and personal property. To compute the top-1% share, we restrict the sample to white prime-age men (20-54).

- **Votes cast per adult male, 1860–1940 (ICPSR, 1999; Bernini et al., 2023).** Number of votes cast in decennial Presidential elections from 1860 to 1940 as a share of the total population eligible based on sex and age (men aged 21 or older).

- **Wealth Gini index, 1860 (census).** County's Gini index of white Americans' wealth, including real property and personal property. To compute the Gini index, we restrict the sample to white prime-age men (20-54).

B.7   Nine-Digit ZIP to Census 2000 Crosswalks

The administrative mortality records contain nine-digit ZIP codes ("ZIP9") of the place of residence at the time of death. We use the Census Bureau's TIGER/Line ASCII files from 1994 to 2006 to link ZIP9s to 2000 census statistical areas (i.e., census blocks, block groups, and census tracts). A ZIP9 comprises a range of addresses, usually a side or segment of a street.

In most cases, a ZIP9 maps into a unique block (and hence maps into a unique block group and census tract). For instance, in 2000, 81 percent of ZIP9s were matched to a unique block. For block groups and census tracts, 96 percent and 97 percent of the ZIP9 matches were unique, respectively. In cases where a ZIP9 occurs in more than one statistical area, we assign the area that has the largest number of matches with the relevant ZIP9. This yields a one-to-one mapping of ZIP9s to blocks. However, not all ZIP9s in the mortality records occur in the TIGER/Line files. To improve the coverage, we sort the data by ZIP9 for each version and interpolate the census statistical areas in case the next non-missing census area is exactly equal to the previous non-missing area (using that the ZIP9s are ordered geographically).

Using this procedure, we link around 84 percent of the decedents with ZIP9s to a census tract, 82 percent to a block group, and 77 percent to a block. For decedents for which we can find the census area corresponding to their ZIP9 both before and after their death, the agreement rate between the different versions is high (98 percent for census tracts, 96 percent for block groups, and 88 percent for blocks).

B.8 Figures

FIGURE B.1: Socioeconomic Characteristics of Family by Region of Origin (1870–1940)
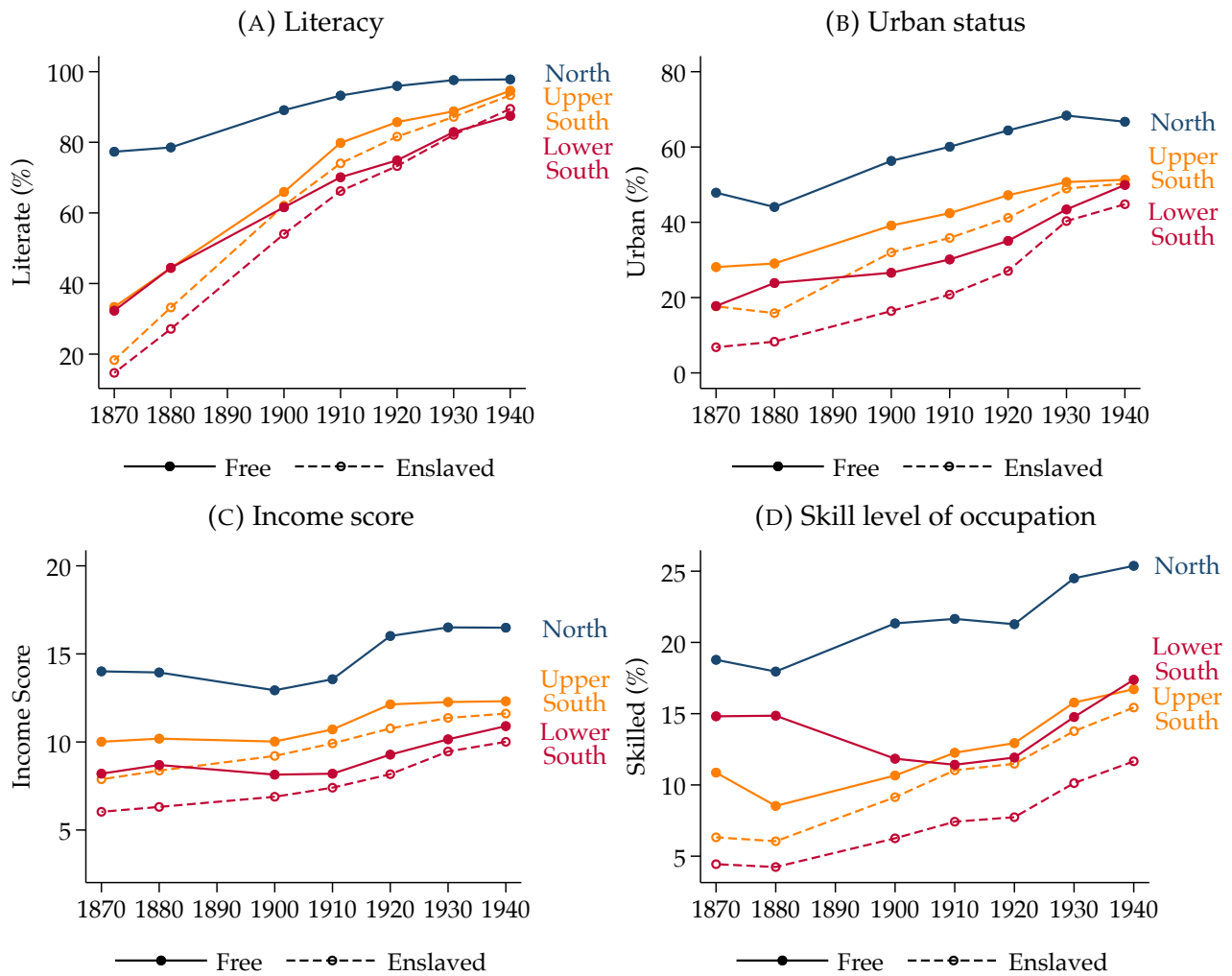
Notes: This figure shows the averages of characteristics in the cross-section of prime-age male descendants of the Free and Enslaved by their ancestor's region (family's residence pre-1880). Incomes Score uses the Lido score developed by Saavedra and Twinam (2020). In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. We assign "skilled" to occupations classified as "medium skilled workers" or above by the HISCLASS scheme (Van Leeuwen and Maas, 2011); and "unskilled" to others. See Data Appendix B for details on the sample and data.

FIGURE B.2: Comparing Name-Based and Linking-Based Measures

(A) Exact surnames

(B) Phonetic version of surnames
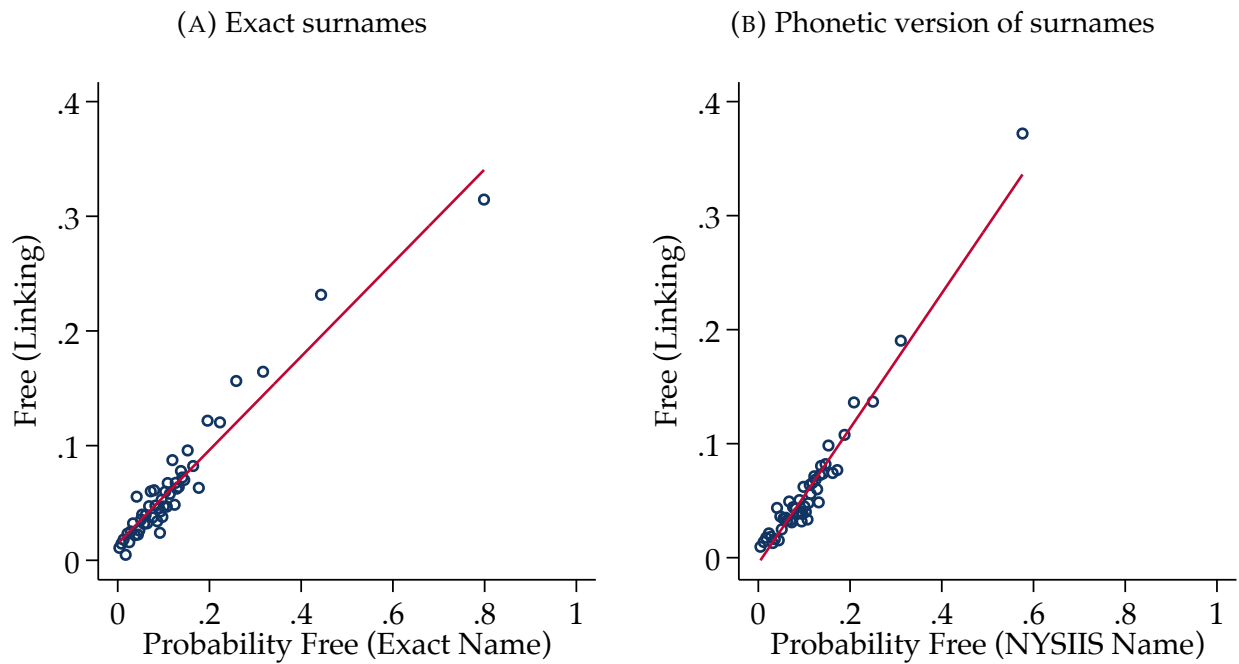
Notes: This figure compares the probabilistic measures of descending from free Black Americans with our preferred measure based mainly on census linking. This binned scatter plot shows that among Black prime-age men in the 1940 census, the fraction of people classified as Free closely coincides with the predicted probability based on the people's surnames.

FIGURE B.3: Long-Term Migration Rates across Regions and States by Race

(A) Left region of origin

(B) Left state of origin
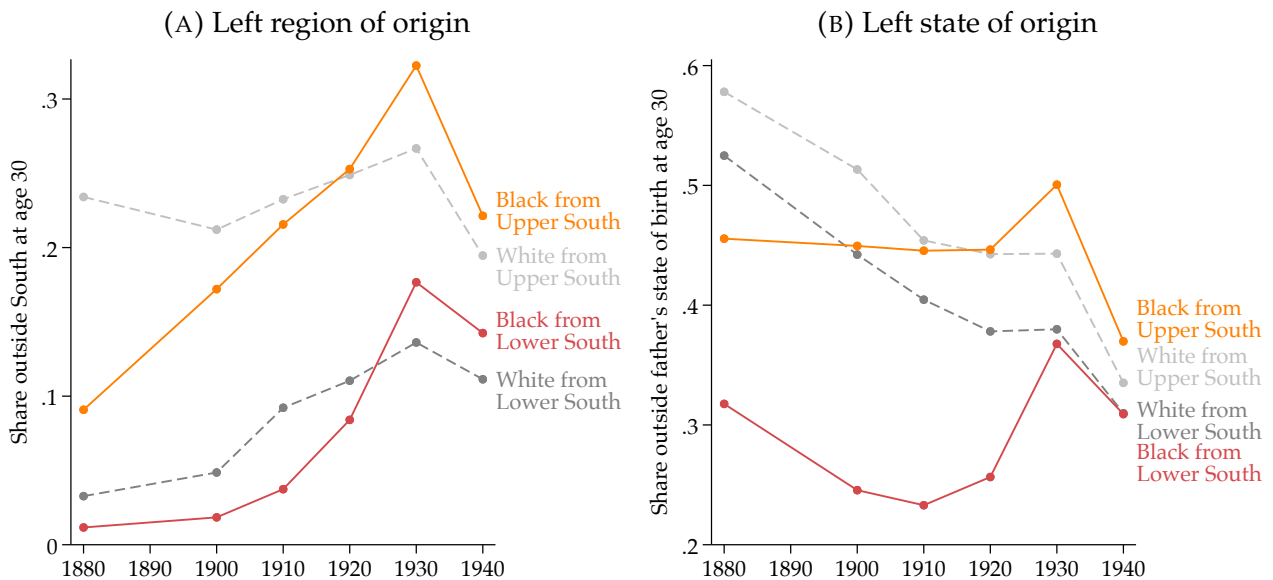
Notes: This figure shows the fraction of Black and white individuals aged 30 who have migrated from their father's birth region (panel A) or father's birth state (panel B) in each census year. The data is derived from the 1850–1940 censuses, focusing on the Southern-born fathers' states of birth, and does not require census linking.

FIGURE B.4: Correlations Between Proxies of Jim Crow Intensity

	HRR Index	Jim Crow Index	Jim Crow laws	Voter participation	Black school quality	Causal state effect
HRR Index	1.00	0.99	0.74	-0.92	-0.94	-0.92
Jim Crow Index	0.99	1.00	0.77	-0.89	-0.91	-0.93
Jim Crow laws	0.74	0.77	1.00	-0.62	-0.57	-0.69
Voter participation	-0.92	-0.89	-0.62	1.00	0.92	0.83
Black school quality	-0.94	-0.91	-0.57	0.92	1.00	0.85
Causal state effect	-0.92	-0.93	-0.69	0.83	0.85	1.00
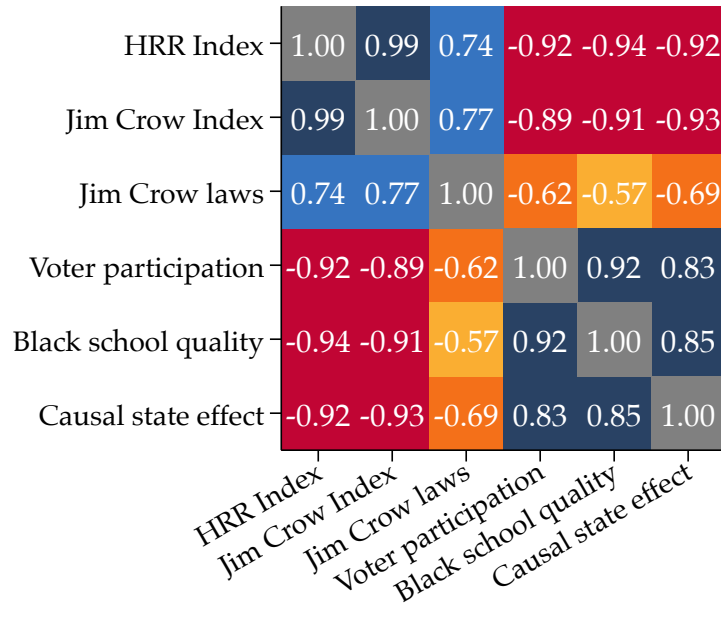
Notes: This figure shows the correlation between a state's Historical Racial Regime (HRR) index (Baker, 2022), Jim Crow index, number of Jim Crow laws, votes cast per adult male (ICPSR, 1999; Bernini et al., 2023), quality of Black schools (Card and Krueger, 1992), and causal 1870-ancestor state effects on Black Americans' 1940 years of education as shown in panel A of Appendix Figure C.3.

FIGURE B.5: Black Families Leaving the Slave States by 1870 State of Origin

(A) By 1920   (B) By 1940   (C) By 2000
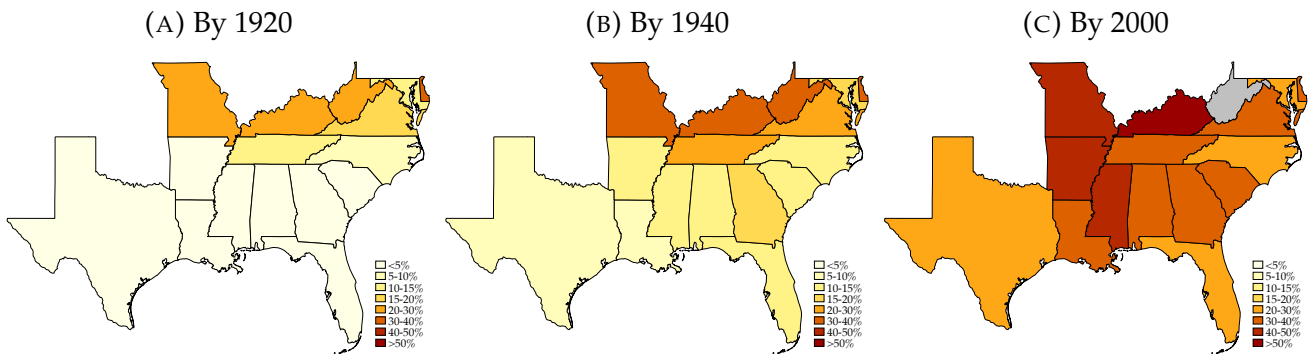
Notes: This figure shows the cumulative fraction of Black families who live outside the slave states, by the state their 1870 ancestor was born. The figure highlights that the first wave of the Great Migration from 1910 to 1940 was mainly an Upper Southern phenomenon (see Panels A and B). Black families with roots to the Lower South only caught up with those rates of migration to the North after 1940 (see panel C).

FIGURE B.6: Black Families Leaving their 1870 State of Origin by 1940
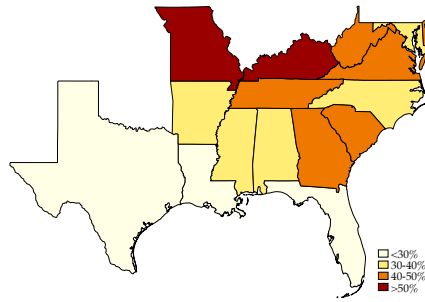
Notes: This figure shows the fraction of Black families who in 1940 live outside the state in which their ancestors were enslaved. As the state of enslavement, we use the state of birth of formerly enslaved ancestors in the 1870 census.

FIGURE B.7: Outcomes Directly Targeted by Jim Crow Differ Sharply Across States

(A) Votes cast per adult male (1900–1940) (B) Black teachers' median wages (1940)
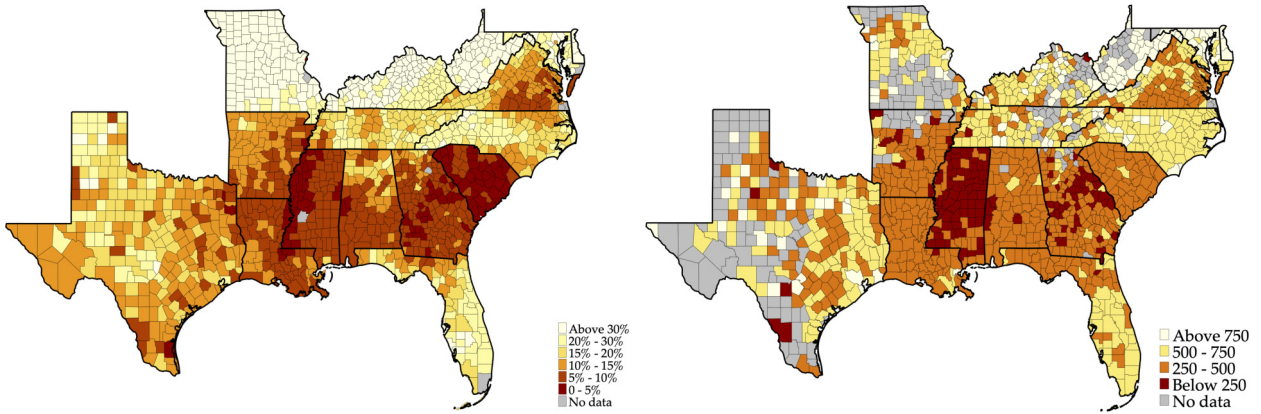
Notes: Panel A of this figure shows the average fraction of each county's population that cast a vote in decennial Presidential elections between 1900 and 1940. Panel B of this figure shows the median annual wage income of Black teachers in the 1940 census for each Southern county. Results for the Black-white ratio in teachers' median annual wage income are very similar and available upon request. Appendix Figure C.13 shows border discontinuity estimates in both outcomes.

FIGURE B.8: Jim Crow Laws by Type
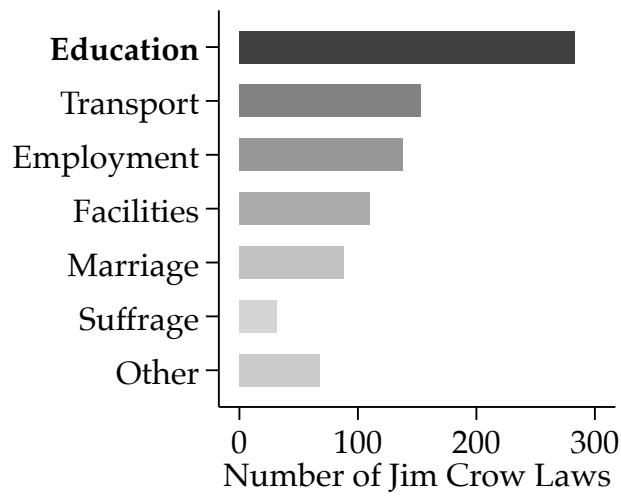
Notes: This figure shows the number of Jim Crow laws across Southern states that pertain to each category. See Data Appendix B for details on the data.

FIGURE B.9: County Population of Enslaved and Free (1790)

(A) Enslaved

(B) Free
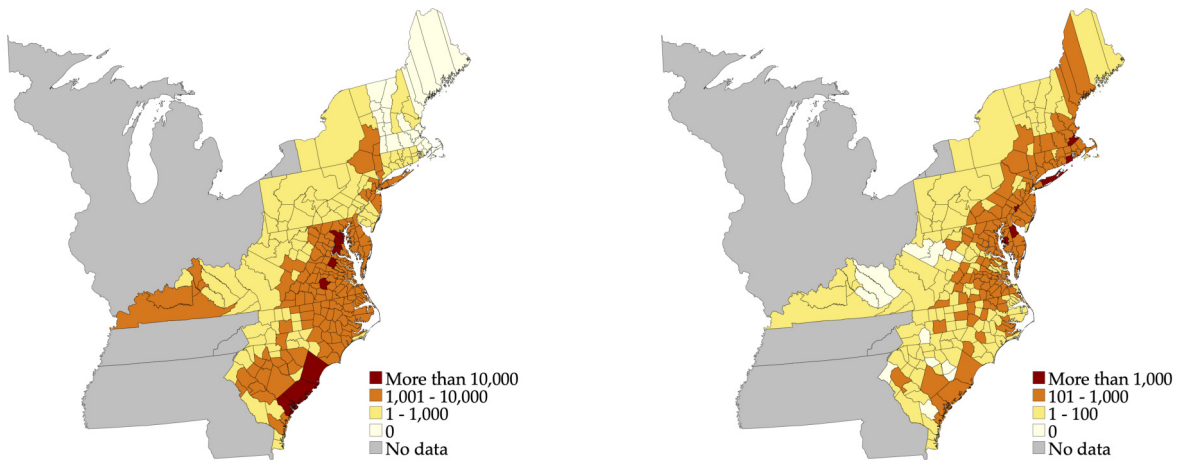
FIGURE B.10: Jim Crow laws by State

(A) Number of Jim Crow laws

(B) Anti-Black share of laws that mention race
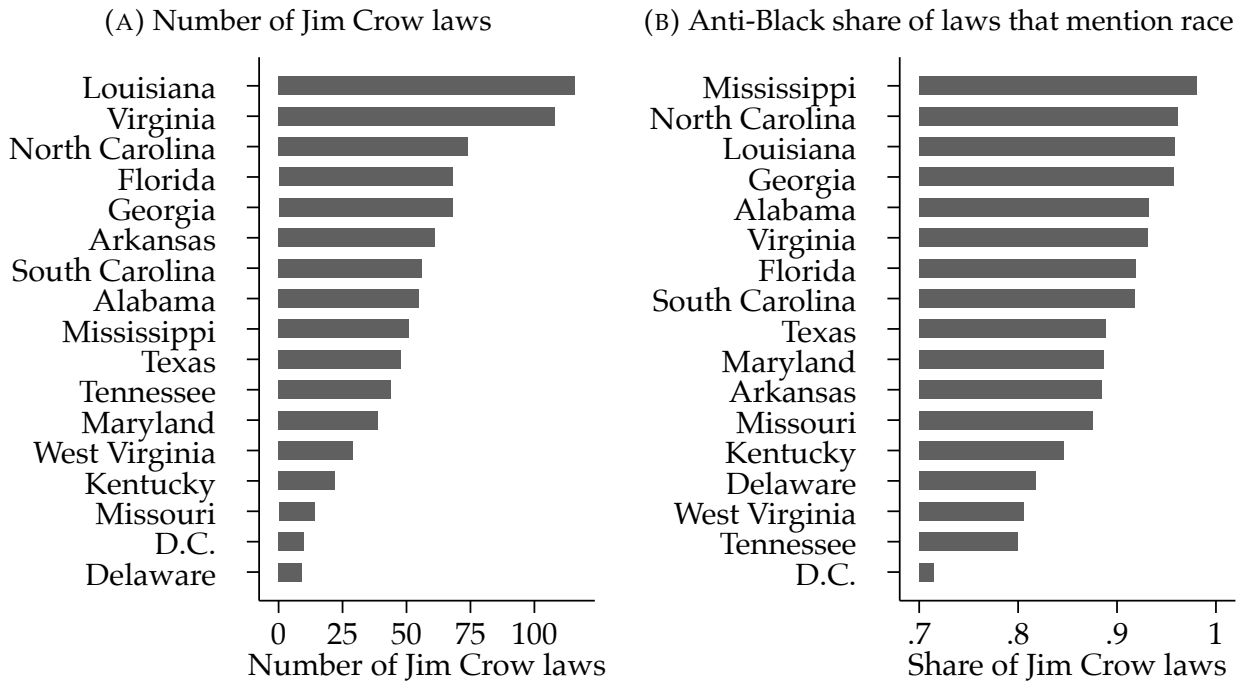
Notes: Panel A of this figure shows the cumulative number of Jim Crow laws passed by state until 1950. Panel B shows the anti-Black discriminatory share of all race-specific laws a state passed until 1950. We categorized each law as discriminatory (Jim Crow) or not based on its content and context provided by other sources.

FIGURE B.11: Annual Jim Crow Laws Passed Across the South by Type

(A) Education

(B) Public transport

(C) Employment & geographic mobility

(D) Facilities

(E) Racial intermarriage

(F) Suffrage
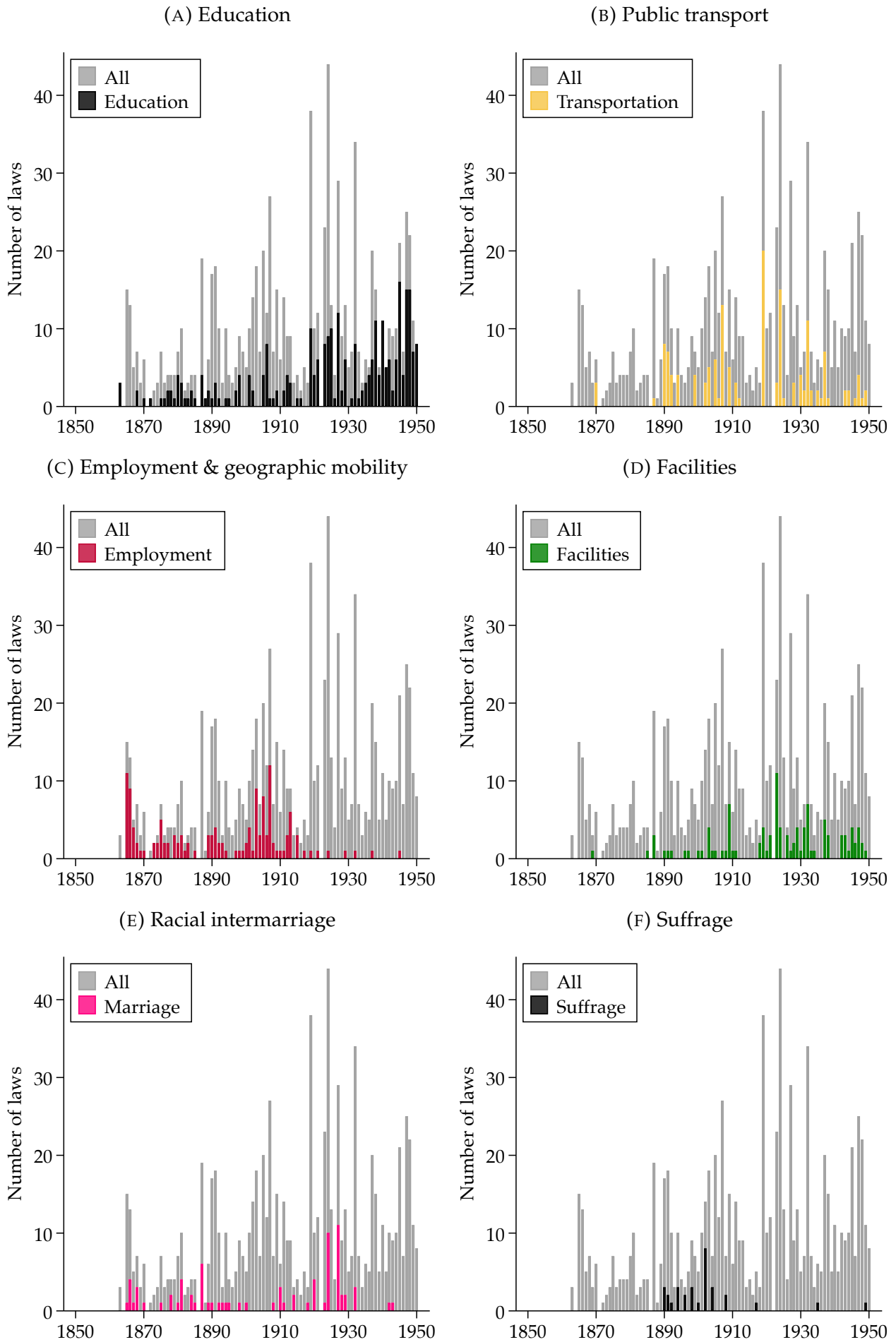
Notes: This figure shows the number of Jim Crow laws passed by type across all Southern states and years.

FIGURE B.12: Illustration of Our Free-Enslaved Classification Algorithm
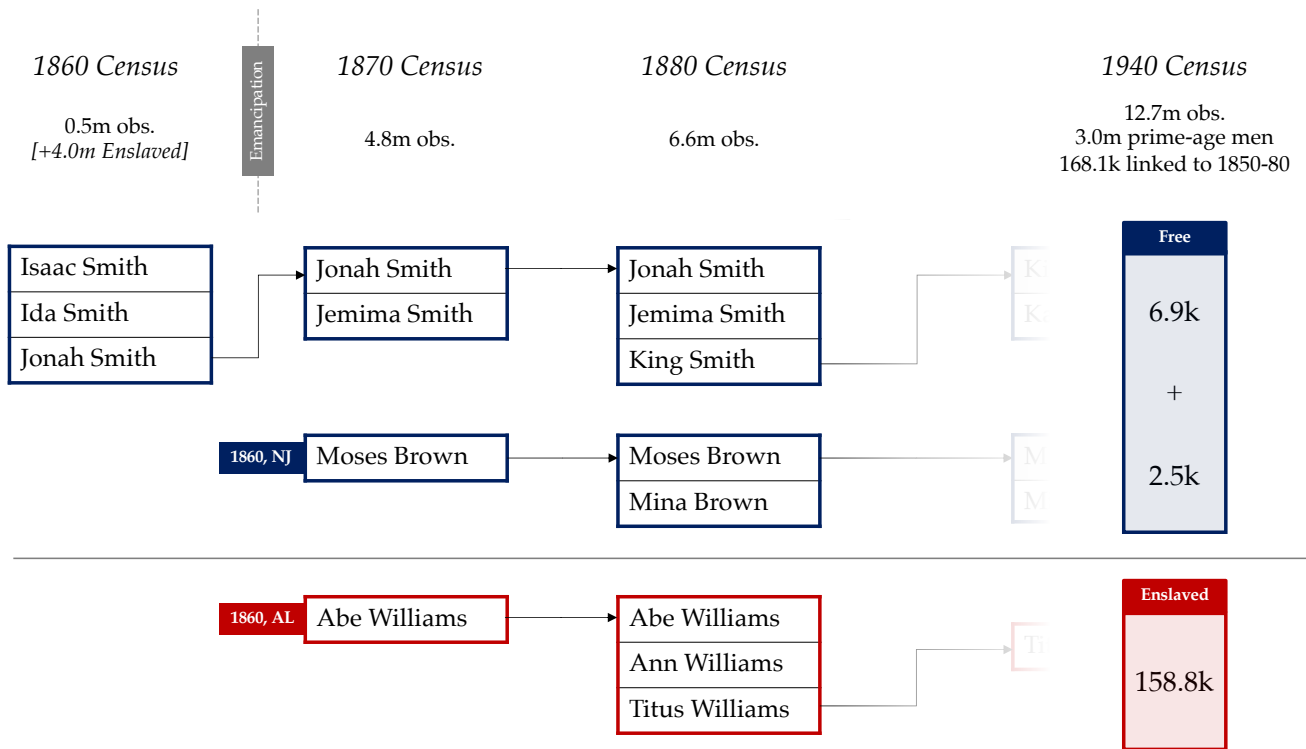
Notes: This figure illustrates our new method to identify descendants of the Free and Enslaved in census records 1870–1940. The names are chosen are arbitrary examples and do not reflect real data. Jonah Smith is identified as a descendant of the Free because he can be linked back to the 1860 census; Moses Brown because he was born in a state (New Jersey) that had abolished slavery by the time of his birth (1860). Abe Williams does not fall into either category and is therefore classified as formerly enslaved or a descendant of the Enslaved. The Free-Enslaved status is assigned to descendants based on their male ancestor. In 1940, the final year of our sample, we identify 9,400 descendants of the Free (6,800 through direct linking to 1850–1860 and 2,600 through their ancestor's birthplace) and 155,800 descendants of the Enslaved. While not comprehensively illustrated here, we do link across all adjacent and non-adjacent census records of 1850, 1860, 1870, 1880, 1900, 1910, 1920, 1930, and 1940.

B.9 Tables

TABLE B.1: Selected Surnames and Enslavement Status

Surname	Likelihood Enslaved
Wanamaker	0%
Du Bois	1%
Cumberland	2%
Dewitt	6%
Radcliffe	10%
McCollins	16%
Dupas	21%
Freemann	28%
Butcher	44%
Freeman	66%
Tubman	70%
Baptiste	85%
Jackson	86%
Broom	87%
Douglass	87%
Johnson	87%
Smith	89%
Carter	90%
Robinson	90%
Hamilton	91%
King	91%
Morrison	91%
Williams	91%
Hughes	92%
Jefferson*	92%
Marshall	92%
Baldwin	94%
Jordan	94%
Lincoln	95%
Knowles	96%
Washington*	96%
Cooks*	97%
Broadnax*	99%
Boykins*	100%
Doyley*	100%
Gadson*	100%
Freedman	100%
Merriweather*	100%
Rockingham*	100%

Notes: This table shows estimates of the probability of descending from enslaved Black Americans by surname (conditional on being Black). Some of the examples (marked by *) are mentioned by Clark (2014), who lists a number of surnames that "sound classically English" but tend to be predominantly Black today, suggesting that they were likely "adopted in the slavery era from masters whose own families died out or left few descendants." Consistent with that idea, our estimates suggest that Black people with those surnames are almost certain to descend from ancestors who were enslaved until the Civil War.

TABLE B.2: Family Tree's Linking Rates

	Individual		**Family**
	Adjacent only	Incl. non-adjacent	
1870 to 1900	12.8%	25.9%	**27.6%**
1870 to 1910	3.5%	19.4%	**24.8%**
1870 to 1920	1.1%	12.3%	**26.0%**
1870 to 1930	0.3%	6.2%	**14.2%**
1870 to 1940	0.1%	3.1%	**9.8%**

Notes: This table shows the linking rates for Black men from 1870 to each decade from 1900 to 1940. The first column shows the linking rate when conditioning on finding a person in each adjacent decade (e.g., 1870 to 1900 would require a person to be linked from 1870 to 1880 and from 1880 to 1900). The second column shows the linking rate when allowing for intermediate decades to be skipped (e.g., 1870 to 1900 would require a person to be linked *either* from 1870 to 1880 and from 1880 to 1900 *or* from 1870 to 1900 directly). The third column shows the linking rate when linking either the individual or their ancestors or descendants in the same household (again, allowing intermediate decades to be skipped).

TABLE B.3: The Jim Crow Index

State	**Jim Crow Index**	Share of laws discriminatory	Disenfranchisement devices	Southern Manifesto	Black-white ratio in term length	Minimum teacher pay introduced
Louisiana	**1.33**	96%	4	100%	0.77	1948
Mississippi	**1.14**	98%	3	100%	0.78	1924
South Carolina	**1.00**	92%	3	100%	0.76	1945
Georgia	**0.91**	96%	4	100%	0.91	1937
Alabama	**0.80**	93%	4	100%	0.89	1927
Virginia	**0.73**	93%	4	100%	0.95	1946
North Carolina	**0.54**	96%	4	71%	0.96	1919
Arkansas	**0.43**	88%	2	100%	0.88	1957
Florida	**0.24**	92%	2	80%	0.96	1955
Texas	**-0.21**	89%	2	21%	0.93	1949
Missouri	**-0.85**	88%	0	0%	1.05	1985
Tennessee	**-0.95**	80%	1	36%	0.99	1925
Maryland	**-0.96**	89%	0	0%	0.96	1904
Delaware	**-1.29**	82%	0	0%	1.00	1919
Kentucky	**-1.33**	85%	0	0%	1.05	1912
West Virginia	**-1.54**	81%	0	0%	1.00	1882

Notes: This table shows each states' Jim Crow index, ordered from most to least oppressive. The Jim Crow index is a principal component extracted from five factors, as shown in the remaining columns. The top-quartile (most oppressive) is highlighted in red; the bottom-quartile (least oppressive) in blue.

TABLE B.4: Abolition of Slavery in the North

Year	State	*De Jure* Abolition of Slavery	*De Facto* Number of Slaves	
			Year	Total
1777	Vermont	Slavery was banned immediately upon founding of Vermont (Vermont State Legislature, 1777).	1790	0[26]
			1800	0
			1810	0
			1820	0
			1830	0
			1840	0
			1850	0

TABLE B.4: Abolition of Slavery in the North

Year	State	*De Jure* Abolition of Slavery	*De Facto* Number of Slaves	
			Year	Total
1780	Pennsylvania	Law of gradual emancipation passed in 1780 (Pennsylvania General Assembly, 1780). Black Americans born to enslaved mothers after 1780 would be freed at age 28. Slavery was ended in 1847.	1790	3,737 (36%)
			1800	1,706 (10%)
			1810	795 (3%)
			1820	211 (1%)
			1830	403 (1%)
			1840	64 (0%)
			1850	0
1781	Maine Massachusetts	Slavery was abolished by Supreme Judicial Court rulings in three related court cases, collectively known as the "Quock Walker case" (Cushing, 1961; Zilversmit, 1968). Slavery was ruled incompatible with the new state constitution of 1780.	1790	0
			1800	0
			1810	0
			1820	0
			1830	3 (0%)
			1840	0
			1850	0
1783	New Hampshire	Similar to Massachusetts, New Hampshire's constitution essentially abolished slavery by stating "all men are born equal and independent" (New Hampshire State Legislature, 1783). However, it is not clear whether court rulings indeed interpreted the constitution as being at odds with slavery or not.	1790	158 (20%)
			1800	8 (1%)
			1810	0
			1820	0
			1830	3 (0%)
			1840	1 (0%)
			1850	0
1784	Rhode Island	Law for gradual emancipation passed in 1784 (General Assembly of Rhode Island, 1784). Black Americans born to enslaved mothers after 1784 would be freed at age 18 (women) or 21 (men).	1790	952 (22%)
			1800	381 (10%)
			1810	108 (3%)
			1820	48 (1%)
			1830	17 (0%)
			1840	5 (0%)
			1850	0
1784	Connecticut	Law for gradual emancipation passed in 1784 (Connecticut General Assembly, 1784). Black Americans born to enslaved mothers after 1784 would be freed at age 25. This age was lowered to 21 in 1797. Slavery was abolished in 1848.	1790	2,759 (50%)
			1800	951 (15%)
			1810	310 (5%)
			1820	97 (1%)
			1830	25 (0%)
			1840	17 (0%)
			1850	0
1787	Ohio Indiana Illinois Michigan Wisconsin Minnesota	The Confederation Congress's Northwest Ordinance of 1787 both banned and enforced slavery (Confederation Congress, 1787). A clause allowed Northerners to capture and enslave runaway slaves. Slavery was abolished by Ohio in 1802, Indiana in 1816, and Illinois in 1818.	1790	–
			1800	135 (21%)
			1810	429 (28%)
			1820	1,106 (40%)
			1830	788 (5%)
			1840	348 (1%)
			1850	0
1799	New York	Law for gradual emancipation passed in 1799 (New York State Legislature, 1799). Black Americans born to enslaved mothers after 1799 would be freed at age 25 (women) or 28 (men). In 1817, state decided to free all slaves born before 1799 (but not their children) in 1827 (New York State Legislature, 1817).	1790	21,324 (82%)
			1800	20,343 (66%)
			1810	15,017 (37%)
			1820	10,088 (26%)
			1830	75 (0%)
			1840	4 (0%)
			1850	0
1804	New Jersey	Law for gradual emancipation passed in 1804 (New Jersey State Legislature, 1804). While not freeing living slaves, Black Americans born to enslaved mothers after 1804 would be freed at age 21 (women) or 25 (men).[27]	1790	11,423 (81%)
			1800	12,422 (74%)

TABLE B.4: Abolition of Slavery in the North

Year	State	*De Jure* Abolition of Slavery	*De Facto* Number of Slaves Year	Total
			1810	10,851 (58%)
			1820	7,557 (38%)
			1830	2,254 (11%)
			1840	674 (3%)
			1850	236 (1%)

Notes: This table provides a timeline for the abolition of slavery in the North. The first column indicates the year which we choose as the states' final year of slavery. We classify any Black American born in the state after this cutoff as free. The third column shows the laws that abolished slavery. In many cases, slavery was not abolished outright, but rather it was restricted in ways that would imply a person is free before 1865 in all likelihood. The final column shows the actual number of slaves who reside in the state and the percentage of the state's Black population being enslaved in parentheses. The number of slaves is taken from aggregate counts in census records (1790–1850).

TABLE B.5: Estimates of newly freed Black people (North & South) by decade (1790–1860)

Year	Actual population	Growth rate: decade-specific US pop. growth rate		Growth rate: 1.1	
		Implied population	Implied newly freed	Implied population	Implied newly freed
1790	59,466	59,466	59,466	59,466	59,466
1800	108,395	80,285	28,106	65,413	42,982
1810	186,446	147,902	38,544	119,235	67,212
1820	233,504	248,092	–	205,091	28,413
1830	319,599	311,854	7,745	256,854	62,745
1840	386,303	424,015	–	351,559	34,744
1850	434,449	524,861	–	424,933	9,516
1860	488,070	588,197	–	477,894	10,176
Average year freed		**1800**		**1816**	

Notes: This table estimates the average year of freedom for free Black families. "Actual population" shows observed figures. "Implied population" and "Implied newly freed" are calculated using two growth rate scenarios: the total population rate and a fixed rate of 1.1. The latter reflects slower growth among free Black Americans in later decades. "Average year freed" is the weighted average of emancipation years (e.g., $\frac{1}{59466+28106+38544+7745}$ · $(59466 \cdot 1790 + 28106 \cdot 1800 + 38544 \cdot 1810 + 7745 \cdot 1830) \approx 1800$). This calculation makes the simplifying assumption that all Black Americans free in the 1790 census were freed that year, although many were likely freed between the end of the Revolutionary War in 1783 and 1790.

[27]While the 1790 census states that 16 slaves were in Vermont that year, this is likely an error.
[27]There is some evidence that after 1804, some Black Americans were sold to slave states before they reached the age to be emancipated (Armstead et al., 2016, p.104).

TABLE B.6: Estimates of newly freed Black people (South only) by decade (1790–1860)

Year	Actual population	Growth rate: decade-specific US pop. growth rate		Growth rate: 1.1	
		Implied population	Implied newly freed	Implied population	Implied newly freed
1790	32,357	32,357	32,357	32,357	32,357
1800	61,241	43,600	17,641	35,593	25,648
1810	108,265	83,400	24,865	67,365	40,900
1820	134,223	144,133	–	119,092	15,132
1830	182,070	179,191	2,879	147,645	34,425
1840	215,575	241,722	–	200,277	15,298
1850	238,187	293,352	–	237,133	1,054
1860	261,918	322,889	–	262,006	–
Average year freed		**1800**		**1813**	

Notes: This table estimates the average year of freedom for free Black families in the South, replicating the methodology of Appendix Table B.5. "Actual population" shows observed figures. "Implied population" and "Implied newly freed" are calculated using two growth rate scenarios: the total population rate and a fixed rate of 1.1. The latter reflects slower growth among free Black Americans in later decades. "Average year freed" is the weighted average of emancipation years. These estimates are sensitive to inter-regional Black migration. Migrants from the North to the South may be misclassified as "newly freed" in their arrival decade, potentially overestimating the year in which those individuals were freed.

TABLE B.7: Surname-based classification conditional on linking-based classification

	Education (Years) Mean: 5.99		Wage Income (USD) Mean: 381.20		Homeownership (%) Mean: 29.25	
Linking-based	1.59***	1.58***	145.65***	144.49***	7.24***	7.10***
Free-Enslaved classification	(0.05)	(0.05)	(6.11)	(6.36)	(0.62)	(0.63)
Surname-based		**0.08**		**22.41**		**2.27**
Free-Enslaved classification		(0.13)		(15.89)		(1.68)
Controls (age, age^2)	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.047	0.047	0.051	0.051	0.010	0.010
Observations	163,549	158,032	154,463	149,252	164,357	158,787
Ancestor Free	*9,078*	*9,009*	*8,551*	*8,485*	*9,070*	*9,000*

Notes: This table shows the intergenerational effects of enslavement on years of education, wage income, and homeownership among prime-age (20–54) male descendants of enslaved vs. free Black Americans in 1940. The sample includes both the South and North of the US. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. Sample means are computed for the combined sample of the Free and Enslaved. The first column for each outcome shows results using only the linking-based Free-Enslaved classification. The second column adds a surname-based Free-Enslaved classification. All regressions control for age and age-squared. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

C. Additional Results

C.1 Figures

FIGURE C.1: Free-Enslaved Gap (1870–1940)
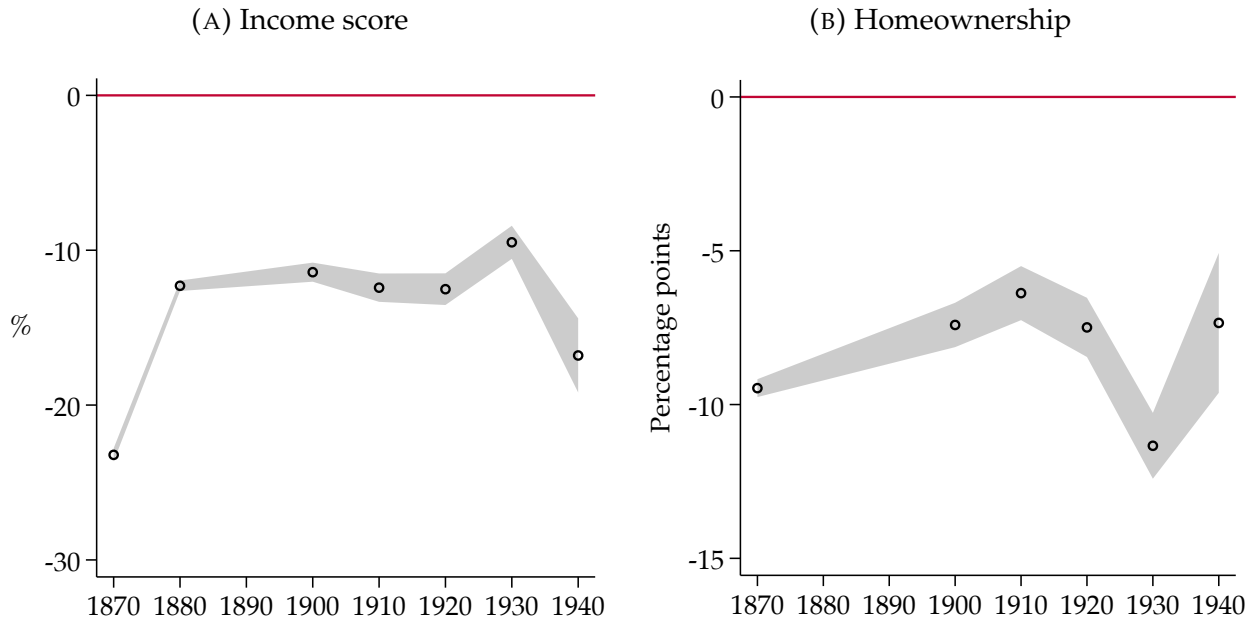
(A) Income score

(B) Homeownership

Notes: This figure shows the gaps in income (occupational income score) and homeownership among prime-age (20-54) male descendants of enslaved vs. free Black Americans in each census decade. The sample includes both the South and North of the US. We restrict the sample to observations linked to ancestors in 1850, 1860, 1870, or 1880. We control for a quadratic function in age and include 95 percent confidence bands clustered at the family level. See Data Appendix B for details on the sample and data.

FIGURE C.2: Free-Enslaved and Southern-Northern Born Gap in Literacy (1870–1940)
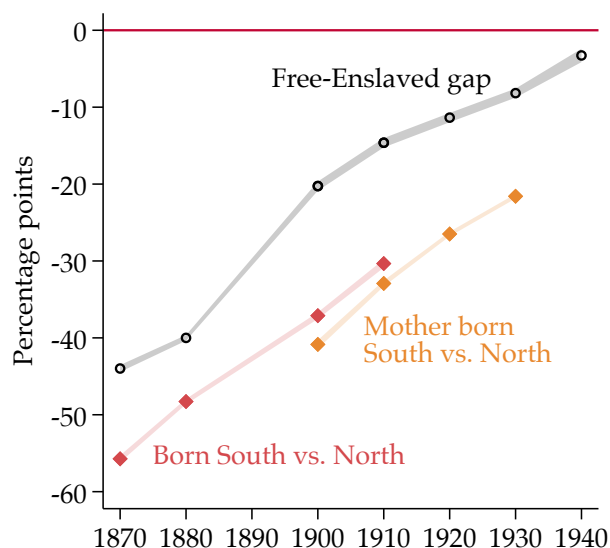
Notes: This figure shows the gaps in literacy among prime-age (20-54) male descendants of free and enslaved Black Americans, as well as those born in the North and South, over each census decade. The gap between Southern and Northern-born individuals is estimated using full census data (not requiring record linkage) that include birthplaces or maternal birthplaces. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. For the Free-Enslaved gap, we restrict the sample to observations linked to ancestors in 1850, 1860, 1870, or 1880. We control for a quadratic function in age and include 95 percent confidence bands clustered at the family level. See Data Appendix B for details on the sample and data.

FIGURE C.3: Long-Run Effect of Ancestor's State of Emancipation on Outcomes

(A) Years of education (1940)

Above 1.5
1 to 1.5
0.5 to 1
0 to 0.5
-0.5 to 0
Below -0.5
No data

Baseline mean: 5.91

(B) Literacy (% in 1940)

Above 5
2 to 5
0 to 2
-2 to 0
-5 to -2
Below -5
No data

Baseline mean: 91.28

(C) High school degree (% in 2000)

Above 3
1.5 to 3
1 to 1.5
0 to 1
-1 to 0
-1.5 to -1
Below -1.5
No data

Baseline mean: 68.29

(D) Income (2000)

Above 5,000
2,500 to 5,000
1,500 to 2,500
0 to 2,500
-2,500 to 0
Below -2,500
No data

Baseline mean: 27,854.11
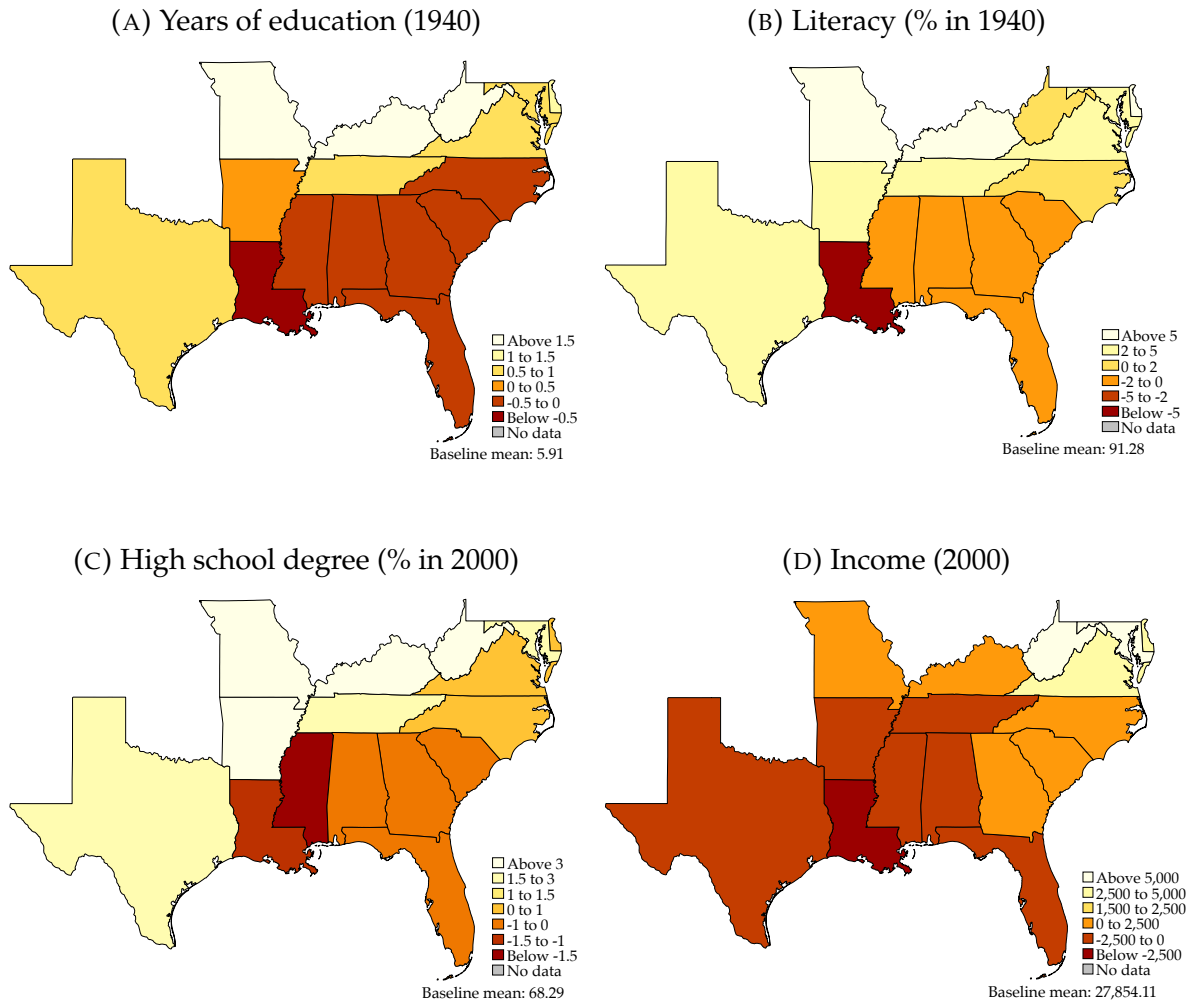
Notes: This figure shows the 1870 ancestor state of birth fixed effect estimates on years of education and literacy rates in 1940, neighborhood-level high school completion rates in 2000, and neighborhood-level income in 2000. A state's FE is the deviation from the population-weighted average across all states (baseline mean) after controlling for a quadratic function of age. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. The sample includes Black prime-age (20–54) men whose ancestors can be located in 1870. See Data Appendix B for details on the sample and data.

FIGURE C.4: Free-Enslaved Gap Conditional on Ancestor State (1870–1940)
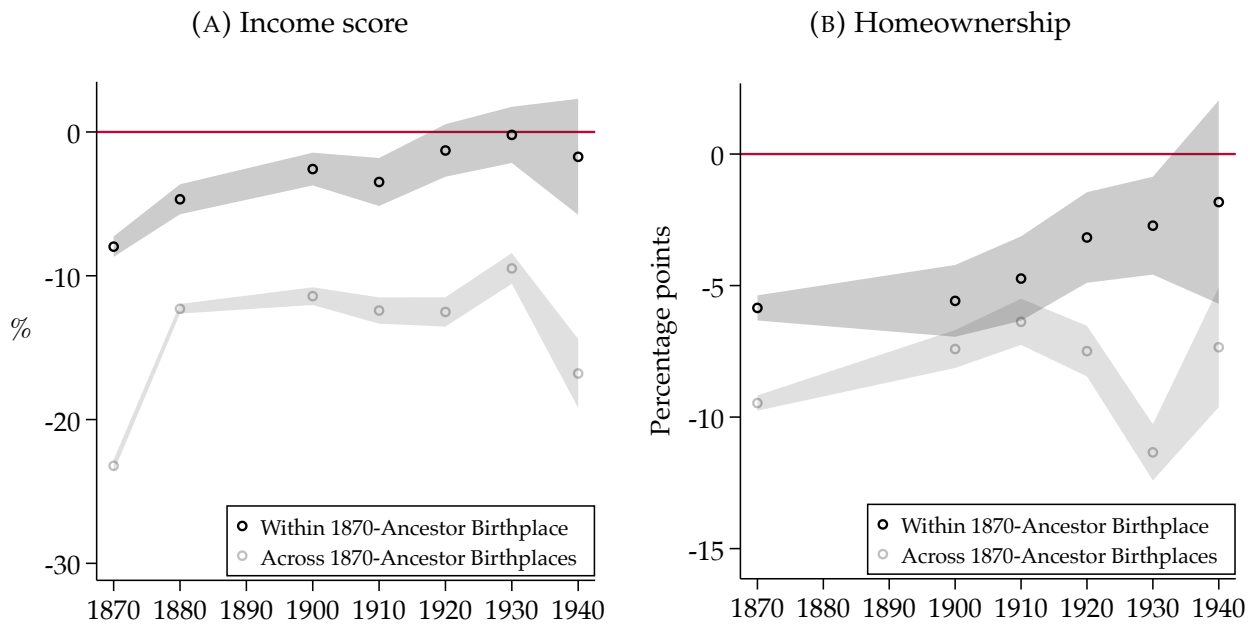
(A) Income score

(B) Homeownership

Notes: This figure shows the gaps in income (occupational income score) and homeownership among prime-age (20-54) male descendants of enslaved vs. free Black Americans in each census decade before (light) and after (dark) including fixed effects for 1870 ancestor state of birth. The sample includes both the South and North of the US. We restrict the sample to observations linked to ancestors in 1850, 1860, 1870, or 1880. We control for a quadratic function in age and include 95 percent confidence bands clustered at the family level. See Data Appendix B for details on the sample and data.

FIGURE C.5: Free-Enslaved Gap in Literacy Conditional on Ancestor Location (1940)
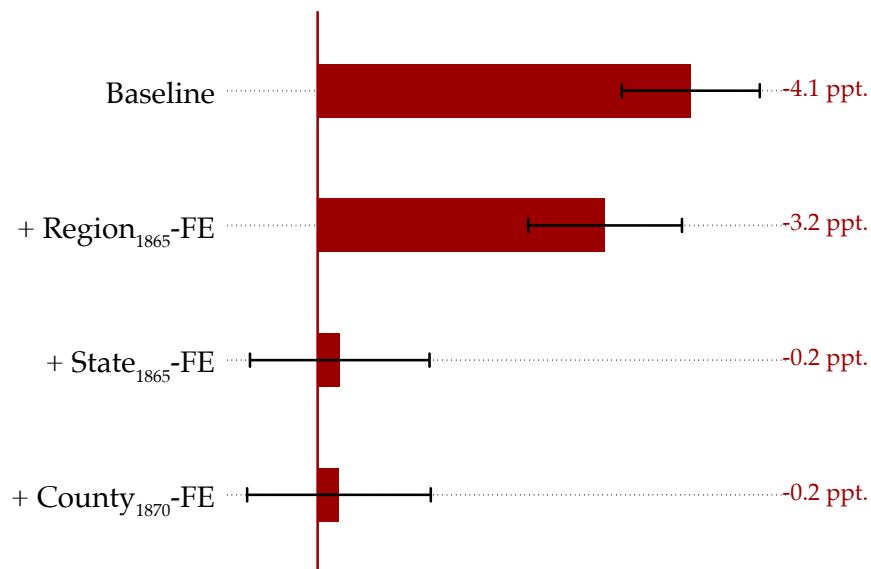
Notes: This figure shows the 1940 Free-Enslaved gap in literacy before and after including different levels of origin location fixed effects. We successively add fixed effects for the region (South or North) and state a family's 1870 ancestor were born, and the county in which their 1870 ancestors lived. The sample includes only Black prime-age (20–54) men whose ancestors can be located in 1870. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. See Data Appendix B for details on the sample and data.

FIGURE C.6: Free-Enslaved Gap in 1940 Years of Education by 1870 Ancestor Birthplace
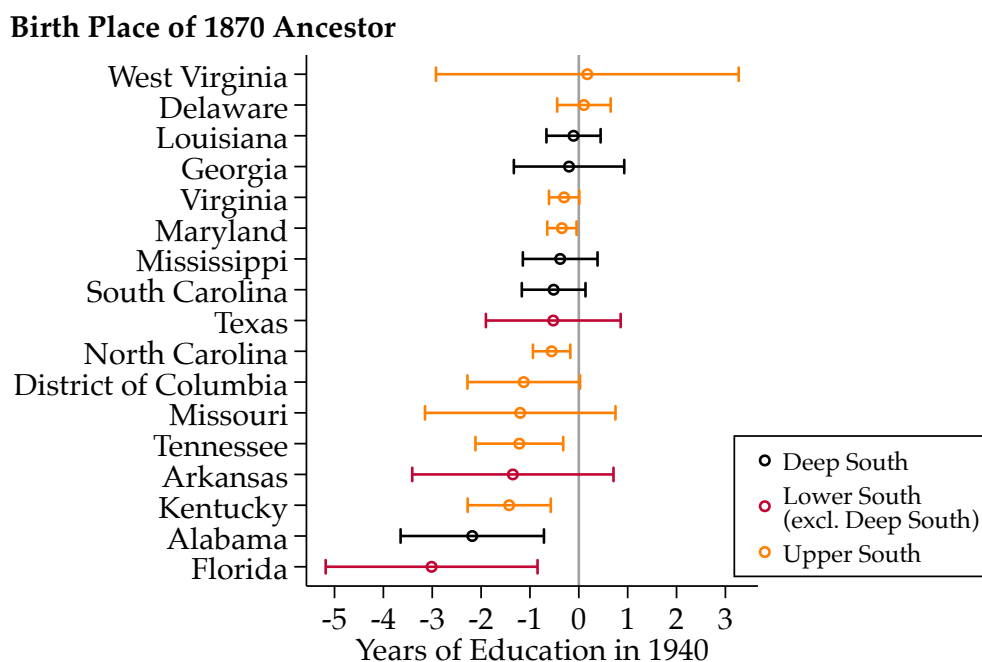
Notes: This figure shows the gaps between descendants of Free and Enslaved in 1940 years of education by 1870 ancestor state of birth. The comparison is made between prime-age (20-54 years) male descendants in each census decade. The sample includes both the South and North of the US. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included, minimizing bias due to the fact that the Free by definition have a link to 1850 or 1860. Both panels control for age and include 95 percent confidence bands that are clustered at the family level.

FIGURE C.7: Border Discontinuities in Additional 1940 Outcomes

(A) Wage income

Discontinuity: -18.53 (12.55)

More oppressive ← | → Less oppressive

(B) Occupational income score

Discontinuity: -0.31 (0.21)

More oppressive ← | → Less oppressive

(C) Lives on farm

Discontinuity: 3.66** (1.53)

More oppressive ← | → Less oppressive

(D) Migrated to North

Discontinuity: -0.57 (1.74)

More oppressive ← | → Less oppressive
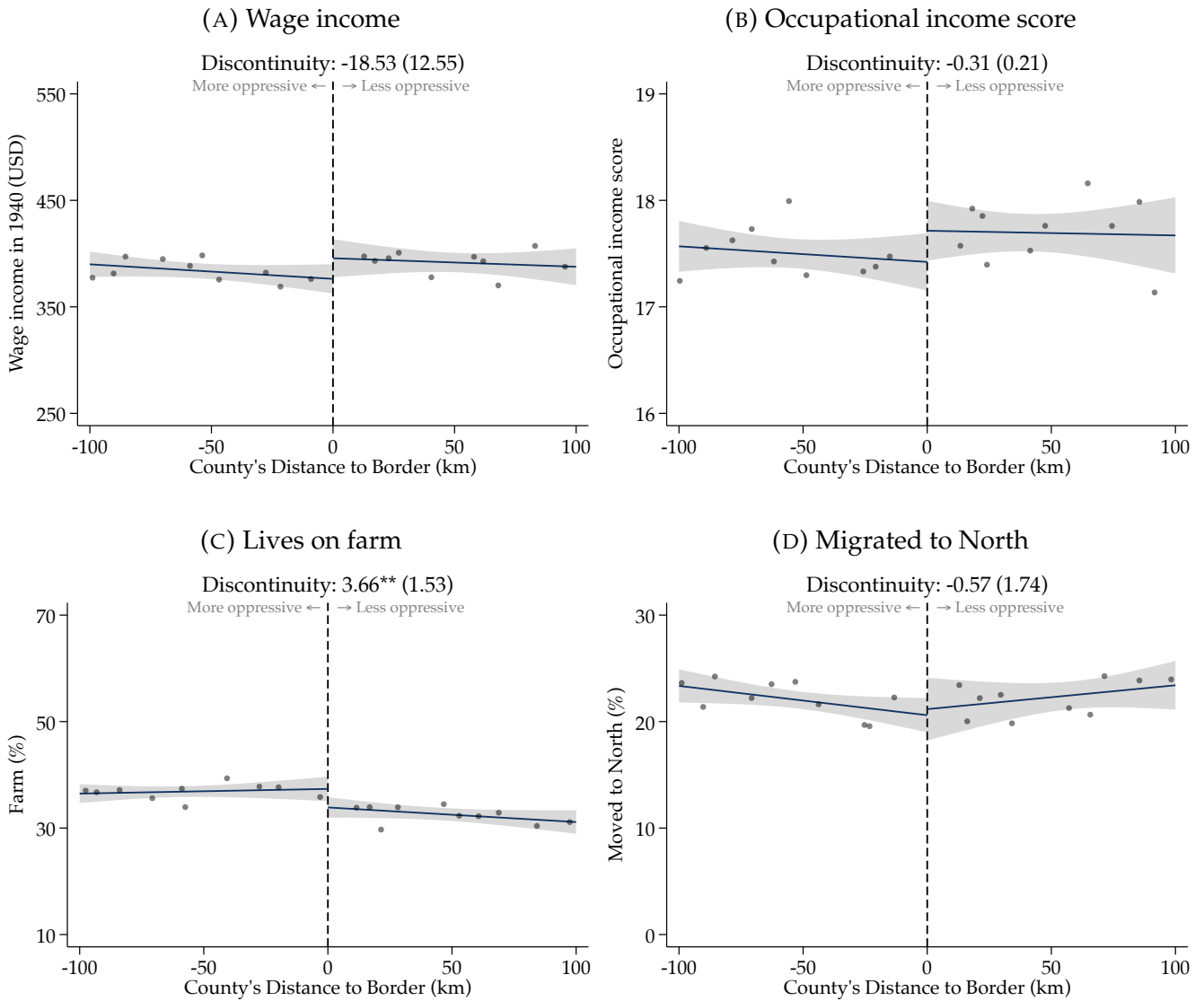
Notes: This figure shows the RD estimate in additional 1940 outcomes for Black families freed across state borders with different Jim Crow intensity in 1865. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). The sample is restricted to "high-contrast borders" where Jim Crow intensity differs more than across the median border (above 0.71 HRR index points, with differences averaging 1.30 HRR index points). The left half of each panel represents more oppressive states; the right half less oppressive states. Each dot is the average across a decile of the border population. Lines show the best linear fit. Shaded areas represent 95 percent confidence bands clustered at the 1870 county level. See Data Appendix B for details on the sample and data.

FIGURE C.8: RD Estimates by Year of Outmigration from Ancestor State
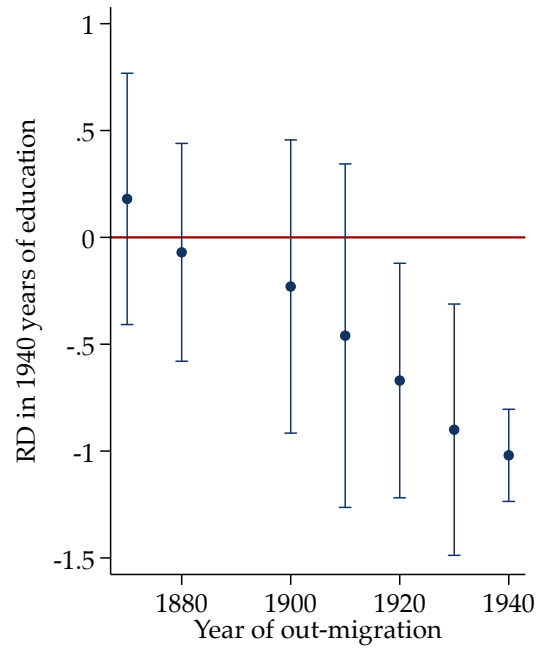
Notes: This figure shows RD estimates in 1940 years of education for Black families whose ancestors were freed on different sides of state borders in 1865 and stayed there for different amounts of time. Each estimate shows the pooled RD estimate for families who stayed in the state where their ancestors were freed from slavery until a given year (x-axis). Jim Crow intensity is measured via the Historical Racial Regime index (Baker, 2022). Negative estimates reflect lower education in the more oppressive state. Bars represent 95 percent confidence intervals. See Data Appendix B for details on the sample and data.

FIGURE C.9: RD Estimates for Poor and Wealthy White Americans

(A) Poor
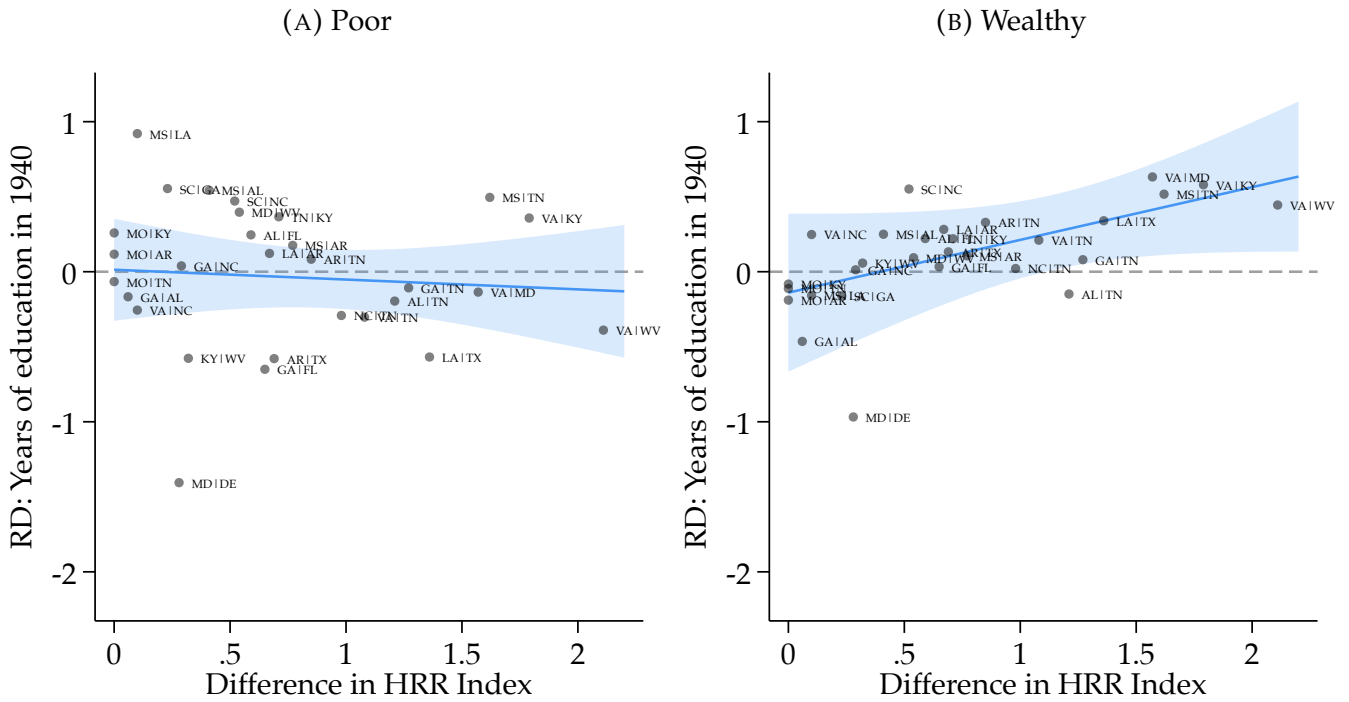
(B) Wealthy

Notes: This figure shows each separate RD estimate in 1940 years of education for white families who had no physical or human capital in 1870, i.e., illiterate and zero wealth (panel A) or were in the top decile in terms of real property in 1870 (panel B). Each label shows the more oppressive before the less oppressive state. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). Negative estimates reflect lower education in the more oppressive state. Lines show the best linear fit between RD estimates and the differences in Jim Crow intensity, weighted by the inverse of each estimate's standard error. Shaded areas represent robust 95 percent confidence bands. For point estimates, we use a 350km bandwidth and empirical Bayesian shrinkage as described in Appendix A.5. See Data Appendix B for details on the sample and data.

FIGURE C.10: RD Estimates Pooling High- and Low-Contrast Borders
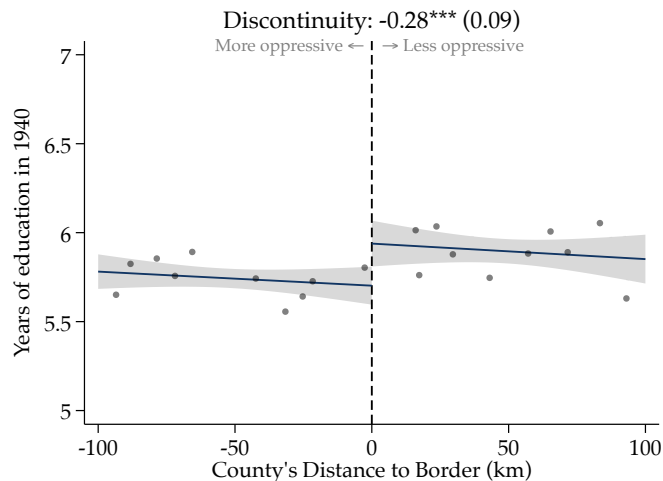
Notes: This figure shows the RD estimate in 1940 years of education for Black families freed across state borders with different Jim Crow intensity in 1865. The left half of the figure represents more oppressive states; the right half less oppressive states. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). Each dot is the average across a decile of the border population. Lines show the best linear fit. Shaded areas represent 95 percent confidence bands clustered at the 1870 county level.

FIGURE C.11: RD Estimates in Literacy over Time

(A) 1880

(B) 1900

(C) 1920
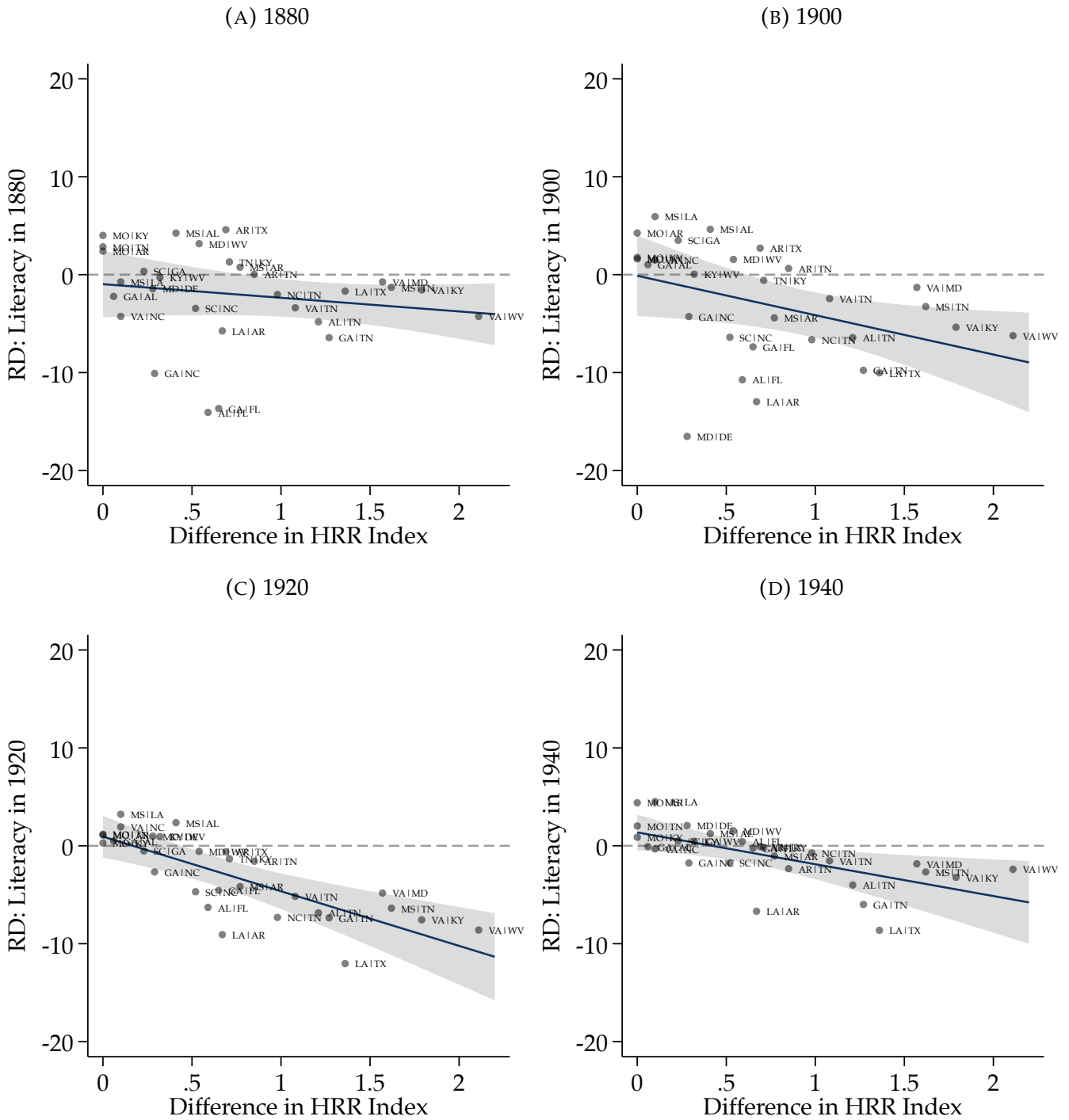
(D) 1940

Notes: This Figure shows each separate RD estimate in literacy in 1880, 1900, 1920, and 1940 for Black families whose ancestors were freed on different sides of state borders in 1865. Each label shows the more oppressive before the less oppressive state. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). Negative estimates reflect lower literacy in the more oppressive state. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. Lines show the best linear fit between RD estimates and the differences in Jim Crow intensity, weighted by the inverse of the estimates' standard error. Shaded areas represent robust 95 percent confidence bands. For point estimates, we use a 350km bandwidth and empirical Bayesian shrinkage as described in Appendix A.5. See Data Appendix B for details on the sample and data.

FIGURE C.12: No Border Discontinuities in 1860 Location Characteristics

(A) Slaves per capita

Discontinuity: 0.05 (0.03)
More oppressive ← | → Less oppressive

(B) Share of Black population

Discontinuity: 4.85 (3.55)
More oppressive ← | → Less oppressive

(C) Plantation crop share

Discontinuity: -0.03 (0.03)
More oppressive ← | → Less oppressive

(D) Agricultural output

Discontinuity: -2.88 (6.43)
More oppressive ← | → Less oppressive

(E) Cotton output

Discontinuity: 0.01 (0.03)
More oppressive ← | → Less oppressive

(F) Farm value

Discontinuity: -0.66 (0.77)
More oppressive ← | → Less oppressive

(G) Wealth Gini index

Discontinuity: -0.01 (0.01)
More oppressive ← | → Less oppressive

(H) Top-1% wealth share

Discontinuity: -0.03 (0.02)
More oppressive ← | → Less oppressive

(I) Migration cost to North

Discontinuity: 0.11 (0.36)
More oppressive ← | → Less oppressive

(J) Population density

Discontinuity: -4.76* (2.88)
More oppressive ← | → Less oppressive

(K) Occupational income

Discontinuity: -0.67 (0.51)
More oppressive ← | → Less oppressive

(L) Age of enslaved people

Discontinuity: 0.03 (0.58)
More oppressive ← | → Less oppressive

Notes: This figure shows the RD estimate in counties' characteristics in 1860 across state borders with different Jim Crow intensities in 1865. Average income is calculated based on occupational income scores. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). The sample is restricted to high-contrast borders (above 0.71 HRR index points, with differences averaging 1.30 HRR index points). The left half of each panel represents more oppressive states; the right half less oppressive states. Each dot is the average across a decile of the border population. Lines show the best linear fit weighted by county population. Shaded areas represent 95 percent confidence bands clustered at the county level. See Data Appendix B for details on the sample and data.

FIGURE C.13: Border Discontinuities in Black Teacher Education and Wages

(A) Black teacher education (1940)

Discontinuity: -0.55*** (0.15)

(B) Black teacher wages (1940)

Discontinuity: -214.05*** (51.84)
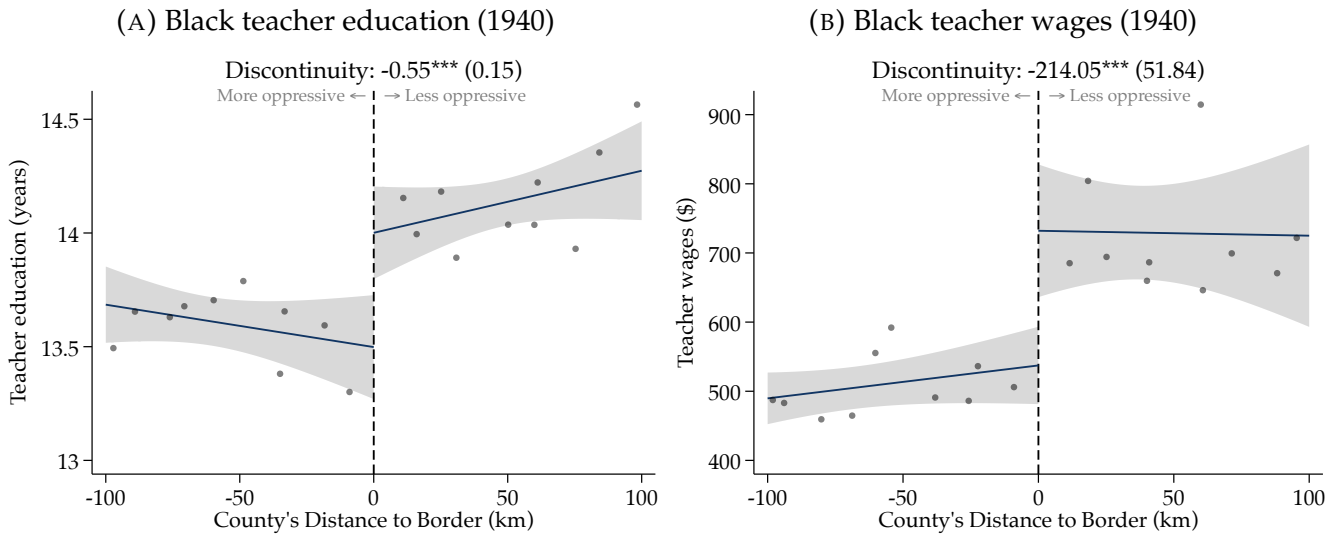
Notes: This figure shows the RD estimates for counties' Black teacher education (years of education attained) in 1940 and counties' Black teacher wages in 1940. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). The sample is restricted to "high-contrast borders" where Jim Crow intensity differs more than across the median border (above 0.71 HRR index points, with differences averaging 1.30 HRR index points). The left half of each panel represents more oppressive states; the right half less oppressive states. Each dot is the average across a decile of the border population. Lines show the best linear fit. Shaded areas represent 95 percent confidence bands. See Data Appendix B for details on the sample and data.

FIGURE C.14: Border Discontinuities Over Time

(A) Votes cast in presidential elections

(B) Black children's school attendance
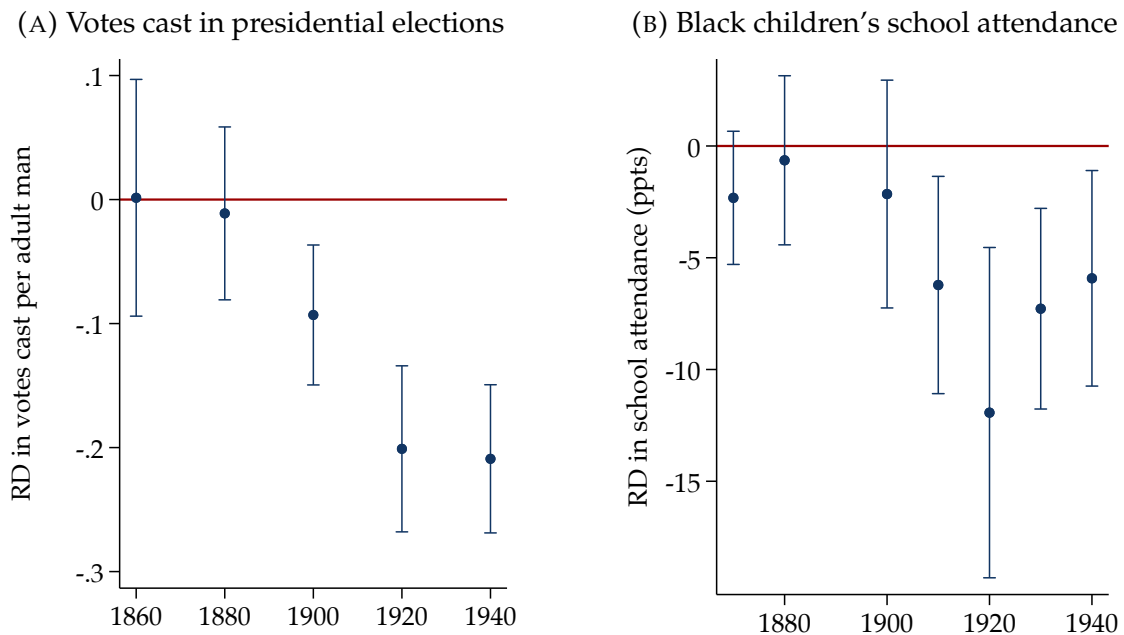
Notes: This figure shows the RD estimates for counties' number of votes cast per adult male in decennial Presidential elections from 1860 to 1940 as a share of the total population eligible based on sex and age (men aged 21 or older); and Black children's school attendance from 1870 to 1940. The sample is limited to "high-contrast borders" (above 0.71 HRR index points, with differences averaging 1.30 HRR index points). Each estimate is the difference between outcomes in the more oppressive compared to the less oppressive state. Vertical bars represent 95 percent robust confidence bands. See Data Appendix B for details on the sample and data.

FIGURE C.15: No Border Discontinuities in Lynchings between 1883 and 1941

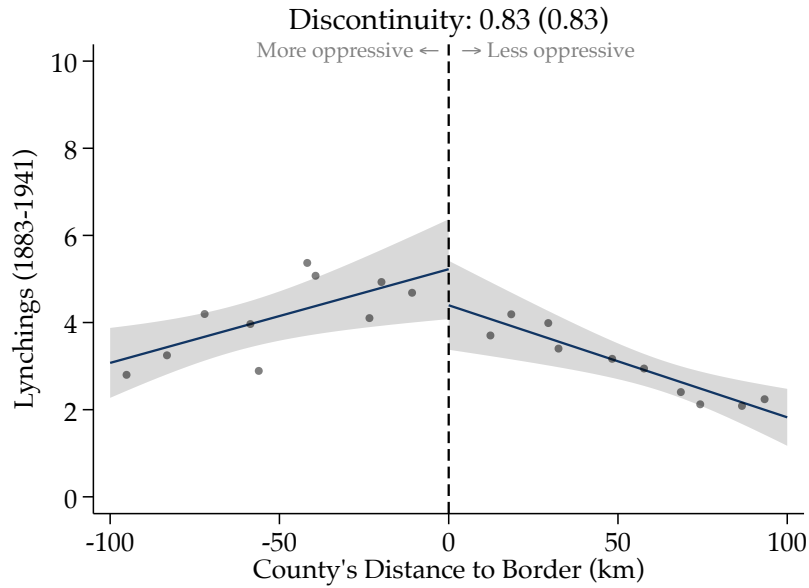*Notes:* This figure shows the RD estimate in counties' number of lynchings of Black Americans between 1883 and 1941. The sample is restricted to high-contrast borders (above 0.71 HRR index points, with differences averaging 1.30 HRR index points). The left half of each panel represents more oppressive states; the right half less oppressive states. Jim Crow intensity is measured via the Historical Racial Regime (HRR) index (Baker, 2022). Each dot is the average across a decile of counties. Lines show the best linear fit. Shaded areas represent 95 percent confidence bands. See Data Appendix B for details on the sample and data.
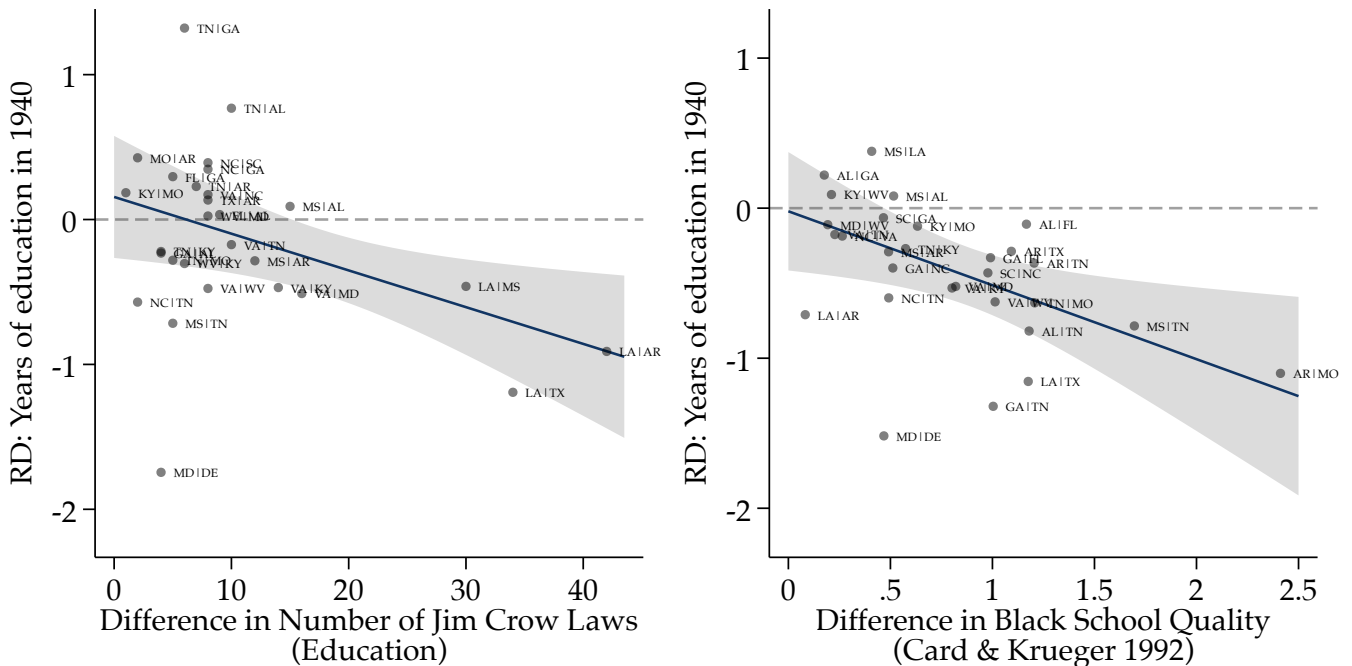
FIGURE C.16: Regression Discontinuity Estimates and Education under Jim Crow

Notes: This figure shows each separate RD estimate in 1940 years of education for Black families whose ancestors were freed on different sides of state borders in 1865. Each label shows the more oppressive before the less oppressive state. Negative estimates reflect lower education in the more oppressive state. Lines show the best linear fit, weighted by the inverse of each estimate's standard error. Shaded areas represent robust 95 percent confidence bands. For point estimates, we use a 350km bandwidth and empirical Bayesian shrinkage as described in Appendix A.5. See Data Appendix B for details on the sample and data. Our results are robust to using an alternative measure of school quality from Carruthers and Wanamaker (2017) instead of Card and Krueger (1992).

FIGURE C.17: Persistence of a State's Capacity to Generate Upward Mobility

(A) Causal Estimates Across Races

(B) Non-Causal Estimates for Black Americans
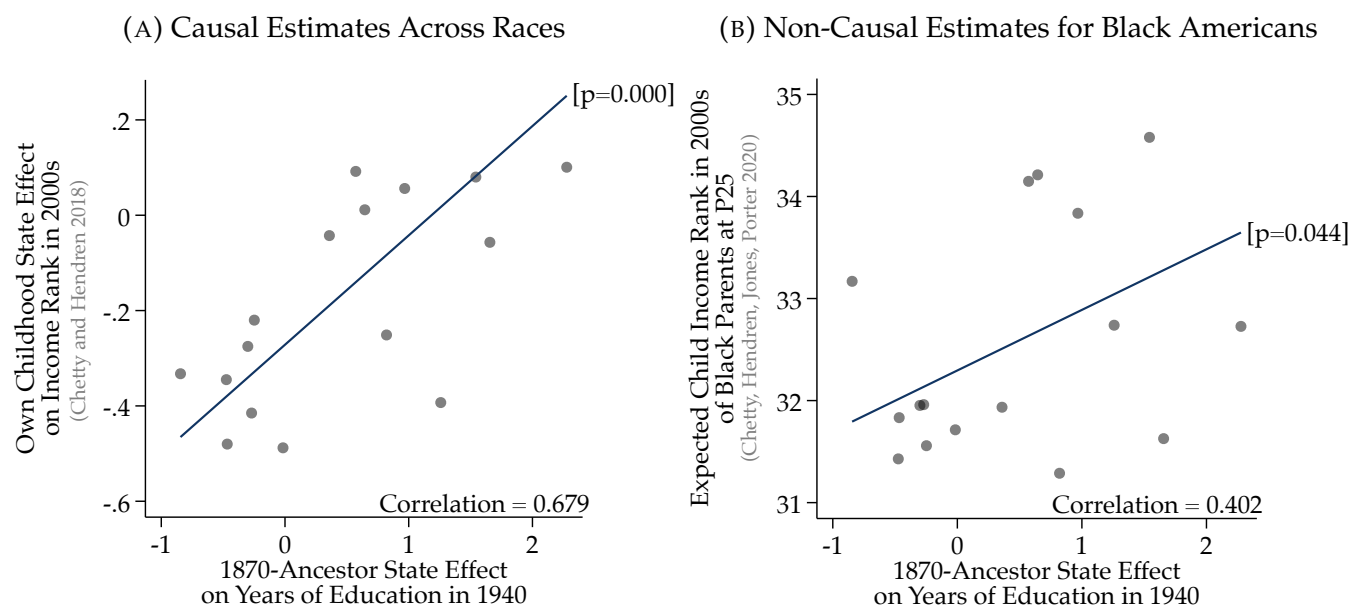
Notes: This figure is a binned scatter plot relating a state's causal effect on Black economic progress from 1865 to 1940 (as shown in panel A of Appendix Figure C.3) to (A) the state's causal effect on intergenerational mobility in recent decades (as estimated by Chetty and Hendren, 2018) and (B) the state's non-causal estimate of expected child income rank among Black parents (as estimated by Chetty et al., 2020). The modern estimates reflect a child's mean percentile rank in the national household income distribution at age 26 conditional on growing up with parents at the 25th percentile. See Data Appendix B for details on the sample and data.

C.2 Tables

TABLE C.1: Free-Enslaved Gap (1940) in Different Income Measures

	OCCSCORE (1950-$) Mean: 1,604.09	LIDO Score (1950-$) Mean: 1,161.69	Wage Income (1940-$) Mean: 381.20	Total Income (1940-$) Mean: 793.47	Song et al. Score Mean: 43.42
Ancestor Enslaved until Civil War	-148.39*** (10.86)	-279.00*** (8.59)	-145.92*** (6.13)	-204.29*** (10.29)	-9.29*** (0.39)
Controls (age, age²)	Y	Y	Y	Y	Y
Adjusted R²	0.04	0.04	0.05	0.09	0.01
Observations	168,138	142,743	154,463	146,871	168,138
Ancestor Free	*9,325*	*7,517*	*8,551*	*8,100*	*9,325*

Notes: This table shows the Free-Enslaved gap in income across different measures: Occupational income score (OCCSCORE), a refined occupational income score (LIDO from Saavedra and Twinam, 2020), wage income, total predicted income, and the Song et al. (2020) score. We compute the Song et al. (2020) score by computing the average literacy rate by occupation and birth decade and converting this measure into ranks. The sample includes both the South and North of the US. All estimates are for Black prime-age men in 1940. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE C.2: Free-Enslaved Gap (1940) in Different Education Measures

	Literacy (%) Mean: 91.49	Education (Years) Mean: 5.99	High School (%) Mean: 9.28	College (%) Mean: 1.70	Graduate (%) Mean: 0.46
Ancestor Enslaved until Civil War	-4.25*** (0.26)	-1.59*** (0.05)	-7.86*** (0.45)	-1.86*** (0.21)	-0.74*** (0.12)
Controls (age, age^2)	Y	Y	Y	Y	Y
Adjusted R^2	0.01	0.04	0.01	0.00	0.00
Observations	163,549	163,549	163,549	163,549	163,549
Ancestor Free	*9,078*	*9,078*	*9,078*	*9,078*	*9,078*

Notes: This table shows the Free-Enslaved gap in education across different measures: Literacy, years of education, and the probability of holding a high school, college, or graduate degree. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. The sample includes both the South and North of the US. All estimates are for Black prime-age men in 1940. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE C.3: Free-Enslaved Gap using Mortality Records (1988–2007)

	HS Degree (%) Mean: 68.85	College Degree (%) Mean: 12.31	Income (USD) Mean: 29,875.58	House Value (USD) Mean: 87,921.78
Ancestor Enslaved until Civil War	-3.02*** (0.51)	-2.45*** (0.55)	-4,795.93*** (636.79)	-15,755.30*** (2,462.82)
Level of outcome	Tract×Race×Sex	Tract×Race×Sex	Tract×Race	Tract×Race
Controls (age, age^2)	Y	Y	Y	Y
Adjusted R^2	0.01	0.00	0.01	0.00
Observations	26,765	26,765	26,803	25,787
Ancestor Free	*1,713*	*1,713*	*1,715*	*1,634*

Notes: This table shows the Free-Enslaved gap in 2000 neighborhood-level outcomes: high school and college degrees, median incomes, and median house values (conditional on ownership). A neighborhood is a census tract. Each person is assigned the value of the census tract in which they last lived according to administrative mortality records. The sample includes both the South and North of the US. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE C.4: Free-Enslaved Gap (1940) between and within Ancestor's Birthplace

	Education (Years) Mean: 5.91		Wage Income (USD) Mean: 388.01		Home Ownership (%) Mean: 29.48		House Value (USD) Mean: 1,412.17	
Ancestor Enslaved until Civil War	-1.49*** (0.07)	**-0.41*** (0.08)**	-137.00*** (8.51)	**-20.22** (9.84)**	-6.76*** (0.86)	**-1.61 (1.04)**	-574.06*** (90.08)	**8.40 (115.61)**
1870 State of Birth-FE	N	Y	N	Y	N	Y	N	Y
Controls (age, age^2)	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.04	0.08	0.04	0.07	0.01	0.03	0.01	0.03
Observations	75,583	75,583	71,474	71,474	76,048	76,048	21,873	21,873
Ancestor Free	*4,617*	*4,617*	*4,371*	*4,371*	*4,640*	*4,640*	*1,624*	*1,624*

Notes: This table shows the gap in years of education, total income, homeownership rate, and house value among prime-age (20-54) male descendants of enslaved vs. free Black Americans in 1940. The sample includes both the South and North of the US. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. Columns 1, 3, 5, and 7 repeat Table 1 but hold the sample constant to the other columns. Columns 2, 4, 6, and 8 add fixed effects for 1870 ancestor state of birth. House values are measured conditional on ownership. Sample means are computed for the combined sample of the Free and Enslaved. Figure 5 and Appendix Figure C.4 show the evolution of the conditional Free-Enslaved gap over time. See Data Appendix B for details. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE C.5: Free-Enslaved Gap Between and Within Ancestor's Birthplace using Mortality Records (1988–2007)

	HS Degree (%) Mean: 69.20		College Degree (%) Mean: 12.32		Income (USD) Mean: 30,143.90		House Value (USD) Mean: 88,830.12	
Ancestor Enslaved until Civil War	-2.57*** (0.74)	**-0.89 (0.82)**	-2.07*** (0.78)	**-0.29 (0.78)**	-5,032.50*** (921.89)	**-1,014.92 (1,005.32)**	-13,391.02*** (3,498.95)	**-780.04 (3,829.19)**
Level	Tract×Race×Sex		Tract×Race×Sex		Tract×Race		Tract×Race	
1870 State of Birth-FE	N	Y	N	Y	N	Y	N	Y
Controls (age, age^2)	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.00	0.01	0.00	0.01	0.01	0.03	0.00	0.02
Observations	11,931	11,931	11,931	11,931	11,932	11,932	11,500	11,500
Ancestor Free	*863*	*863*	*863*	*863*	*861*	*861*	*830*	*830*

Notes: This table shows the Free-Enslaved gap at the neighborhood-level in the fraction of people who hold a high school degree, the fraction of people who hold a college degree, the median income earned, and the median house value in 2000. The sample includes both the South and North of the US. Columns 1, 3, 5, and 7 repeat Table C.3 but hold the sample constant to the other columns. Columns 2, 4, 6, and 8 add fixed effects for 1870 ancestor state of birth. House values are measured conditional on ownership and therefore exclude zeros. Each person is assigned the respective value of the census block in which they lived at the time of death. Sample means are computed for the combined sample of the Free and Enslaved. See Data Appendix B for details on the sample and data. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE C.6: Free-Enslaved Gap (1940) for Free Without Physical or Human Capital in 1860

	Education (Years) Mean: 5.83		Wage Income (USD) Mean: 381.64		Homeownership (%) Mean: 29.08		House Value (USD) Mean: 1,380.43	
Ancestor Enslaved until Civil War	-1.00*** (0.15)	-0.12 (0.15)	-90.43*** (21.13)	26.85 (21.44)	-6.16*** (1.95)	-1.42 (2.00)	-343.74** (159.58)	440.28** (184.15)
1870 State of Birth-FE	N	Y	N	Y	N	Y	N	Y
Controls (age, age^2)	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	0.03	0.07	0.04	0.07	0.01	0.02	0.00	0.03
Observations	71,574	71,574	67,672	67,672	72,013	72,013	20,455	20,455
Ancestor Free	*608*	*608*	*569*	*569*	*605*	*605*	*206*	*206*

Notes: This table shows the gap in years of education, total income, homeownership rate, and house value among prime-age (20-54) male descendants of a subset of the enslaved vs. free Black Americans in 1940. Among the Free, we only include those whose ancestors had no measurable physical capital (real and personal property) or human capital (literacy) in 1860. The sample includes both the South and North of the US. Only observations that can be linked to the 1850, 1860, 1870, or 1880 census are included. Columns 1, 3, 5, and 7 repeat Table 1 but hold the sample constant to the other columns. Columns 2, 4, 6, and 8 add fixed effects for 1870 ancestor state of birth. House values are measured conditional on ownership. Sample means are computed for the combined sample of the Free and Enslaved. Appendix Figure C.4 shows the evolution of the conditional Free-Enslaved gap over time. See Data Appendix B for details. Standard errors are clustered at the family level and are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

D. MODEL APPENDIX

D.1 Importance of Geography in Perpetuating Free-Enslaved Gap

We can decompose the average treatment effect (ATE) of descending from ancestors enslaved until the Civil War defined in equation (4) into the sum of 1) the intergenerational effect conditional on location and "ability" $(-\rho\delta)$, 2) the geographic effect of the ancestor's enslavement location (*geographic endowment effect*), and 3) the effect of opportunities to migrate to more favorable locations (*location choice effect*). Formally, we decompose the ATE into

$$\text{ATE} = -\rho\delta + \theta + \kappa$$

where θ is the *geographic endowment effect* and κ is the *location choice effect*, and

$$\theta \equiv \int \sum_{\ell \in \mathcal{L}} \left(\Pr\left(\ell_{(i,0)} = \ell \mid s_i = 1 \right) - \Pr\left(\ell_{(i,0)} = \ell \mid s_i = 0, \alpha_{i,0} \right) \right) \times$$
$$\left(\rho\gamma_\ell^0 + \mathbb{E}\left[\gamma_{\ell(i,1)}^1 \mid s_i = 1, a_{i,0}, \ell_{(i,0)} = \ell \right] \right) dF(\alpha_{i,0})$$
$$\kappa \equiv \int \sum_{\ell \in \mathcal{L}} \Pr\left(\ell_{(i,0)} = \ell \mid s_i = 0, \alpha_{i,0} \right) \times$$
$$\left(\mathbb{E}\left[\gamma_{\ell(i,1)}^1 \mid s_i = 1, a_{i,0}, \ell_{(i,0)} = \ell \right] - \mathbb{E}\left[\gamma_{\ell(i,1)}^1 \mid s_i = 0, a_{i,0}, \ell_{(i,0)} = \ell \right] \right) dF(\alpha_{i,0}).$$

We imposed Assumption 1: location is independent of ability for the enslaved population.

We argue that the geographic disadvantage that the Enslaved population faced relative to the Free *within the South* provides a lower bound (in absolute terms) for the *geographic endowment effect* (θ). In the North, descendants of the Free tended to face more favorable conditions after slavery than those in the South. A large part of the *geographic endowment effect* therefore likely results from the fact that around half of the Free population lived in the North before 1865—an effect that we ignore to provide a lower bound. Formally, we assume that the *geographic endowment effect* $\theta \leq Z$ with Z defined as

$$Z \equiv \sum_{\ell \in \mathcal{L}} \left(\Pr\left(\ell_{(i,0)} = \ell \mid s_i = 1 \right) - \Pr\left(\ell_{(i,0)} = \ell \mid s_i = 0, \ell \in S \right) \right) (\eta_\ell - \eta_{\ell'}),$$

where $S \subset \mathcal{L}$ denotes all states in the South, $\ell' \in S$ is an arbitrary reference state in the South, and $\eta_\ell - \eta_{\ell'}$ as defined in equation (7) is the intent-to-treat effect of having a formerly enslaved ancestor born in state ℓ (relative to state ℓ'). We estimate Z using the state effects estimated in

regression equation (6). Specifically, we estimate Z via

$$\hat{Z} = \sum_{\ell \in \mathcal{L}} \left(\frac{1}{N} \sum_{i=1}^{N} \mathbb{1} \left(\ell_{(i,0)} = l \mid s_i = 1 \right) - \frac{1}{N} \sum_{i=1}^{N} \mathbb{1} \left(\ell_{(i,0)} = l \mid s_i = 0, l \in S \right) \right) \left(\hat{\eta}_l - \hat{\eta}_l' \right)$$

where $\mathbb{1}(\cdot)$ is the indicator function and $\hat{\eta}_l - \hat{\eta}_l'$ are the state fixed effects obtained in (6).

We find that the estimated upper bound of Z is around two-thirds of the Free-Enslaved gap. We also argued that Z is plausibly a lower bound of the geographic endowment effect. Under the additional assumption that $-\rho\delta$ and κ are both negative,[28] this implies that 1) at least two-thirds of the Free-Enslaved gap is *causal*, i.e. did not arise from selection into freedom, and 2) that the difference in the initial geographic distribution induced by slavery was the most important channel underlying this causal effect.

TABLE D.1: Decomposition of the Free-Enslaved Gap in 1940

	Free-Enslaved gap & ancestor location			Geography's effect as % of gap		
	National	Within South	Within state	Less conservative	Conservative	Lower bound
Literacy (%)	-4.2	-3.2	-0.4	138%	90%	67%
Years of education	-1.6	-1.2	-0.4	113%	75%	50%

Notes: This table decomposes the 1940 Free-Enslaved gaps in literacy and years of education. We successively add fixed effects for the region (South or North) and state a family's 1870 ancestor were born, and the county in which their 1870 ancestors lived. Columns 4 and 5 show the fraction of the national Free-Enslaved gap (column 1) that can be accounted for by state variation (column 3), respectively including (less conservative) or excluding (conservative) extrapolated effects for the North. The extrapolation predicts causal state effects for the North based on the relationship between causal state effects among Enslaved in the South and non-causal state effects among Free in the South. Column 6 shows the result of our formal decomposition. In the 1940 census, instead of literacy, we observe the highest year of school or degree completed. We classify individuals who have completed at least two grades of school as literate; others we classify as illiterate. The sample includes only Black prime-age (20–54) men whose ancestors can be located in 1870. See Data Appendix B for details on the sample and data.

We further estimate how the Enslaved would have progressed had they been geographically distributed as they Free within *the South and the North*. To do so, we extrapolate Northern states' effects. We cannot estimate those effects directly because we lack plausibly exogenous variation in location assignment there. Our extrapolation predicts Northern state effects based on 1) Northern non-causal state effects among the Free and 2) the relationship between Southern causal state effects among the Enslaved and non-causal state effects among the Free. This exercise shows that the Free-Enslaved gap would have closed entirely by 1940 (see Appendix Table D.1). Overall, our results show that group differences in initial location were the primary driver of the persistent Free-Enslaved gap.

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[28]Intuitively, this assumption imposes that 1) being enslaved longer did not benefit descendants ($-\rho\delta < 0$) and 2) migration opportunities were not better from enslaved people's locations than from free Black Americans' locations ($\kappa < 0$).

D.2 Direct Evidence on Selection into Freedom Before the Civil War

Combining (2), (3), and (4), the observed Free-Enslaved gap is equal to

$$\mathbb{E}[y_{i,1} \mid s_i = 1] - \mathbb{E}[y_{i,1} \mid s_i = 0] = ATE - B, \tag{12}$$

where the (negative of) the selection bias B, arising from 1) potential selection into being free, 2) potential selection into location by (descendants of) the Free, and 3) potential selection into location by (descendants of) the Enslaved, is equal to:

$$B = \underbrace{\mathbb{E}\left[(\lambda + \rho)\,\alpha_{i,0} \mid s_i = 0\right] - \mathbb{E}\left[(\lambda + \rho)\,\alpha_{i,0} \mid s_i = 1\right]}_{\text{Potential selection into being free}} +$$

$$\underbrace{\left(\mathbb{E}[\rho \gamma^0_{\ell(i,0)} + \gamma^1_{\ell(i,1)} \mid s_i = 0] - \int \mathbb{E}[\rho \gamma^0_{\ell(i,0)} + \gamma^1_{\ell(i,1)} \mid s_i = 0, \alpha_{i,0}] dF(\alpha_{i,0})\right)}_{\text{Potential selection into location by (descendants of) the Free}} -$$

$$\underbrace{\left(\mathbb{E}\left[\rho\left(\gamma^0_{\ell(i,0)} - \delta\right) + \gamma^1_{\ell(i,1)} \mid s_i = 1\right] - \int \mathbb{E}\left[\rho\left(\gamma^0_{\ell(i,0)} - \delta\right) + \gamma^1_{\ell(i,1)} \mid s_i = 1, \alpha_{i,0}\right] dF(\alpha_{i,0})\right)}_{\text{Potential selection into location by (descendants of) the Enslaved}}.$$

If being free before the Civil War was a matter of pure chance, the differences between the Free and the Enslaved have a causal interpretation. A priori, this assumption is strong. However, the plausibility of the assumption depends crucially on the conditions under which freedom was attained.

There were five main channels into freedom between the Revolutionary War (1775–1783) and the abolition of slavery in 1865: 1) by emancipation through abolition of slavery in the North in the late 18th and early 19th century, 2) by manumission through one's master, 3) by manumission through self-purchase, 4) by manumission through purchase by a third party, or 5) by running away. A person born to a free mother inherited their mother's freedom. In rare occasions, enslaved people were unintentionally freed by accompanying their masters on a trip to a free state. Setting foot on free soil freed enslaved people by law and some sued to enforce their rights (see, e.g., Rose, 2009).

In 1860, around half of the free population was born in the North, which we argue is a reasonable approximation of the share of the free families freed through general emancipation in the North. Within the remaining half, it is hard to estimate the share of people freed "legally" and those who ran away.

Dittmar and Naidu (2012) use runaway slave advertisements placed in Southern newspapers between 1840 and 1860 and suggest that such advertisements were placed for around 8,000 runaway slaves throughout the final two decades of slavery. However, the authors also point out that "it is clear that among the many absconders only a small fraction remained at large for a lengthy period." The odds of a successful escape were especially small in the Lower South. This is corroborated by the fact that in a Pennsylvania census of Free Black Americans, only 2 out of 314 people who were not born free indicated that they attained freedom through escape.[29] It is therefore safe to conclude that the vast majority of those who became free in the South did so through manumission (as opposed to escape).

Since slavery had been de facto abolished in the North by 1850 (see Table B.4), the enslaved people there were freed non-selectively. That is, as long as one is willing to assume that those enslaved in the North were not inherently different from those enslaved in the (Upper) South around 1800, those in the North were freed independently of any observed or unobserved characteristics. In the South, the degree of selection into manumission varied largely across time and locations. Around the 1780s, the early years after the Revolutionary War, there was a stream of manumissions motivated by morality or religion. In later antebellum years, manumission turned into an instrument to uphold slavery (Berlin, 1974). It did not, in most cases, arise from anti-slavery sentiments. On the contrary, many owners manumitted their slaves as a reward for loyalty and by doing so "reinforced rather than challenged the values, assumptions, and discipline of slavery" (Wolf, 2006, p. 44).

One could imagine that the practice of manumission induced a degree of selection into being free. Indeed, some quantitative evidence on the presence of selection into manumission exists. Cole (2005) finds that in Louisiana, manumitted people were 62.5 percent female (43.6 percent in the enslaved population) and much more likely to be "Mulatto" (38.5 percent) than the slave population (5.8 percent). This is consistent with the observation that manumission in the Lower South was reserved for "illicit offspring, special favorites, or least productive slaves" (Berlin, 1974). Bodenhorn (2011), too, finds evidence of preferential manumission for people of mixed race in Virginia. Similarly, Berlin (1974) argues that skilled slaves had a larger chance of accumulating enough wealth to be manumitted through self-purchase. Little is known about selection into being manumitted through purchase by other people (usually other free Black people). Run-

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[29]Pennsylvania Abolition Society and Society of Friends Manuscript Census Schedules, 1838. Available in machine-readable form through https://doi.org/10.3886/ICPSR03805.v1.

aways, however, "as a group, had always been more skilled, sophisticated, and aggressive than the mass of slaves" (Berlin, 1974, p. 160). Table D.2 summarizes the discussion.

TABLE D.2: Relative prevalence of and selectivity in different roads to freedom

	%	Degree of selection
Emancipation in North	≈ 50	None
Manumission by master	30–40	Varied across time and locations
Manumission by self-purchase	5–10	Potentially high
Manumission by a third buyer	5–10	Unknown
Escape	< 5	Potentially high

Notes: This table indicates a rough breakdown of the relative probability of attaining freedom in various ways. The percentage emancipated in the North is estimated by the fraction of free Black people born in the North in the 1860 census. The fraction that escaped is a conservative upper bound given the observations mentioned in the text. The remaining probability is attributed to manumissions. The distribution within manumissions is derived from (Bodenhorn, 2011): 10-20 percent through self-purchase, 10-20 percent through a third buyer, and the remaining 60-80 percent by the master.

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