Bitter Sugar: Slavery and the Black Family *

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Abstract

We empirically assess the effect of historical slavery on the African American family structure, as proxied by the likelihood that a household is headed by a single woman. Our hypothesis is that female single headship among blacks is more likely to emerge in association with the experience of slavery in sugarcane plantations. The latter has been linked, within the slave population, with extreme demographic outcomes that may have impeded the formation of stable families adhering to the nuclear model. We test our hypothesis on U.S. Census individual data covering the period 1880-1940. By exploiting the exogenous variation in crop suitability, we establish that higher sugar suitability is associated with a higher likelihood of single female headship. The effect is driven by blacks and starts fading in 1920 in connection with the Great Migration. We complement OLS estimates with a pseudo-panel approach, a matching estimator, and a fuzzy RDD. Next, over a linked dataset of black individuals between 1880 and 1930, we uncover an even stronger intergenerational legacy of sugar planting. County data for the period 1970-2000 show that in the long-term its effect is replaced by slavery, consistent with the spread of its influence through migration and intermarriage, and that black incarceration represents a powerful mediator. Lastly, by merging data on Louisiana slaves' ethnic origin with ethnographic data, we rule out any influence of African cultural traditions.

JEL Codes: J12, J47, N30, O13, Z10.

Keywords: Black family, slavery, sugar, migration, culture.

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1 Introduction

Since its publication in 1965, shortly after the enactment of the Civil Rights and the Voting Rights Acts, the Moynihan Report on the *"Negro family"* has been fraught with controversy. Moynihan, a sociologist who was then serving as Assistant Secretary of Labor in the Johnson Administration, through a wealth of tables and charts uncovered indisputable facts revealing that single mother families were widespread among blacks. He also attributed to the breakdown of the black family the responsibility for the more general *"tangle of pathology"* affecting the American ghettos, and including crime, unemployment, and racial gaps in education. More speculatively and even more controversially, he traced this evidence back to the legacy of slavery and its persistent influence on family formation for the descendants of freed slaves (*"It was by destroying the Negro family under slavery that white America broke the will of the Negro people."*) Within the popular press and the policy arena, these hypotheses were challenged with accusations of racism and suspicions of a patronizing attitudes toward African Americans.

In the slave society of the U.S. South, the organization of work in the plantations and in the whites' premises, together with the domestic slave trade, may indeed have severely impeded the formation of stable families adhering to the nuclear model. The tendency to matrifocality was strengthened by laws mandating that the children of a slave woman would also be slaves and prohibiting free men to intermarry with slave women. Even though a connection between the legacy of slavery and the dysfunctions of the black family had been made earlier on (DuBois et al., 1899, 1908; Frazier, 1932, 1939), Moynihan's stress on family structure as the heart of racial inequalities raised heated critiques also on the part of social scientists. In particular, the conjecture that slavery may have negatively influenced family formation and sexual mores among blacks was decisively rejected by historians and economic historians such as Genovese (1965), Fogel and Engerman (1974), and Gutman (1975).

To this day, Moynihan's conjecture relating the failure of the black family structure to the legacy of slavery has not been formally tested.[1] In the present paper, we address this question by building on evidence about the unique characteristics of the demographics of slavery in sugar plantations. Among North American slaves, births greatly exceeded deaths, so that the slave population rapidly increased. In contrast, the Caribbean and Latin America – where sugar planting was widespread – persistently experienced a dramatic natural decrease, with low levels of fertility and high levels of mortality. It has been suggested that these differences were related to the unique working conditions associated

[1] A notable exception is Miller (2018), who finds that, in the Cherokee Nation of Oklahoma, in 1880 slave children in smaller slaveholdings were more likely to belong to single female-headed families.

with the production of sugar (Tadman, 2000; Coclanis, 2010). In fact, unlike other slave owners, sugar planters did not consider slave children as potential assets over which claim property rights. They thought instead that they could maximize profits by continually skewing their labor force toward males. Together with the disease environment associated with sugar planting, this attitude caused profound demographic and social consequences.

The same characteristics that were associated with sugar production in the Caribbean and Latin America were also observed within the U.S., even though sugar planting was quite limited in scope, and almost entirely confined to a small group of parishes located in Louisiana. In order to identify the long run impact of slavery on the black family, our investigation will then be able to exploit differences between counties exposed to alternative modes of production associated with sugar and the other crops that were typical of the southern slave economy, such as cotton, tobacco, and rice. Our argument is that the unique demographic and social conditions associated with sugar planting may indeed have been conducive to the development of the black family.

We start our analysis by presenting data on slave demographics and relating them to crop suitability in order to trace the contribution of the latter in shaping differing performances. We document that in 1850, among the slave population, suitability to sugar is associated with an unbalanced sex ratio, skewed toward men, a lower birth rate, and a lower share of infants.

To show the effect of sugar planting on the family structure of African Americans, we use individual data on household heads from the 1 percent sample of the U.S. Census over the period 1880-1940. We show that sugar suitability is strongly associated with the probability of the occurrence of single female headship and this relationship is driven by blacks. We also find that the relationship between sugar and single female headship is stronger at the beginning of the period under consideration but then starts fading. The emerging patterns can be reconciled with the relocation of freed slaves and their descendants due to the Great Migration, that by 1930 had already involved a large fraction of the blacks formerly living in the U.S. South, and especially from in the sugar counties. As a result, the same kind of social arrangements were likely exported to other areas in the U.S., making the relationship between sugar and the black family less stable. Furthermore, for migrants, intermarriage among blacks from source counties with different exposure to sugar planting further weakened the legacy of the latter.

For our empirical investigation we rely on a variety of identification strategies. First, using OLS estimates, we exploit the exogenous variation in suitability to crops across U.S. states to test the relationship between potential sugar yield and the probability of single female headship. Second, we construct a pseudo-panel that allows to control for year and cohort fixed effects that may be correlated with sugar production. Third, we

complement OLS estimates with a matching estimator by forming groups that include individuals sharing the same characteristics, to avoid the possibility that individuals in treated and untreated counties may display different characteristics which are correlated with the treatment. As a further robustness check, we apply a Regression Discontinuity Design (RDD), by exploiting the fact that sugar suitability is confined to a relatively small and precisely spatially clustered number of counties. Since we may face an issue of partial compliance, we present a fuzzy version of the design and, to adjust for potential covariate unbalance, we complement it with the matching strategy described above. For the same design, we also perform a falsification test using rice suitability.

The magnitude of the effects we uncover is large. With reference to our preferred specification over stacked cross-sections with matching, in 1880 the increase in the likelihood of single female headship, relative to its sample mean and for a one standard deviation of sugar suitability, is 43 percent, and increases to 75 percent when we omit widowed and divorced household heads, whose marital status may reflect extraneous events that dilute the effect of slave life in sugar plantations.

In order to examine the persistence of the legacy of sugar planting in further depth, across generations and throughout the country, using information about unique surnames we construct a dataset linking black household heads between 1880 and 1930. We find that, in 1930, the impact of sugar suitability on the descendants of blacks that had likely experienced slavery in sugar plantations is stronger if compared with the one we detected from the cross section of black household heads in the same year.

When we move on to contemporaneous (county-level) data covering the period 1970-2000, we discover instead that legacy of sugar planting has faded, being replaced by that of slavery, consistent with the experiences of migration and intermarriage. Furthermore, we highlight that black incarceration (over data available for 1990 and 2000) emerges as a powerful mediator of the effect of both slavery and sugar planting, that channels and even amplifies their long-term influence. These findings confirm that the dysfunctions of the black family inherited from sugar plantations, and spread all over the country after Abolition, is tightly linked to the present-day economic insecurity that has been suggested as a determinant of the inability to form stable unions for African-American urban poor males.

An alternative explanation for the diffusion of the black family, other than slavery, rests on the legacy of African cultural traditions. By combining the Louisiana Slave Database with the Ethnographic Atlas, we assess this hypothesis but find no evidence that the family structure that we found to be associated with slavery in sugar plantations can instead be traced back to the prevailing customs among the African ethnicities that were represented among slaves in Louisiana.

This paper is close in spirit to Engerman and Sokoloff (1997) and Nunn (2008a), who have looked at the impact of slavery on long-term development by focusing on the factor endowments that have promoted the reliance on this specific form of labor coercion.[2] It is also connected with Alesina et al. (2013), who find that the suitability of a location for cultivating crops that require the use of the plough predicts the role of women in society. Relatedly, Nunn and Qian (2011) and Galor and Ozak (2016) look at the long-term influence of crops on population growth and time preferences, respectively. On the specific link between slavery and gender roles, Goldin (1977) suggests that slavery has increased black female labor force participation and, through an intergenerational transmission channel, shaped African Americans' cultural norms about women's work and their role within the family. Boustan and Collins (2014) document racial gender gaps in participation until at least 1980. Baiardi (2018) exploits cross county variation in the production of cotton and tobacco and finds that the lower degree of division of labor in the former promotes labor market participation among African American women.

The paper is organized as follows. Section 2 summarizes background information on slavery, sugarcane planting, and their influence on family formation. Section 3 presents the main data. Section 4 delivers our results. Section 5 contains robustness checks relying on the fuzzy RDD with matching. Section 6 investigates the persistency of the legacy of sugar planting. Section 7 explores African culture as an alternative explanation of the diffusion of the black family. Section 8 concludes.

2 Historical background

2.1 Slavery in the Americas

Between the sixteenth and the nineteenth century, through the transatlantic slave trade, over 12 million blacks were embarked from Africa and transported to the Americas, in order to supply labor for the expanding plantation economies (Eltis et al. 1999; Curtin 1969). The main destinations of the Middle Passage were Brazil and the the Caribbean, that absorbed 45 and 22 percent of the slaves, respectively, while only 4 percent (about

[2]The long-term consequences of slavery in the U.S. have also been investigated with regard to productivity (Mitchener and McLean, 2003), inequality (Soares et al., 2012; Bertocchi and Dimico, 2014), education (Sacerdote, 2005; Bertocchi and Dimico, 2012), and politics (Naidu, 2012; Acharya et al., 2016; Bertocchi and Dimico, 2017), while the determinants of the diffusion of slavery have been explored by Lagerlof (2005) and Esposito (2019), with reference to geography and malaria, respectively. The persistent effect of slavery and other forms of labor coercion in the receiving countries, other than the U.S., has been studied by Dell (2010) for Peru, Summerhill (2010), Naritomi et al. (2012), and Fujiwara et al. (2019) for Brazil, Acemoglu et al. (2012) for Colombia, and Bobonis and Morrow (2014) for Puerto Rico. For the legacy of the slave trades in Africa we refer to Nunn (2008b) and the survey in Bertocchi (2016).

650,000 people) arrived in North America, where they were initially employed along the southern Atlantic coast for the cultivation of rice and tobacco. Slave import expanded rapidly during the seventeenth century. The local reproduction rate was much higher than in the rest of the Americas, so that the slave population grew, and the natural increase eventually outpaced import. During the first half of the nineteenth century, a Second Middle Passage witnessed the forced migration of a million slaves from the coastal regions to the interior areas, where the production of cotton was booming. Between 1800 and 1860 the slave population increased from one to four million, to reach 13 percent of total population, albeit concentrated in 15 southern slave states. The American Civil War led to the abolition of slavery in 1865, followed by the enactment of the Black Codes in the southern states. The regional distribution of the black population remained substantially stable until 1914 (Higgs, 1997). Starting with 1916, the Great Migration caused the voluntary relocation of six million descendants of slaves from the rural South to the northern cities (Berlin, 2010).

2.2 Sugar planting and slave demographics

In the seventeenth-century Caribbean, the so-called sugar revolution determined a rapid shift from diversified agriculture to sugar monoculture and, in association to that, from free to slave labor, causing in turn a huge boost to the transatlantic slave trade (Higman, 2000). By the eighteenth century, the Atlantic economy was dominated by sugar, and sugar was in turn dominated by slavery, because it would have been impossible to make sugar cultivation profitable by hiring free labor (Wright, 2006).

The demographics of the "sugar islands" were peculiar ones, with slave fertility rates lower and slave mortality rates higher than in non-sugar-producing regions. These patterns were due to a variety of interrelated reasons: the extremely harsh working conditions, the lethal disease environment, and the age and sex ratios preferred by slave owners for slave imports.[3] As a direct consequence, the natural increase among slave populations in sugar regions tended to be negative, in contrast with non-sugar ones. Thus, in sugar regions the growth of the slave populations was only sustained by the importation of slaves. Indeed it was cheaper for sugar planters to buy new slaves rather than maintain the labor force by improving fertility and reducing infant mortality. Inevitably, when the transatlantic slave trade was abolished in the nineteenth century, these regions

[3]The appalling living standards in the sugar plantations are described, among others, by Burnard et al. (2019). Demographers list plantation slaves in Trinidad among the documented populations with lowest life expectancies (20 years or less), comparable to those recorded within short-lasting, acute episodes of high mortality due to famines (in Ukraina in 1933, Sweden in 1772, and Ireland in 1845), or epidemics (in nineteenth century Iceland) (Zarulli et al., 2018). Ortiz (1947) attributes to sugar planting, if compared to tobacco, the development of a more authoritarian culture in Cuba.

experienced a decline in their slave populations (Coclanis, 2000).

While sugar planting spread swiftly through the Caribbean and Latin America, due to the prevailing geo-climatic conditions in North America it remained limited to a relatively small area in the South East, involving a handful of southern Louisiana counties and a few other counties in Florida and the bordering states. Sugar production intensified in Louisiana with the 1803 Purchase, bringing in large slave imports. By the time Louisiana entered the Union in 1812, sugar had become the main plantation crop along the Lower Mississippi River. Sugar planting was followed by the harvesting season and then by the actual production stage, involving grinding and boiling of the canes (Follett, 1997; Rodrigue, 2001). Indeed production in a sugar plantation combined both agricultural and industrial processes, a characteristic that kept the slaved labor force under extreme pressure all year round.

In the aggregate, the demographics of the North American slave population differed sharply from those of the Caribbean and Latin America, displaying a sustained natural increase. However, the sugar areas of the U.S. stood as an exception, unique to North America, that confirms the crucial influence of plantation crop in determining patterns of natural increase and decrease (Tadman, 2010).

For the Louisiana sugar parishes, the U.S. Census provides accurate information that have allowed to document the demographic cost of sugar, by allowing to track both crude population growth rates and ratios of children to women. Related studies on slave imports show that the demands of the sugar planters shaped the gender selective nature of the slave trade in the area, with the extreme labor demands of the sugar plantations determining a preference toward male slaves (Follett, 1997). The consequent shortage of women induced very low fertility rates. Taken together, these factors produced a persistent natural decrease, caused by a combination of excess adult mortality, skewed sex ratio, and shortage of children.

2.3 The "black family"

The demographics of slave regimes in the sugar islands carried important implications for all social institutions including family and kinship. Male-dominated African importation made it difficult for male slaves to find spouses (a mirror image of the reversed gender imbalance determined by slave exports in Western Africa). Moreover, intensive importation implied for the slaves the permanent trauma of separation from relatives and friends. The slaves were reportedly so demoralized that they were uninterested in forming a family and taking care of children (Patterson, 1969). Furthermore, high death rates implied pervasive widowhood at an early age, especially for women, who then had to face the prospect

of having to raise young children on their own. These factors combined prevented the diffusion of a family structure based on the nuclear model. Matrifocality, i.e., a system of familial relations focused upon women in their role as mothers, with an associated lack of emphasis upon the conjugal relationship, was instead promoted (Smith, 1982). A somewhat different view holds instead that the majority of the slaves that did possess a family lived in nuclear units, but that at the same time a large fraction – mostly males – had instead no family, while a third relatively unimportant category lived in extended households (Highman, 1975).

With reference to the U.S., as mentioned in the introduction an early stream of the literature (DuBois et al., 1899, 1908; Frazier, 1932, 1939) had stressed the instability of the "black family"and attributed it to the legacy of slavery. This view, once embraced and brought to public attention by Moynihan (1965), provoked a revisionist response asserting that black families, under slavery and just after Abolition, overwhelmingly displayed a two-parent structure (Genovese, 1965; Fogel and Engerman, 1974; Gutman, 1975). According to this view, the distinctive African American family structure is of relatively recent origin and has been caused by contemporaneous racial inequalities and extreme poverty, rather than causing them. In turn, a further and more recent stream of studies has reconsidered the revisionist view and documented the continuity of the black family structure starting at least since the nineteenth century. Using Census data from 1880 through 1980, Ruggles (1994) shows that black children are indeed persistently more likely to reside with a single parent than are white children, even though the racial differential has grown over time and especially after 1960.[4] The share of black (aged 0 to 14) children living with a single mother increased from 13 percent in 1880 to 37 percent in 1980, against 6 and 12 percent respectively for whites. In 1880, parental mortality was the main reason for the absence of parents among whites, while it explained less than half of the cases for blacks.[5] Moreover, female headship among blacks tends to involve primarily single, never-married (rather than widowed or divorced) women. The larger prevalence of extended families among blacks can also be traced back to the fragility of the nuclear family model. Whether these racial differences can be explained by distinct social norms, either engrained in African culture or else developed during slavery, had so far remained an open question. Which characteristics of the latter may have been decisive channels was also, so far, still lacking an answer.[6]

[4]For a further discussion of post-1960 trends see, e.g., Ellwood and Crane (1990) and Darity and Myers (1995).

[5]Sacerdote (2005) reports that children and grandchildren of slaves were more likely to live in female headed households than children and grandchildren of free blacks.

[6]On the influence of African culture, see McDaniel (1990); for a legal history of slave marriage, see Goring (2006).

3 Data

To derive our main results, we use individual data from the 1 percent sample of the U.S. Census, for each Census year from 1880 to 1940.[7] The choice of the time period is constrained, on the one hand, by the fact that data disaggregated by race are not available for 1860. Moreover, we choose not to use data for 1870 since the year is too close to the end of the Civil War, with unavoidable consequences of the associated casualties for household composition. Data for 1890 have been lost.[8] On the other hand, after 1940 information which could identify individuals (and consequently a county) is not reported, or sparsely reported, due to U.S. regulation protecting anonymity (i.e., the 72 year rule). In fact, starting from 1950, geographical identifiers are only available for places with population above 100,000.

We restrict the above sample to the states that had already joined the U.S. in 1860, the year for which Census data on the proportion of the population in slavery are available for the largest number of states. From the resulting source, in order to exploit variation across household heads, we focus on a sample consisting exclusively of household heads aged 15-89 and, using information on the sex of the household head and on the presence of a spouse within the household, we construct a binary variable which takes value 1 if the household head is a female without a coliving spouse, and 0 otherwise.[9] In keeps with the literature, we interpret this variable, that we define for short as single female headship, as our main proxy for family structure.

Data on agro-ecological crop suitability are from the FAO GAEZ database.[10] Crop suitability is measured using information on agro-climatic factors, soil resources, and terrain-slope conditions, and is classified on a scale from 1 to 8, with 1 denoting maximal suitability and 8 denoting no suitability.[11] For each decade for which we have Census data, we overlay county boundaries with the suitability maps for sugarcane, cotton, tobacco, and wetland rice, in order to have a measure of suitability for each crop, county, and

[7] Data are available from IPUMS USA at https://usa.ipums.org/usa/. See also Ruggles et al. (2019).

[8] Higgs (1997) reports serious under-enumerations of blacks in the 1870 and 1890 Censuses.

[9] In more detail, the variable takes value 1 for the following marital status categories: married with spouse absent, divorced, widowed, and never married/single. We also consider an alternative definition based on information on household types and construct a binary variable which takes value 1 if the household head is either a female with no husband, or a female living alone, or a female living with others (and 0 if male or female with a partner). However, data on household type are only available from 1900, and missing in 1920. For the available census years, the correlation between the two alternative variables is nearly 1.

[10] See http://www.fao.org/nr/gaez/en/. Nunn and Qian (2011) provide an in-depth description of the database.

[11] We exclude from the analysis category 9, that corresponds to water. In order to capture as closely as possible exogenously-determined factor endowments, we refer to the indices corresponding to low input levels (i.e., traditional management techniques) and rain-fed production (i.e., absence of irrigation).

decade. The fact that for each Census year we use the corresponding boundary file in order to map counties onto crop suitability areas allows us to exclude issues related to boundary changes. Figure 1 shows the result from overlaying sugar suitability classes on the map of U.S. counties at 1880 boundaries.

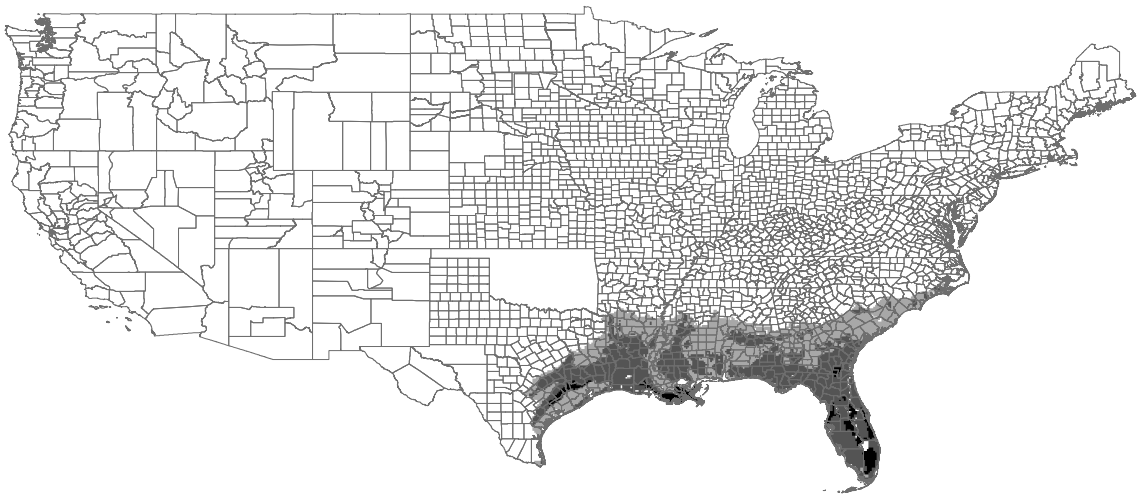

Figure 1: U.S. Counties by Sugar Suitability Class at 1880 County Boundaries

Note: The sugar suitable area comprises regions with suitability between very high (class 1) and very marginal (class 7), i.e., with a strictly positive suitability index. Sugar suitable regions are shaded. A darker shade indicates higher sugar suitability. Counties are represented at 1880 boundaries.

Table A1 in the Appendix reports a data description and sources and Tables A2 and A3 provides descriptive statistics for each year in the sample, overall and for blacks. Figure A1 illustrates the evolution of the share of single female heads during the period 1880-1940, overall and disaggregated between black and white household heads. Overall, households with a single female head represent 11.9 percent of the sample in 1880 and reach 14.6 percent in 1940, with a larger share for blacks (from 17.8 in 1880 to 22 percent in 1940). Steadily through the period, average age increases and the number of children per household, as well as the number of children below age five, decline. Urbanization

increases and cane sugar production declines.

4 Results

4.1 Preliminary evidence

In order to describe the demographic and social conditions associated with slavery and, in particular, with slavery in the sugar plantations, we start with county-level data from the 1850 Census - Vital Statistics.[12]

Table 1: The Demographics of Sugar, 1850

	(1) Log Slaves	(2) Sex Ratio	(3) Birth Rate	(4) Infant Share	(5) Death Rate
Sugar Suitability	-0.265	-0.014	0.002	0.002	0.0002
	(0.091)***	(0.007)**	(0.001)***	(0.001)***	(0.000)
	[0.069]*	[0.054]*	[0.002]***	[0.003]***	[0.491]
State FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.972	0.130	0.164	0.164	0.061
Observations	1609	965	927	927	830
States	35	18	16	16	17

Note: Log Slaves is the logarithm of 0.01 plus the number of slaves, Sex Ratio is the share of male over female slaves, Birth Rate is slave births over slave population, Infant Share is the share of infants (below one year of age) over slave population, and Death Rate is slave deaths over slave population. Controls for total and urban population are also included. Clustered robust standard errors at a state level in parentheses and wild bootstrap p-values in square brackets: *** p<0.01, ** p<0.05, * p<0.1.

Table 1 shows the relationship between sugar suitability and a number of demographic variables concerning the slave population and potentially associated with the black family structure. Our (inverse) measures of sugar suitability is standardized (i.e., re-scaled with average equal to 0 and standard deviation equal to 1), in order to ease the interpretation of the coefficients in terms of a one standard deviation change of the regressor. Each regression also controls for total and urban population, to account for the potential influence of sugar suitability on population and urbanization (Nunn and Qian, 2011). In Model 1 we find a significant and positive association between sugar suitability and slavery, measured with the number of slaves. Model 2 shows that sugar suitability is also associated, within the slave population, with a higher sex ratio (measured by the number of male slaves over female slaves), that is, with a gender distribution of the slave population skewed toward men. The next models uncover a negative effect of sugar suitability

[12]Variable definitions are in Table A1 and summary statistics in Table A4.

on the birth rate (slave births over slave population) and the share of infants (i.e., children below age 1). The fact that the coefficient on the death rate (slave deaths over slave population)[13] is not statistically significant is not surprising, given that underreporting of slave deaths on the part of planters was widespread, and presumably more so when deaths were more frequent (Steckel, 1979).[14]

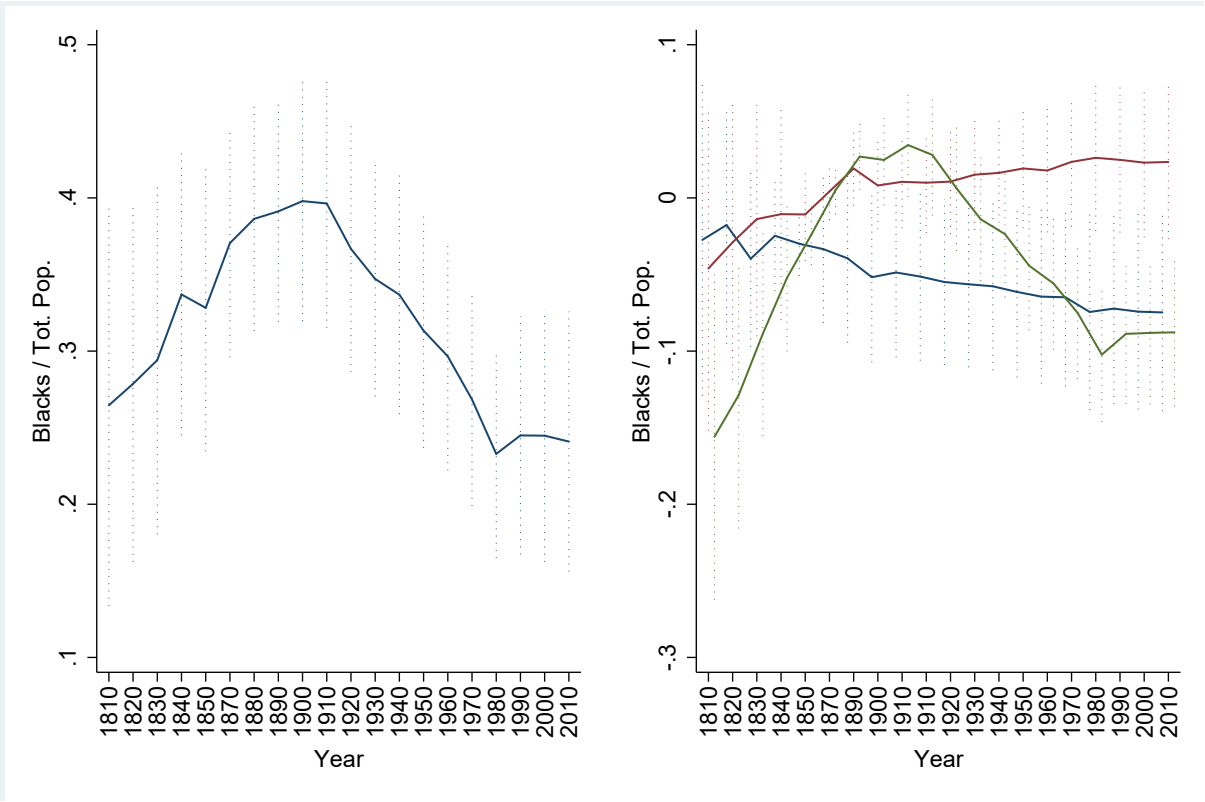

Figure 2: Black Population Share by Crop Suitability

Note: Sugar Suitability on the LHS. Rice Suitability (Green), Cotton Suitability (Red), and Tobacco Suitability (Navy) on the RHS. The reference year is 1860. Dotted lines indicate 95 percent confidence intervals.

In Figure 2, we plot the coefficients from a regression of the black share on year dummies from 1810 to 2010 (1860 is the reference year) and interactions between dummies for measures of crop suitability (the dummy takes value 1 if the level of suitability is above the median, and 0 otherwise) and year dummies.[15] The plotted coefficients show the differential for each crop with respect to the average black share for each year. Sugar suitability is represented on the LHS, while the RHS represents rice (in green), cotton (red), and tobacco suitability (navy). While the black share in counties with high suit-

[13]We trim observations for which the death rate is strictly greater than 1.

[14]Since the number of states in 1850 is smaller than 50, Table 1 also reports, in square brackets, the p-values obtained from a wild bootstrap, in order to deal with the potential over-rejection of the null when the number of clusters is small (see Cameron and Miller, 2015).

[15]We use county-level Census data on the slave share from 1810 until 1860 and on the black share from 1870 until 2010.

ability to cotton and tobacco stays relatively constant after 1860, in counties with high suitability to sugar we observe an increase until 1910, followed by a sharp decline. This pattern is explained by the Great Migration, which was especially intense out of the counties where sugar suitability was higher. The evolution of the black share for the case of rice is similar to that of sugar, a point that we shall address in detail in Sub-section 5.2.

Taken together, this preliminary evidence highlights the crucial role of sugar suitability as an explanation of demographic outcomes that are deeply differentiated from those prevailing in areas that were also marked by the exploitation of slave labor, but were characterized by suitability to other crops.

4.2 OLS estimates

As shown in Figure 1, high values of sugar suitability are strongly geographically concentrated in small regions within Louisiana and Florida and a few regions within neighboring states. This allows us to achieve identification by exploiting a geographical discontinuity together with a source of exogenous variation in sugar production. As a result, we estimate models in which the exogenous variation in sugar suitability affects an outcome variable using variants of the following Equation 1:

$$Y_{i,c,s} = \sigma_s + \beta_1 SugarSuitability_{c,s} + \beta_2 Z_{c,s} + \beta_3 X_{i,c,s} + \epsilon_{i,c,s} \quad (1)$$

where $Y_{i,c,s}$ is an outcome variable – primarily, single female headship – for individual i in county c and state s; σ_s represents state fixed effects; $SugarSuitability_{c,s}$ is the county-level average measure of sugar suitability; $Z_{c,s}$ includes other county-level geographical controls (i.e., cotton, tobacco, and rice suitability, the log of population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density); and $X_{i,c,s}$ includes individual controls (i.e., age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area). The error $\epsilon_{i,c,s}$ will be clustered at a county level (i.e., the unit at which the treatment varies).

Figure 3 plots the coefficient of sugar suitability obtained by estimating Equation 1 with OLS using individual data on household heads for each Census year in our sample (i.e., from 1880 to 1940 with the exclusion of 1890 and 1920). The dependent variable is a binary which takes value 1 if the household head is a female without a coliving spouse, and 0 otherwise. Thus, only the variation between heads of household – female vs males

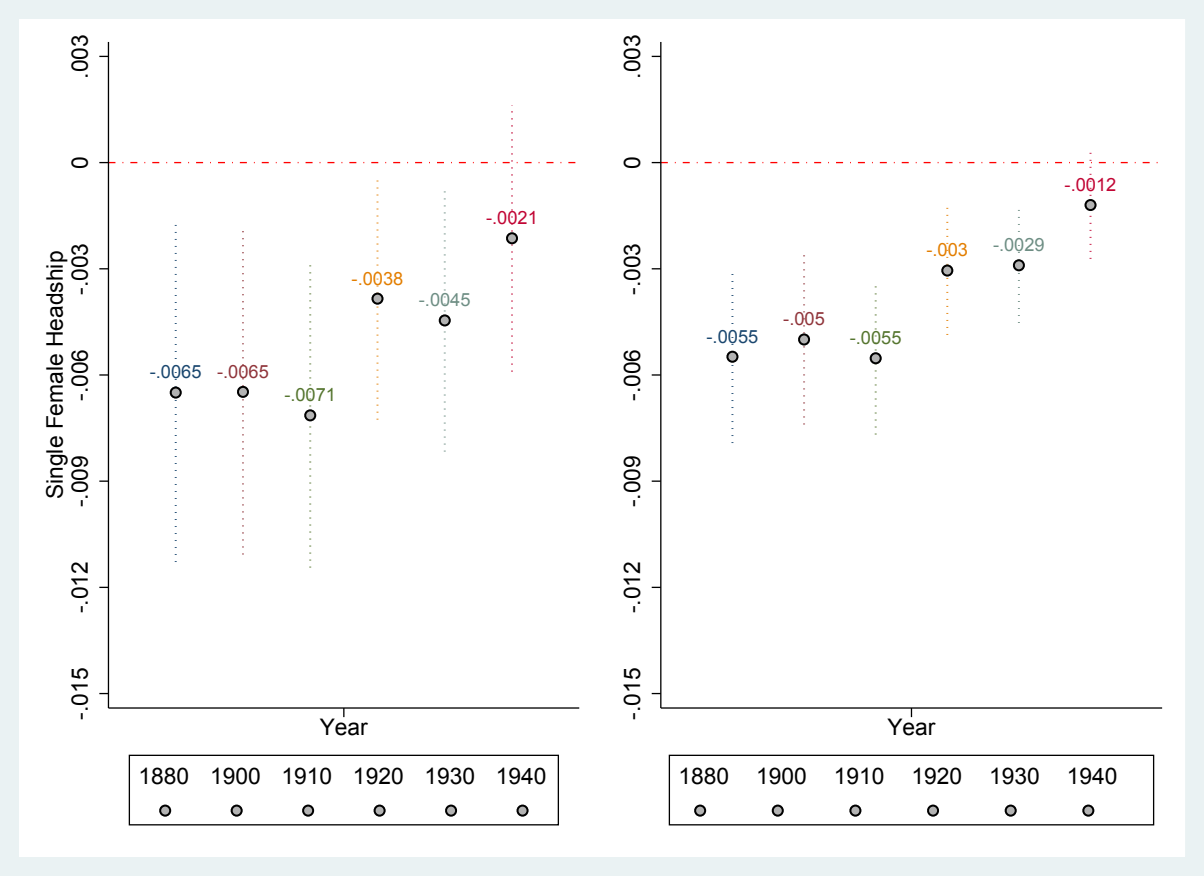

Figure 3: Single Female Headship and Sugar Suitability, 1880-1940 - OLS

Note: The dependent variable is single female headship. The dots represent the coefficients of sugar suitability obtained from OLS estimates for each Census year. The values of each coefficient is also reported. On the LHS, controls include only the log of the share of slaves in the population in 1860 and state fixed effects. On the RHS controls also include geographical controls (cotton, rice, and tobacco suitability, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density) and individual controls (age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area). Robust standard errors are clustered at a county level. Dotted vertical lines represent 90 percent confidence intervals.

and single females vs married females – is exploited. The LHS shows estimates controlling only for the log of the share of slaves in the population in 1860 and state fixed effects. Cotton, tobacco, and rice suitability, as well as the other geographical and individual controls, are added on the RHS. The corresponding estimates are reported in Table A5.[16]

Although the geographical and individual controls help increasing the R-squared significantly (as shown in Table A5), the estimated effects of sugar suitability do not vary much across the two specifications and retain very similar levels of statistical significance. From 1880 through 1930, sugar suitability exerts a negative influence of the dependent variable, thus increasing the probability of the occurrence of single female headship. The absolute size of the coefficients tends to decline after 1920, in connection with the first wave of the Great Migration, which hit the sugar-suitable counties/states harder than the rest of the U.S. By 1940 the effect of sugar suitability is no longer significant.[17]

In terms of magnitudes, with reference to the fully controlled specification, in 1880 a one standard deviation increase in sugar suitability increases the probability raises the probability of single female headship by 0.55 percentage points, or by 19 percent relative to the mean of the dependent variable (0.029 in the estimated sample in non sugar suitable counties, i.e., in counties where mean sugar suitability is in class 8), with a gradual decline in subsequent years, down to a 5 percent increase in 1930.[18] The suitability measure for cotton is associated with much smaller and statistically insignificant coefficients, while rice tends to exert an opposite effect if compared to sugar, albeit the coefficients are smaller in size and insignificant in 1910 and 1920. As for tobacco, the effect is largely insignificant except for 1900. Overall, the proxies for the cultivation of the other crops that were typical of the southern slave economy do not exert a robust effect on the probability of a single female headship. The same applies to the measure of slavery.[19] It is also instructive to report how the dependent variable is affected by other covariates. For instance, its likelihood increases with the size of a county's population and an individual's location in a metropolitan area, while it decreases with her occupational earnings score,

[16]Using the alternative dependent variable based on household type, which is only available in 1900, 1910, 1930, and 1940, yields nearly identical results, which we do not report for brevity.

[17]To account for the possibility that standard errors in the same state may be correlated, in Table A6 we report a version of Table A5 with clustering at the state level. Since the number of states is smaller than 50, we also report in square brackets the p-values obtained from a wild bootstrap. Moreover, to adjust for spatial autocorrelation, the same table also reports in curly brackets Conley (1999) spatial HAC standard errors for a windows of 100 km. Overall, the results are confirmed.

[18]Using the 1880-1910 linked sample jointly provided by NAPP and IPUMS, we can gauge the influence of migration on our estimates. Restricting the sample to blacks, and controlling only for slavery and state fixed effects given the small number of observations (fewer than 900), we find for sugar suitability a coefficient of 0.89. If we control for migration, the effect increases to 0.98, showing that the omission of migration causes a downward bias.

[19]The effects of slavery would be nearly the same in analogous models dropping crop suitability measures.

and increases at a decreasing pace with age.

Even though our preferred measure of suitability refers to the low input definition, as provided by FAO-GAEZ, it can be argued that the historical conditions reflecting the relatively advanced level of technological innovation in agriculture, even during the antebellum period (Follett, 1997), are better captured by an alternative definition based on intermediate inputs. In Table A7 in the Appendix, we replicate the regressions in Figure 2 and Table A5 under such alternative definition, with very similar results for sugar suitability, as well as for cotton, tobacco, and the slave share, while we detect coefficient instability for rice.

The influence of sugar planting, as captured by the suitability proxy, can be confounded by variation in the size of slaveholdings. The latter tend to be larger both for sugar and cotton plantations, if compared to tobacco and rice. Therefore, the fact that the impact of sugar might reflect scale economies in production is a legitimate concern. To verify that this is not the case, in Table A8 we add a set of controls for the shares of farms belonging to seven dimensional classes in the county of an individual's residence.[20] Thus, we use information on farm dimension as a proxy for slaveholdings. The coefficients of the farm size shares tend to be negative, consistent with a higher probability of the occurrence of single female headship in association with larger farms. However, the coefficients lack statistical significance in most years, while the impact of sugar suitability on the dependent variable is unaffected by their inclusion.[21]

Family formation after the abolition of slavery was also affected by the diffusion of sharecropping, because share contracts often involved entire families of freed people and having a family was in some cases required for tenants. Since the terms of share contracts varied enormously and information regarding sharecropping is collected inconsistently across Census years, it is not possible to gauge the potential influence of this factor. However, in the sugar parishes – unlike for instance in the cotton ones – the diffusion of sharecropping with emancipation was hindered by the difficulty of dividing the product between planters-millowners and cane cultivators, making this factor likely uninfluential (Sitterson, 1953).

[20] Classes are defined for farms of 3-9, 10-19, 20-49, 50-99, 100-499, 500-999, and over 1000 acres. We omit the largest class.

[21] Our results contrast somewhat with those reported by Miller (2018). However, not only those results are limited to the Cherokee Nation and the year 1880, over a sample of only 683 freed individuals, but they also apply to a state, Oklahoma, where sugar planting was absent, so that any variation in slaveholdings is to be attributed to differences between other crops.

4.3 A pseudo-panel approach

Despite the fact that the Census data we employed so far are stacked cross-sections, following Deaton (1985) it is possible to use them in order to construct a pseudo-panel, where household heads sharing the same year of birth are grouped into cohorts. The year of birth is computed by subtracting an individual's age from the year of the Census. The resulting cohorts can be tracked over time along the 60 years under consideration.[22] The advantage of a pseudo-panel approach rests on the possibility to control for year and cohort fixed effects that may be correlated with sugar production. Therefore, we can estimate the following type of model:

$$Y_{i,k,c,s,y} = \kappa_k + \iota_y + \sigma_s + \beta_1 SugarSuitability_{c,s,y} \cdot Year + \beta_2 Z_{c,s,y} + \beta_3 X_{i,k,c,s,y} + \epsilon_{i,k,c,s,y} \quad (2)$$

where $Y_{i,k,c,s,y}$ is the outcome variable for individual i in cohort k, county c, state s, and year y; κ_k, ι_y, and σ_s represent cohort, year, and state fixed effects, respectively; $SugarSuitability_{c,s,y}$ is the county-level average measure of sugar suitability, which is entered in interaction with a set of year dummies. As in Equation 1, $Z_{c,s,y}$ includes other county-level geographical controls and $X_{i,k,c,s,y}$ includes individual controls. To be noticed is that sugar suitability and the other geographical controls are time invariant, but since we kept track of the varying county boundaries over time, they are also indexed by year. The error $\epsilon_{i,k,c,s,y}$ will be clustered at a county level.

Figure 4 plots the coefficients of the interactions defined in Equation 2, one for each Census year. The dependent variable is single female headship. The figure presents four alternative samples, that we stagger in order to ease the reading of the 90 percent confidence intervals we report with vertical lines. The medium-dashed line represents the sample of all household heads, that displays significant coefficients over the entire period under consideration. The short-dashed line represents a sub-sample excluding widowed and divorced household heads, that we analyze in order to better capture cultural and behavioral attitudes that more closely fit the single female model. The hypothesis is that the status of widowed and divorced is determined by events occurring after and independently of the formation of a given family structure. The size of the coefficients is reduced (in absolute value) but their significance is preserved, with the only exception of the year 1910. Next, we split the sample excluding widowed and divorced between blacks and whites. The long-dashed line represents blacks, for whom the estimated coefficient is always the largest (in absolute value), with the only exception of 1900. The fact that the variation in the outcome of interest is driven by race is confirmed by the dotted

[22] Summary statistics for the pseudo-panel are provided in Table A9.

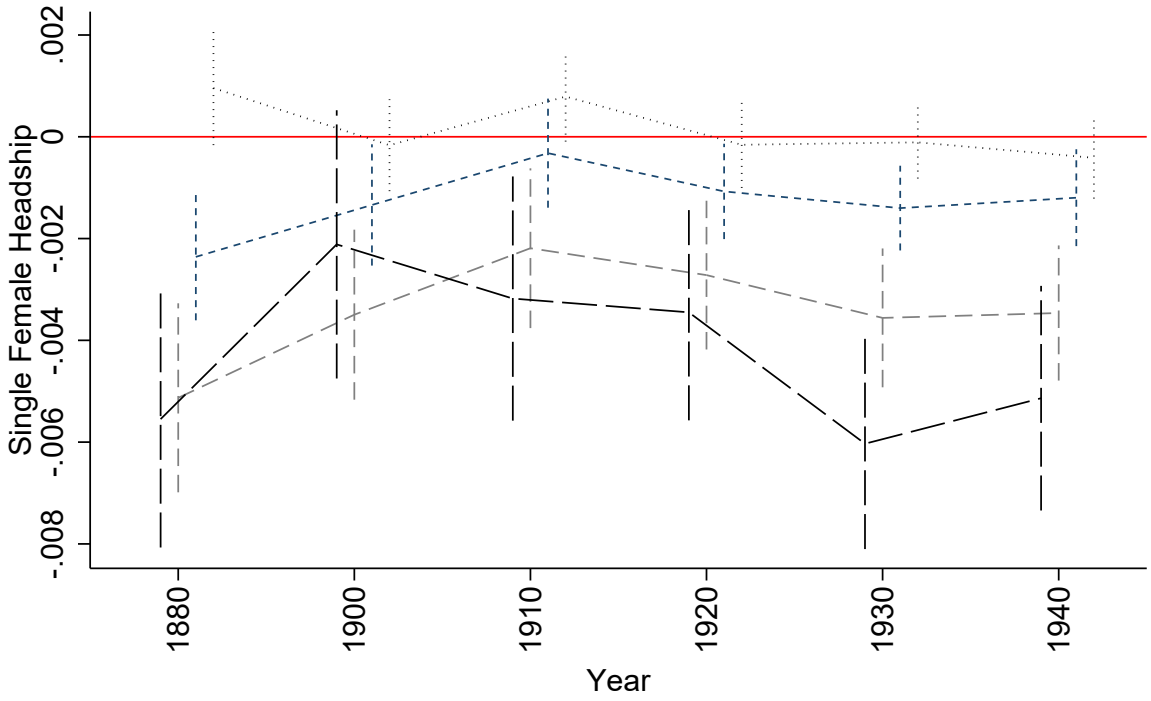

Figure 4: Single Female Headship and Sugar Suitability, 1880-1940 - Pseudo-Panel

Note: The dependent variable is single female headship. The plots represent the coefficients of sugar suitability obtained from pseudo-panel estimates. The medium-dashed line represents the sample of all household heads. The short-dashed line represents a sub-sample excluding widowed and divorced household heads. The long-dashed line and the dotted line represent sub-samples of black and white household heads,respectively, again excluding widowed and divorced. Geographical controls (cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density), individual controls (race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area), and cohort, year, and state fixed effects are included. Standard errors are clustered robust at a county level. Vertical lines represent 90 percent confidence intervals.

line for whites, that displays insignificant coefficients with values close to zero. The corresponding estimates, for each sample, are also provided in Table A10, Models 2.[23] Since not all cohorts are represented throughout the six Censuses, in Model 3 we present, for each sample, estimates limited to those cohorts that remain for at least three Censuses, with similar results. The corresponding plots are in Figure A2.

Overall, the results confirm a substantial and significant effect of sugar on the probability that a household is headed by a single female. The effect is driven by blacks and tends to decline with the relocation determined by the Great Migration.

4.4 A matching OLS estimator

One drawback of the pseudo-panel approach is that it cannot fully capture heterogeneities across individuals. Indeed, a potential issue both with the stacked cross sections in Equation 1 and the pseudo-panel in Equation 2 is that individuals in treated and untreated counties may have different characteristics that are in some way correlated with the treatment and thus may confound its effect. If this were the case, then simple OLS estimates of the model – where outcomes are allowed to vary at the individual level – would be biased. For this reason, we complement the approach illustrated in Equation 1 with a matching estimator for which we exactly match individuals based on their characteristics.[24] We form groups by matching individuals having exactly the same age, number of children, number of children below age five, and number of families within the household, and sharing the same characteristics in terms of labor force participation, socioeconomic status as measured by the Duncan index, occupational earnings score, and residence in metropolitan area.[25] For each group, some individuals – the treated ones – will be located in an county which is relatively suitable to sugar (i.e., in a county in the shaded area in Figure 1) while the other – untreated – individuals will be in a county which is not suitable to sugar. We disregard individuals who belong to groups including individuals who are all treated/untreated, because they do not satisfy the overlapping condition (i.e., they are not on the common support). We then estimate the following variant of Equation 1:

$$Y_{i,g,c,s} = \gamma_g + \sigma_s + \beta_1 SugarSuitability_{c,s} + \beta_2 Z_{c,s} + \epsilon_{i,g,c,s} \tag{3}$$

where $Y_{i,g,c,s}$ is the outcome variable for individual i in group g, county c, and state s; γ_g

[23] Models 1 in Table A10 report the average effect over the entire period 1880-1940.

[24] To combine matching with a pseudo-panel approach is prevented by the fact that the cohorts in the latter can only include time-invariant characteristics.

[25] To avoid incurring in the dimensionality curse, for the estimates with matching the Duncan index and the occupational earnings score are grouped in categories of 10 (therefore, we reduce the variables to 10 categories instead of 100).

denotes matched group fixed effects that we insert in order to exploit the variation within each group, as defined on the basis of the above described individual characteristics; and σ_s represents state fixed effects. Our focal regressor, as well as the geographical controls, are analogously defined as in Equation 1. Even though, if compared to the pseudo-panel in Equation 2, we now lose the possibility to capture yearly shocks, the resulting estimator should deal with potential problems that may arise when exploiting the variation among individuals with different characteristics which may be correlated with the treatment and thus capable of confounding its effect.

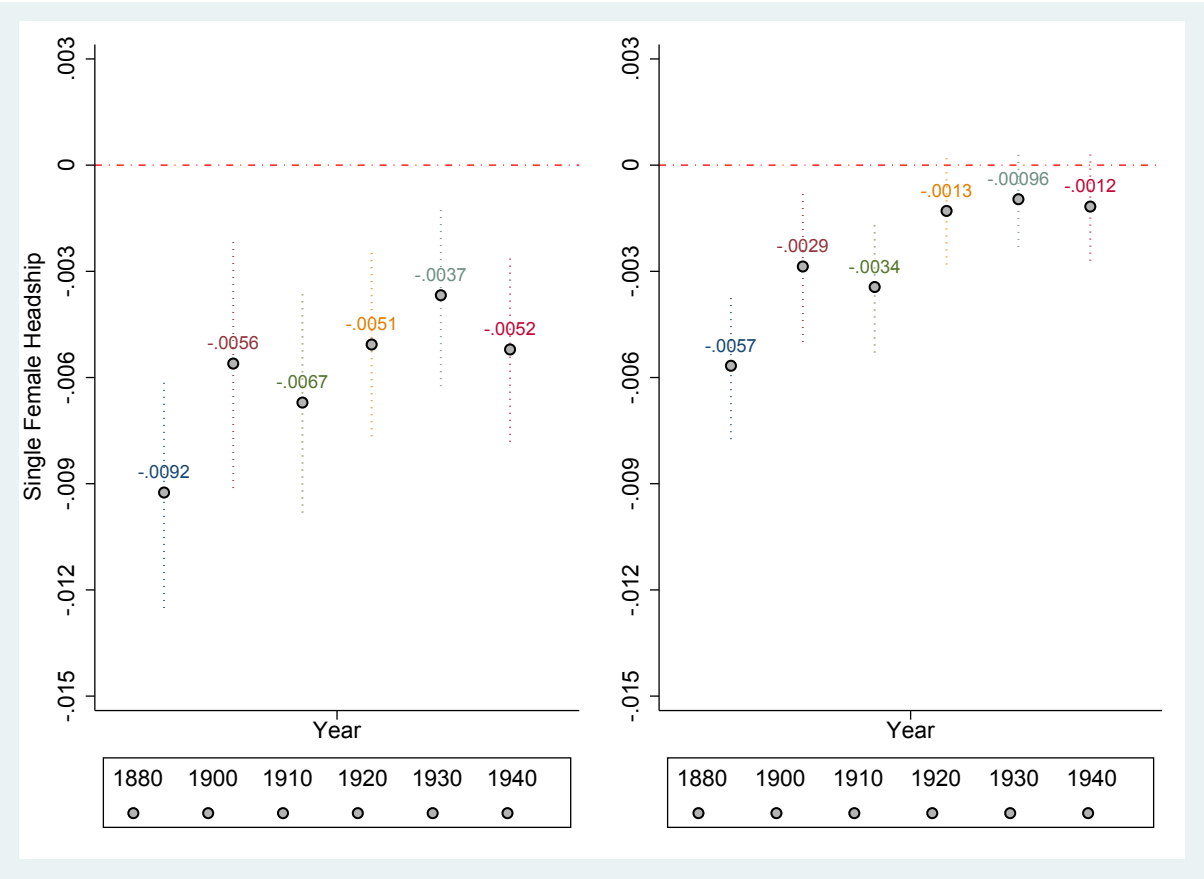

Figure 5: Single Female Headship and Sugar Suitability, 1880-1940 - Matching

Note: The dependent variable is single female headship. The dots represent the coefficients of sugar suitability obtained from OLS estimates with matching for each Census year. The values of each coefficient is also reported. The LHS includes all household heads. The RHS excludes widowed and divorced. Geographical controls (cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density), individual controls (age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area), and matched group and state fixed effects are included. Robust standard errors are clustered at a county level. Dotted vertical lines represent 90 percent confidence intervals.

Similarly to Figure 3 for OLS, Figure 5 plots the coefficient of sugar suitability obtained by estimating Equation 3 using our exact matching strategy, in fully controlled specifications. The LHS shows estimates that exploit the variation across all household

heads within the same matched group. If compared to Figure 3, now the effect of sugar suitability persists until 1940. The RHS is restricted to non widowed and divorced. The resulting estimates produce smaller coefficients, that lose significance starting from 1920.[26] The magnitudes of the effects, if compared to OLS, are larger. For the full sample, in 1880 the percentage change in the dependent variable relative to the sample mean, for a one standard deviation of sugar suitability, is now 43 percent, against only 19 in the OLS. This confirms that the OLS estimates are downward biased because of confounding differences in individual characteristics. When we omit widowed and divorced, the percentage change is up to 75, which suggests that indeed when we include them we capture the influence of extraneous events that do shape family structure but dilute the effect of slave life in sugar plantations. For blacks, again in 1880 and omitting widowed and divorced, we observe a 25 percent increase, which is naturally lower due to the higher sample mean. In other words, the difference in magnitude between the full and black sample can be explained by the fact that, among whites, single female headship is relatively rare, with an impact on the mean. However, under the matching strategy we compare individuals with similar characteristics, so that the coefficient for the full and black sample remain very similar, which implies that in both samples the estimated effect largely captures the variance among blacks.

In Figure 6, we restrict the sample to blacks and whites, again excluding widowed and divorced. As for the pseudo-panel, again we find for blacks much larger coefficients, that triple on average across the years, despite some decrease in significance due to the loss of efficiency of the estimator, to be expected given the sharp reduction of degrees of freedom. The corresponding estimates are reported in Table A12 while, for the sake of comparison, Table A13, Panels A-C, presents variants of OLS estimates excluding widowed and divorced, altogether and by race. From an identification point of view, the coefficients are relatively stable, across the two alternative estimation strategies. Still, as expected, the differences we detect suggest the presence of a bias due to omitted individual characteristics which are correlated with sugar suitability. Therefore, in the following we shall rely on the matching strategy.

The position of children living with single mothers has been central in the discussion on the causes and consequences of the black family (Ruggles, 1994). To address this issue, we can restrict the sample to households that do indeed include children. However, the cultural and behavioral attitudes that lead to have children may imply selection into a given family model, with the result of biasing the corresponding estimates. Table A14 presents estimates for the sample of households with children, altogether and by race. With the above warning in mind, we find that previous results substantially old also for

[26]The corresponding estimates are reported in Table A11.

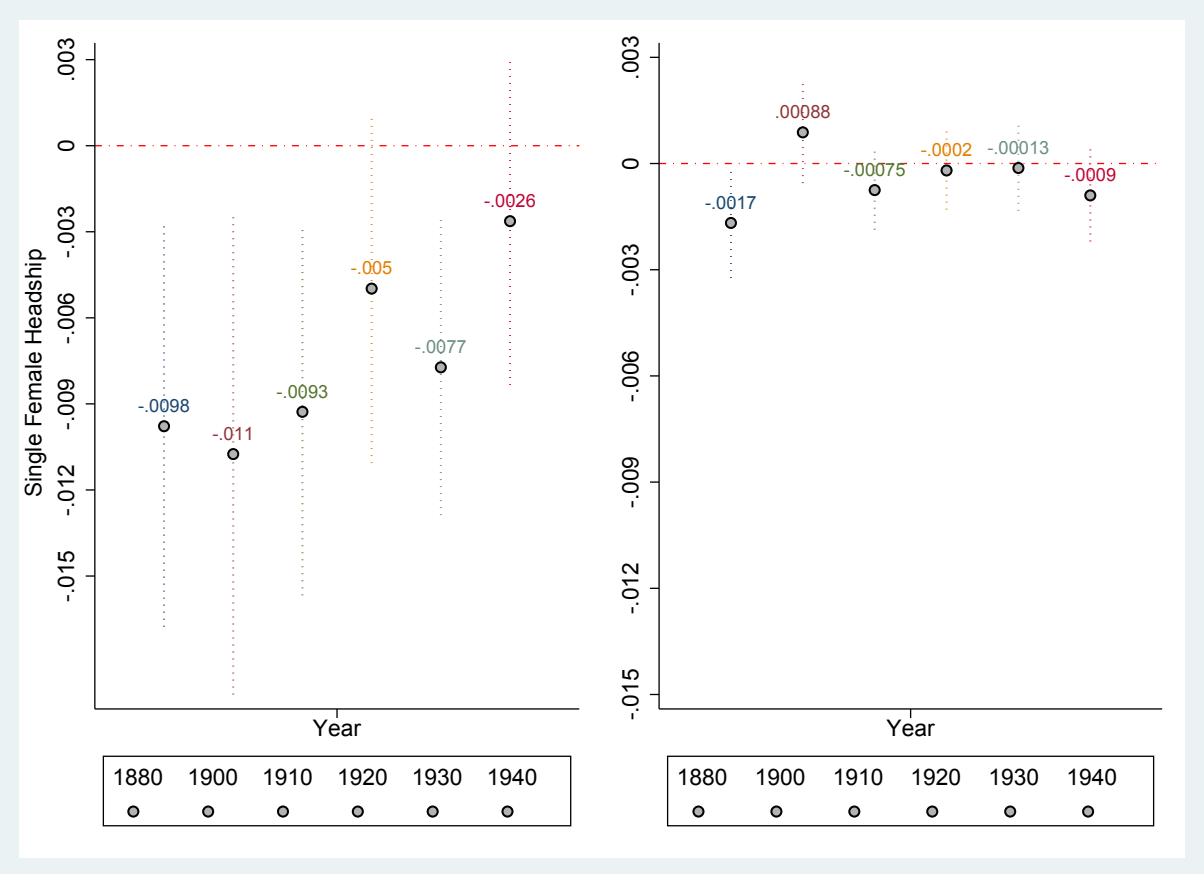

Figure 6: Single Female Headship and Sugar Suitability, 1880-1940 - Matching - By Race

Note: The dependent variable is single female headship. The dots represent the coefficients of sugar suitability obtained from OLS estimates with matching for each Census year. The values of each coefficient is also reported. The LHS includes black, non widowed/divorced household heads. The RHS includes white, non widowed/divorced household heads. Geographical controls (cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density), individual controls (age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area), and matched group and state fixed effects are included. Robust standard errors are clustered at a county level. Dotted vertical lines represent 90 percent confidence intervals.

these samples. Table A13 in Panels D-E replicates the same for OLS.[27]

5 Robustness

5.1 A fuzzy regression discontinuity design with matching

As a robustness check, we take advantage of the highly concentrated spatial distribution of sugar suitability and exploit a county's distance from the border of the sugar suitable area in a quasi-experimental RDD. Figure 7 highlights the border of the sugar suitable area on the map of the U.S. counties. We generate a dummy variable that takes value 1 if a county is in an area which is suitable to sugar, and 0 if a county is not suitable to sugar (or crossed by the sugar suitability border). Thus, the running variable that determines the treatment will be a measure of the distance of the county from the border in Figure 7.

Because the running variable is measured at a county level, again it is possible that the individual characteristics of the people living on either side of the border turn out to be severely unbalanced.[28] Thus, to adjust for potential covariate unbalance, we complement the RDD with the matching strategy described in the previous section and compute the optimal bandwidth using only individuals on the common support.

Using a sharp RDD requires the hypothesis of perfect compliance, which in our case is unlikely to be satisfied. Indeed, since the distance from the border of the sugar suitable area only denotes potential production, it may not be indicative of whether the county has actually produced sugar during slavery, that is, of whether a county has truly been treated. Therefore, we turn to a fuzzy RDD that combines county data on distance from the border of the suitable sugar area with Census data on actual sugar average production in 1850-1860. However, a warning is in order, since estimates may be affected by potential variation in the production of sugar during slavery. For example, it is possible that, before the Civil War, sugar production experienced a reduction, with relatively small sugar plantations being pushed out of the market (Carrington, 2002). If this were the case, sugar production as of 1850-1860 may underestimate production during the previous decades, also due to a variation in the distribution of sugar plantations.

With the above warning in mind, we estimate variants of the fuzzy RDD with matching

[27]Regressions restricted to samples excluding both widowed and divorced, as well as childless household heads, produce broadly consistent results despite a severe loss in efficiency, so that we do not report them for brevity.

[28]Table A15 shows the extent to which unbalancedness occurs, for instance in the share of blacks, which is higher in sugar suitable regions, so that the treated sample will be influenced by the prevalence of charactieristics that are more common among blacks.

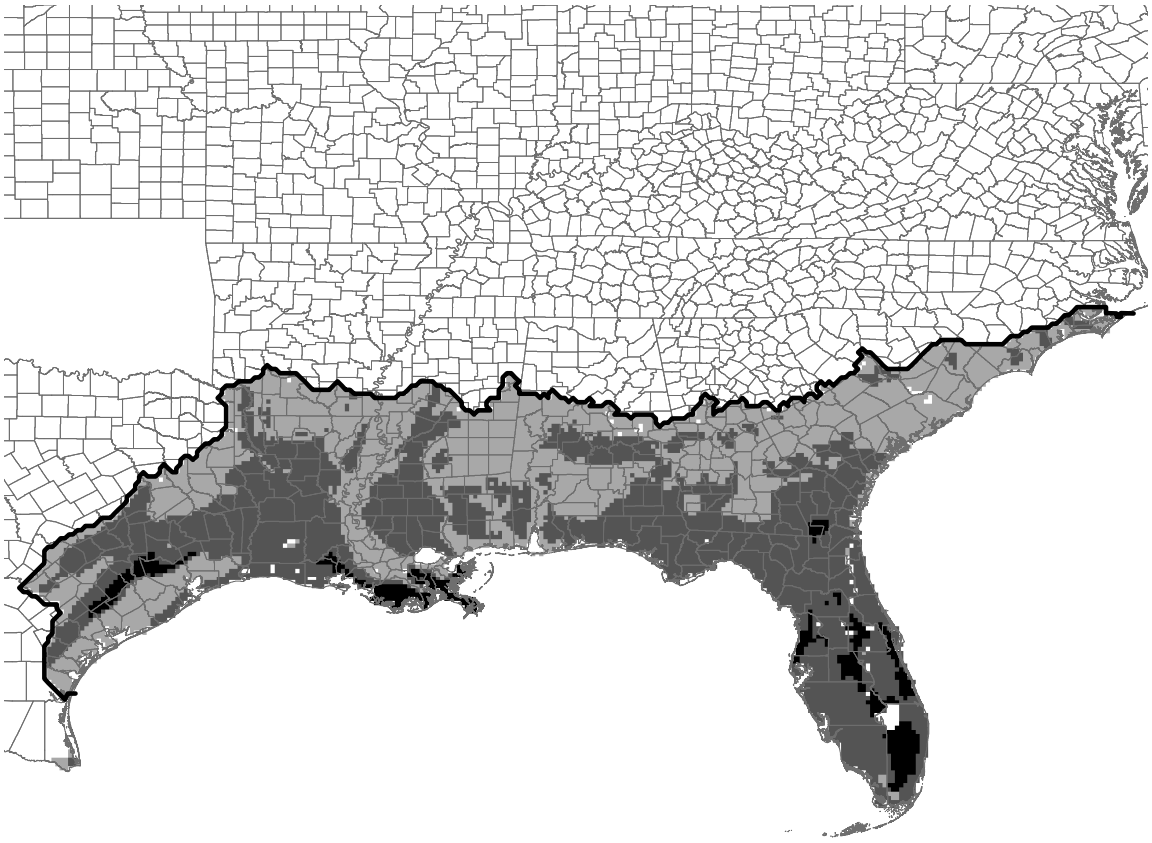

Figure 7: Border of the Sugar Suitable Area

Note: The black line represents the border of the sugar suitable area. The area comprises regions with sugar suitability between very high (class 1) and very marginal (class 7), i.e., with a strictly positive suitability index. Higher sugar suitability regions are represented in a darker shade. Counties are represented at 1880 boundaries.

given below:

$$Y_{i,g,c,s} = \gamma_g + \sigma_s + \beta_1 log(SugarProduction_{c,s}) + \beta_2 Distance_{c,s} + \\ + \beta_3 Distance_{c,s} \cdot (Distance_{c,s} > 0) + \epsilon_{i,g,c,s} \quad (4)$$

$$log(SugarProduction_{c,s}) = \lambda_g + \theta_s + \delta_1 (Distance_{c,s} > 0) + \delta_2 Distance_{c,s} + \\ + \delta_3 Distance_{c,s} \cdot (Distance_{c,s} > 0) + \mu_{i,g,c,s} \quad (5)$$

where, for individual i in group g, county c, and state s, in the second stage (Equation 4) $Y_{i,g,c,s}$ is the main outcome of interest, i.e., the probability of single female headship; γ_g are matched group fixed effects forcing the estimator to exploit the variance among individuals with balanced covariates; σ_s denotes state fixed effects; $SugarProduction_{c,s}$ is actual average sugar production in 1850-1860, entered as $log(1 + SugarProduction)$; $Distance_{c,s}$ is the distance from the sugar suitability border; $(Distance_{c,s} > 0)$ indicates whether the cutoff has been crossed and is inserted in Equation 4 in interaction with $Distance_{c,s}$, in order to capture differential trends at the two sides of the cutoff. Analogously, in the first stage (Equation 5), λ_g and θ_s denote matched group and state fixed effects, respectively, while $(Distance_{c,s} > 0)$ is the treatment. In other words, in Equation 5 the probability of being treated (i.e., of producing sugar) is shown to depend on whether the cutoff has been crossed, while in Equation 3 the treatment (i.e., effective historical sugar production) determines the probability of female headship.

Table 2 reports the results using the fuzzy RDD strategy with matching, including the first stages, both for the full sample and for the sample excluding widowed and divorced.[29] In the first stage regressions the potential treatment has a strong and positive effect on the probability to be treated, providing a large value for the partial F-statistics of excluded instruments. In the full sample, with the only exception of the initial year, 1880, we find a significant effect of the treatment. In the restricted sample, the effect of the treatment loses significance from 1920 on. Thus, reassuringly, this alternative strategy corroborates previous results.[30]

Since a RDD strategy is doomed to deliver only local results, in Table A16 we run

[29]The bandwidth is measured in degrees with, say, 0.001 corresponding to one degree, i.e., approximately 111 kilometers.

[30]Since matched group fixed effects absorb a large part of the variation in distance, in samples confined to blacks or whites the partial F-statistics would become extremely small in several years, inducing a weak identification problem and unreliable estimates.

Table 2: Single Female Headship, 1880-1940 - RDD

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
			Panel A: All			
			Second Stage			
Log Sugar Production	0.0188	0.0651***	0.0497***	0.0257**	0.0312**	0.0372***
	(0.0116)	(0.0243)	(0.0151)	(0.0105)	(0.0153)	(0.0117)
R-squared	-0.176	-0.449	-0.288	-0.168	-0.234	-0.310
Observations	13456	22924	24547	27641	26974	30715
Left Bandwidth	0.0028	0.0028	0.0026	0.0025	0.0020	0.0020
Right Bandwidth	0.0012	0.0019	0.0012	0.0013	0.0012	0.0015
			First Stage			
Treated Counties	0.8789***	0.3971***	0.6231***	0.737***	0.529***	0.6195***
	(0.1102)	(0.0807)	(0.0801)	(0.0753)	(0.0737)	(0.0697)
F Stat. Excluded Instr.	63.64	24.20	60.49	95.91	51.43	78.98
Kleibergen-Paap F Stat.	63.64	24.20	60.49	95.91	51.43	78.98
Cragg-Donald F Stat.	98.833	40.95	102.64	162.17	83.29	126.46
Stock-Yogo Crit. Val.	16.38	16.38	16.38	16.38	16.38	16.38
			Panel B: Without Widowed and Divorced			
			Second Stage			
Log Sugar Production	0.0241***	0.0333***	0.0271***	-0.0005	0.0081	0.0005
	(0.0088)	(0.0117)	(0.0075)	(0.0074)	(0.0132)	(0.0099)
R-squared	-0.261	-0.341	-0.254	-0.131	-0.111	-0.171
Observations	20086	25094	39127	22949	61786	25644
Left Bandwidth	0.0053	0.0042	0.0056	0.0022	0.0062	0.0023
Right Bandwidth	0.0011	0.0014	0.0013	0.0014	0.0008	0.0006
			First Stage			
Treated Counties	0.7746***	0.5194***	0.6730***	0.5860***	0.3475***	0.6539***
	(0.1102)	(0.0833)	(0.0793)	(0.0794)	(0.0783)	(0.1021)
F Stat. Excluded Instr.	49.43	38.92	72.01	54.49	19.68	41.03
Kleibergen-Paap F Stat.	49.43	38.92	72.01	54.49	19.68	41.03
Cragg-Donald F Stat.	104.05	75.13	174.01	86.75	66.55	83.04
Stock-Yogo Crit. Val.	16.38	16.38	16.38	16.38	16.38	16.38
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Matched Group FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Border distance and its interaction with the treatment are also included among regressors. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

(fully-controlled) 2SLS regressions with matching, where sugar suitability is used as an instrument for Sugar Production in 1850-1860.[31] Once again, the main results are confirmed both for the full and the restricted sample excluding widowed and divorced.

5.2 A falsification test

Unlike cotton and tobacco, that are associated with highly dispersed suitability maps, rice shares with sugar a relatively well defined border. If we draw the border of the rice suitability area by comprising regions with rice suitability between very high (class 1) and marginal (class 6), we obtain a compact area that, if compared to sugar, stretches further North, while at the same time loses some regions at the far West.[32] To be noticed is that the border definition in this case excludes the regions with very marginal rice suitability (class 7) that are represented in a lighter shade outside the border depicted in Figure 8. By contract, in the case of sugar, excluding the regions with very marginal suitability would not affect the border substantially, since they reduce to a few spots within the border depicted in Figure 7.[33] Irrespectively of this definitional issue, the purpose of this sub-section is to identify an alternative, well-defined border, other than that of the sugar suitable area, in order to perform a falsification test.

Table 3 shows that, if we replicate the fuzzy RDD with matching using the rice suitability border, indeed the treatment no longer exerts any effect on the probability of female headship, with coefficients of a small and sometimes even negative signs. This points to a unique role for sugar suitability and slave life in the sugar plantations in shaping American family structure.

6 Persistence

6.1 Intergenerational and geographical transmission

In order to assess the persistence of the legacy of sugar planting, through generations and across states, we construct a dataset of black household heads whom we link between the 1880 and the 1930 Census.[34] The period under investigation therefore goes from the

[31] Given the relative inefficiency of IV estimates, we apply again the robust option for the computation of the standard errors.

[32] The similarity between the shape of the sugar and the rice suitable area justifies the similar evolution of the black population share illustrated in Figure 2.

[33] If we redraw the border of the sugar suitability area to exclude very marginally suitable regions, the results remain similar to those in Table 2, unsurprisingly given that they are negligible in size and that the alternative border would only affect the first stage.

[34] Using standard Census linking techniques, between 1880 and 1930 we can only track about 20 black individuals, of whom very few moved across state.

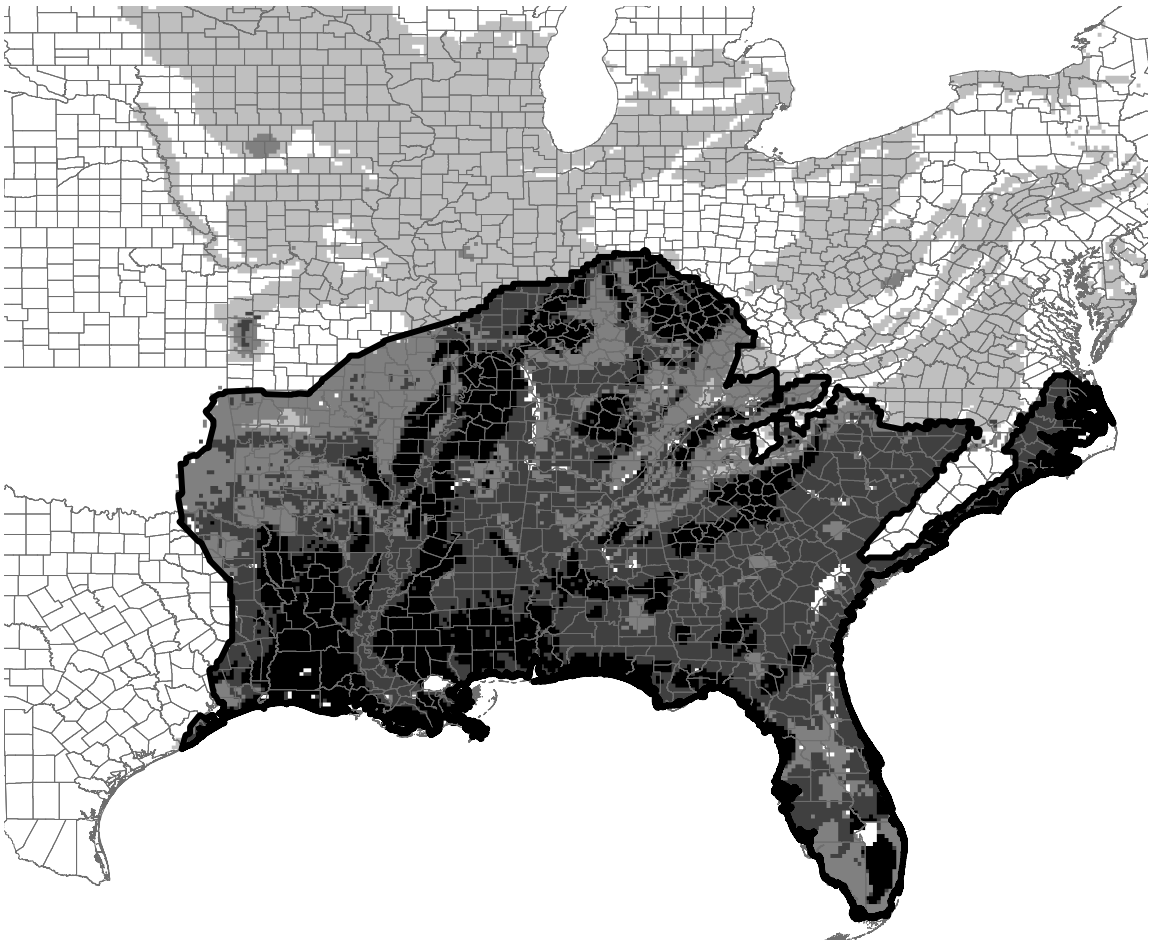

Figure 8: Border of the Rice Suitable Area

Note: The black line represents the border of the rice suitable area. The area comprises regions with rice suitability between very high (class 1) and marginal (class 6), i.e., with a suitability index larger than 10. Higher rice suitability regions are represented in a darker shade. Regions with very marginal suitability (class 8, i.e., with a suitability index between 0 and 10) are excluded from the rice suitable area and are represented in a lighter shade outside it. Counties are represented at 1880 boundaries.

Table 3: Single Female Headship, 1880-1940 - Rice

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
			Panel A: All			
			Second Stage			
Log Rice Production	0.0335	-0.0523	0.0011	0.0174	-0.0044	-0.0006
	(0.0566)	(0.0351)	(0.0056)	(0.0265)	(0.0046)	(0.0049)
R-squared	-0.662	-1.092	-0.131	-0.237	-0.140	-0.146
Observations	12155	19242	24066	37100	43801	43110
Left Bandwidth	0.9419	0.9827	1.5206	1.8327	2.514	1.7858
Right Bandwidth	1.7031	1.7034	1.0843	2.2584	0.9687	1.9784
			First Stage			
Treated Counties	-0.1431	0.2661**	1.2396***	0.1851*	1.310***	0.8472***
	(0.1442)	(0.1217)	(0.1277)	(0.0965)	(0.1254)	(0.0921)
F Stat. Excluded Instr.	0.98	4.78	94.19	3.68	109.01	84.69
Kleibergen-Paap F Stat.	0.98	4.78	94.19	3.68	109.01	84.69
Cragg-Donald F Stat.	1.08	5.20	126.63	4.65	227.45	117.63
Stock-Yogo Crit. Val.	16.38	16.38	16.38	16.38	16.38	16.38
			Panel B: Without Widowed and Divorced			
			Second Stage			
Log Rice Production	0.0184	-0.0199	0.0026	0.0072*	-0.0006	0.0019
	(0.0345)	(0.0166)	(0.0047)	(0.0039)	(0.0024)	(0.0040)
R-squared	-0.565	-0.569	-0.129	-0.212	-0.112	-0.166
Observations	13885	22144	25972	27500	55900	35417
Left Bandwidth	1.4550	1.7484	1.8286	1.4229	3.3627	1.3086
Right Bandwidth	1.9337	1.9832	1.5696	1.6085	1.9533	1.868
			First Stage			
Treated Counties	-0.1330	0.2527**	0.7362***	0.7529***	1.0499***	0.7177***
	(0.1382)	(0.1169)	(0.1180)	(0.1132)	(0.0979)	(0.0986)
F Stat. Excluded Instr.	0.93	4.67	38.94	44.27	115.04	52.98
Kleibergen-Paap F Stat.	0.93	4.67	38.94	44.27	115.04	52.98
Cragg-Donald F Stat.	1.07	5.53	52.57	56.34	229.56	69.72
Stock-Yogo Crit. Val.	16.38	16.38	16.38	16.38	16.38	16.38
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Matched Group FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Border distance and its interaction with the treatment are also included among regressors. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

aftermath of the abolition of slavery and the completion of the first wave of the Great Migration. Our linked sample is created by matching individuals on the basis of surnames (only available until 1930).[35] We also keep track of a sub-sample of migrants, that is, of individuals that by 1930 were relocated out of state, even though they may not have moved in their own lifetimes.[36] Our scope is two-fold. First, our linked dataset allows us to look at intergenerational persistence for households whose ancestors experienced slavery in sugar plantations. Second, we can exploit the information about the original location of a household to track migration patterns and the consequent geographic spread of the black family model.

Our matched and linked sample is constructed as follows. We start from the 10 percent sample of the 1880 Census and we select black household heads (aged 15-89) with unique surnames.[37] Using surnames, we then match them with black household heads in the 5 percent sample of the 1930 Census.[38] This allows us to trace the origin of each individual in the dataset to the state where his/her family presumably came from.[39] We obtain a sample of 4,740 black household heads in 1930, with a match rate of about 20 percent.[40] Over 17 percent are single female heads. By 1930, over 85 percent of the individuals in the sample had relocated out of the state they ancestors lived in 1880.

Table A17 contains summary statistics. If compared with the 1 percent cross-sectional sample of the 1930 Census for blacks, they are very similar in most dimensions (such as age, urbanization, number of children, and labor force participation), which assures us that selection into the linked sample is not biased. The lower Duncan socioeconomic index in the linked sample can be justified by the high probability of migration. In Table A17 we also present separate statistics for migrants within the linked sample, to assure that they are comparable, as indeed they are.

Table 4 presents regression results for the linked sample of black household heads

[35]For our analysis, individual characteristics beside surnames are not essential to the matching, since we aim at capturing a link between any household member residing in 1880 in a sugar suitable county and any household member descending from him/her, as of 1930.

[36]See Fernandez and Fogli (2009) and Giuliano (2007) for analyses of the behavior of migrants, in terms of fertility and female labor force participation and of living arrangements, respectively.

[37]Our task is facilitated by the fact that, in the 1880 10 percent sample, minorities are oversampled, i.e., one in five observations for blacks are reported, out of those reported in the 100 percent Census.

[38]For 1930 the 10 percent sample is not provided.

[39]Using only unique surnames alleviates concerns about the possibility of false positive matching. Ager et al. (2019) also use a similarly conservative matching strategy, but they warn that unique matches are more likely for uncommon names and/or more accurately reported names, which in turn may be associated with higher economic status. However, in our setting, this concern is reduced since we focus on a sample of blacks shortly after Abolition. On the other hand, a drawback of restricting the match to unique surnames is that it may imply a loss of observations since, as reported by Baiardi (2018), it was common for freed slaves to adopt the surnames of former slaveholders.

[40]A 20 percent match rate is in line with Ager et al. (2019), who also start with nineteenth century Census data.

Table 4: Black Single Female Headship and Sugar Suitability, 1930 - Linked Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: All					
	Full Sample			Migrants Sample		
Sugar Suitability 1880	-0.0175	-0.0251*	-0.0261***	-0.0171	-0.0260*	-0.0267**
	(0.0112)	(0.0137)	(0.0094)	(0.0097)	(0.0147)	(0.0118)
R-squared	0.001	0.000	0.443	0.000	-0.001	0.438
Observations	4363	4363	3699	3716	3716	3147
Counties	199	199	194	193	193	187
	Panel B: Without Widowed and Divorced					
	Full Sample			Migrants Sample		
Sugar Suitability 1880	-0.0097	-0.0208**	-0.0159**	-0.0099	-0.0218**	-0.0175**
	(0.0066)	(0.0084)	(0.0066)	(0.0078)	(0.0099)	(0.0080)
R-squared	-0.001	-0.002	0.203	-0.002	-0.003	0.195
Observations	3569	3569	3118	3038	3038	2648
Counties	195	195	192	188	188	184
State FE	No	No	Yes	No	No	Yes
Ind. Controls	No	No	Yes	No	No	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is black single female headship. Geographical controls include cotton, rice, and tobacco suitability, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density, all at 1880 boundaries, and the the log of the population slave share in 1860. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area, both in 1880 and 1930. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

(Panel A) and for a sample excluding widowed and divorced (Panel B). For each panel, we present results both for the full sample and for the sub-sample of out-of-state migrants. In Models 1 and 4, in addition to crop suitability for sugar, cotton, tobacco, and rice in 1880 and slavery in 1860, we include the geographical controls in 1880. All controls refer to the county of origin. In Models 2 and 5 we add state-of-origin fixed effects, and in Models 3 and 6 we further add individual characteristics of the matched household heads in the sample, measured both in 1880 and 1930, in order to control for potential selection into migration. In 1930, the impact of sugar suitability on the descendants of blacks that had likely experienced slavery in sugar plantations is stronger if compared to the one we detected from the cross section of black household heads: for instance, in the fully-controlled specification excluding widowed and divorced (Panel B, Model 3), the coefficient on sugar suitability increases to 1.59 percentage points, if compared to 0.77 (reported using our preferred matching strategy in the year 1930 for blacks in Figure 6 on the RHS, or in Table A12, Panel A, Model 5). For a one standard deviation increase in sugar suitability, the implied magnitudes consist in a 32 percent increase of the likelihood of a black single female head, relative to the estimated sample mean, if compared to 15 percent. For migrants, the indirect influence of sugar planting through the environment should be filtered away, so that their outcomes can be attributed to the experience of slavery in sugar plantations only through their own cultural beliefs and norms. On the other hand, in principle they are exposed to a higher likelihood of intermarriage with migrants from non sugar-suitable areas, that can attenuate the legacy of sugar. However, Model 6 in Panel B implies an increase of 36 percent, even higher than that for the full sample, pointing to a non dissipating effect of sugar even after accounting for geographic mobility.

6.2 Contemporaneous outcomes

We now turn to evaluate the persistency of the influence of sugar planting on black family structure up to the present day using data from 1970 to 2000, provided at the county level by the Census.[41] Summary statistics in Table A18 show that the share of single female heads is 9.4 percent in 1970 and increases to 15.6 percent in 2000. Disaggregated information by race is not available in our data, even though a wealth of other sources (e.g., Vespa et al., 2013) document the prominent role of blacks in determining these patterns.

[41] As previously mentioned, after 1940 individual data from the 1 percent sample of the Census are only available for places with population above 100,000, which excludes a large portion of the population. For this reason, we use data at the county level. However, the latter provide information on single female headship, defined as the share of single female heads out of total household heads, only from 1970.

Table 5: Single Female Headship and Sugar Suitability, 1970-2000 - County Data

	(1) 1970	(2) 1980	(3) 1990	(4) 2000
Sugar Suitability	-0.0029	-0.0018	-0.0040	-0.0039
	(0.0022)	(0.0028)	(0.0035)	(0.0041)
Log Slaves/Pop.	0.0069**	0.0114***	0.0152***	0.0169***
	(0.0026)	(0.0037)	(0.0050)	(0.0056)
State FE	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes
R-squared	0.576	0.568	0.535	0.523
Observations	1989	1989	1989	1989

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population. Clustered robust standard errors at a state level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

The estimates in Table 5, after controlling for geographical characteristics and state fixed effects, reveal the absence of any significant association between sugar suitability and the dependent variable. On the other hand, the (logarithm of the) slave share in 1860 is now significantly and positively associated with it, a finding that can be explained by migration and intermarriage.[42] Indeed the relocation of the descendants of black slaves throughout the country, following the Great Migration, induced intermarriage among blacks from source counties with different exposure to sugar planting. This process ultimately weakened the relationship between sugar and the black family structure, but created a novel one between the latter and slavery.

During the past few decades, the dissolution of the black family has forcefully been attributed to the economic insecurity of black men. According to Wilson (1987), the growing diffusion of factors such as unemployment and incarceration, disproportionately so for African-American urban poor males, has disabled them from forming stable unions, making them de facto withdraw from the marriage market.[43] Can these relatively recent developments represent alternative explanations of the existing trends, other than the history of slavery and sugar planting? In order to dig deeper into what can explain contemporaneous family structure, we employ data on incarceration rates by race for 1990 and 2000, provided by the Vera Institute of Justice,[44] to test whether incarceration

[42]Berger (2018) also documents a relationship between slavery and contemporaneous family structure, as captured by the fraction of single mothers.

[43]The so-called Wilson Hypothesis has been tested, among others, by Charles and Luoh (2010), who find that higher male imprisonment has lowered the likelihood that women marry, and Caucutt et al. (2018), that model differences in incarceration dynamics between black and white men and show that they can explain the black-white marriage gap.

[44]See https://www.vera.org. Data by gender are not available, but since incarceration is dispropor-

may be a mediator of the effect of slavery and/or sugar plantation slavery. In other words, we aim at establishing whether incarceration may be the proximate factor that can explain the reduced form relationship between historical variables and family structure.

Table 6: Incarceration as Mediator of Slavery and Sugar Suitability, 1990-2000

	(1) 1990	(2) 2000
	Panel A: Slavery	
Direct Effect *(Slavery → Single Female)*	-0.042**	-0.049**
	(0.044)	(0.020)
Indirect Effect *(Slavery → Incarceration → Single Female)*	0.261***	0.271***
	(0.000)	(0.000)
Total Effect	0.219	0.222
RIT (Ratio of Indirect to Total Effect)	1.192	1.220
	Panel A: Sugar Suitability	
Direct Effect *(Sugar S.→ Single Female)*	-0.003	0.003
	(0.879)	(0.880)
Indirect Effect *(Sugar S.→ Incarceration→ Single Female)*	-0.073***	-0.053***
	(0.000)	(0.000)
Total Effect	-0.076	-0.050
RIT (Ratio of Indirect to Total Effect)	0.961	1.058

Note: Incarceration stands for the rate of incarceration for blacks, Slavery for the log of the population slave share in 1860, and Single Female for the share of single female household heads. All regressions include geographical controls for cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population. *p*-values in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table 6 summarizes our findings, again after controlling for geographical characteristics and state fixed effects. The direct effect of slavery is significant (Panel A), but turns negative once we control for incarceration, as the entire variation in slavery is captured by incarceration except for a residual fraction which is negatively correlated with the dependent variable. The direct effect of sugar suitability is not significant (Panel B). Strikingly, the table uncovers a significant indirect effect – through incarceration – of both slavery (Panel A) and sugar suitability (Panel B) on single female headship. Thus, the attitudes toward family formation inherited from sugar plantations, and spread all over the country through migration and intermarriage, are indeed channeled – and even amplified – by incarceration.[45]

tionately prevalent among males, we use black incarceration as a proxy for black male incarceration.

[45]Analogously, these results can be illustrated by way of the significant coefficients we obtain by regressing first incarceration on the historical variables and then single female headship on incarceration, while incarceration absorbs the effect of the historical variables in a third regression where we run a horse race between the two. A warning is in order, however, about the use of mediation analysis, because of the potential endogeneity of the mediator.

7 An African legacy?

An alternative explanation for the diffusion of the black family, other than slavery – and in particular slavery in sugar plantations – rests on the legacy of African cultural traditions, pointing to specific patterns of family and kinship ties and practices related to childbearing and sexuality. For example, the emphasis on extended families in African culture may justify a reliance on kinship networks rather than the nuclear family model (McDaniel, 1990). Furthermore, in the context of the West Indies, low fertility in sugar plantations has been attributed to African traditions concerning breastfeeding, with long periods of lactation (above two years) accounting for wide birth-spacing (Fogel and Engerman, 1979). In African societies, late weaning was in turn related to post-partum sex taboos precluding intercourses, with the purpose to limit conception and assure child survival (Morgan, 2006). The higher likelihood of pregnancy for female black teenagers, and lack of coresidence for black males, has been associated with the alleged promiscuity in the mating patterns of slaves and their tribal origins, with reference also to polygyny (Bush-Slimani, 1993).

In order to asses the explanatory power of African legacies, we assemble a dataset that documents the ethnic origins of slaves, by combining the Louisiana Slave Database with the Ethnographic Atlas. The Louisiana Slave Database includes information about 104,729 individuals who were enslaved in Lower Louisiana between 1719 and 1820.[46] The database was built by Gwendolyn Midlo Hall on the basis of a variety of documents, including sales of slaves and inventories of the estates of slaveholders, and with a focus on the African origin of slaves. Indeed, according to Hall (2004), the legacy of African culture was especially strong in Lower Louisiana. For African-born slaves, the ethnicity is reported for 8,994 individuals. The Ethnographic Atlas by George Peter Murdock (1967) contains data for 863 primitive, historical, and contemporary societies, organized along 51 categories that pertain a variety of economic and social features, including family and kinship structures. For Africa, data are available at the ethnicity level and are meant to describe them at a stage that precedes European colonization.

We match the slaves in the Louisiana Slave Database for whom ethnicity is reported with the ethnicities in the Ethnographic Atlas and obtain a dataset of 5,588 slaves belonging to 73 ethnicities. The most represented ones are the Ewe, Wolof, Konkomba, and Yoruba.[47] Then we match each parish in the Louisiana Slave Database with the sugar suitability data from FAO GAEZ. Therefore, for each slave in the dataset, we collect information about ethnic characteristics, as provided by Murdock (1967), and average

[46] See http://www.ibiblio.org/laslave.

[47] The distribution by ethnicity in our sample is consistent with the historical records, according to which many of the Louisiana African-born slave were taken from Senegambia (Curtin, 1975).

suitability to sugar in the parish where the slave is located. Because ethnic characteristics are constant across groups, we collapse the dataset at an ethnic group level. Next, we focus on a set of ethnographic variables, reflecting social and economic organization, that carry potential implications for family structure. The variables are: Extended Family, Nuclear Family, Patrilocality, Post-Partum Sex Taboos, Matrilinear Descent, Norms of Premarital Sexual Behavior for Girls, Animal Husbandry, Dependence on Agriculture, Intensity of Agriculture, Roots and Tubers, Animals and Plow Cultivation, and Sex Differences in Agriculture.[48]

Some of the above variables have already been used in other contexts. For instance, Alesina et al. (2013) show that the descendants of societies that traditionally practiced plough agriculture have less equal gender norms in the present day. Becker (2018) uses animal husbandry to construct a measure of dependence on pastoralism that predicts constraints on women's sexuality. Enke (2018) combines information on domestic organization and descent to measure kinship tightness and its effect on trust. Bertocchi and Dimico (2019) find that within Africa sexual norms for girls are not correlated with the slave trade, which corroborates their hypothesis that the impact of the slave trade on HIV infection is channeled instead through polygyny.

Table 7: African Ethnic Legacies and Sugar Suitability

Dependent Variable	(1) Sugar Suitability	(2) Obs.	(3) R^2
Extended Family	-0.126 (0.083)	73	0.0410
Nuclear Family	0.0170 (0.017)	73	0.0130
Patrilocality	0.0510 (0.078)	73	0.0100
Post-Partum Sex Taboos	-0.00200 (0.725)	14	0
Matrilineal Descent	-0.0250 (0.067)	73	0.00400
Norms of Premarital Sexual Behavior	-0.253 (0.412)	32	0.0110
Animal Husbandry	-0.114 (0.161)	69	0.00400
Dependence on Agriculture	0.0780 (0.164)	73	0.00200
Intensity of Agriculture	0.0900 (0.107)	71	0.00900
Root and Tubers	-0.0110 (0.011)	71	0.00500
Animals and Plow Cultivation	0.0340 (0.034)	71	0.0130
Sex Differences in Agriculture	0.289 (0.224)	50	0.0360

Note: Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table 7 shows the results from regressing the mean values of the categorical values on

[48]The variables are described in Table A1 and summary statistics are reported in Table A19.

average sugar suitability. The coefficients reveal the absence of any correlation between sugar suitability and the dependent variables, which implies that the fact that a slave belongs to a sugar plantation carries no implication for, say, his/her attitude toward marital residence, or post-partum tex taboos. Even though we must take the above findings as merely suggestive, due to the low number of slaves that can be matched, we can conclude that we find no evidence that the family structure that we found to be associated with sugar planting under slavery in previous sections can be traced back to the prevailing customs among the African ethnicities that were represented among slaves in Louisiana.

8 Conclusion

In this paper, we have empirically assessed the effect of historical slavery on the African American family structure, where the latter is proxied by the likelihood that a household is headed by a single woman. Our hypothesis was that the black family structure is more likely to emerge in association not with the intensity of historical slavery per se, but with sugar suitability. This is because sugar planting determined for the slave population extreme demographic outcomes. Forced celibacy for male slaves, early widowhood for young female slaves with small children, and general living conditions that discouraged the slave population from forming families and raising children, are the likely channels of transmission, that prevented the formation of nuclear families and kept exerting their influence well past Abolition.

Our results indeed confirm that, as of 1850, sugar suitability is strongly associated with a skewed sex ratio and low fertility among the slave population. Over the period 1880-1940, higher sugar suitability is significantly increasing the likelihood of female headship, particularly among blacks, even though the effect starts fading in 1920. Linking a sample of black household heads between 1880 and 1930 reinforces the persistency of the effect of sugar across generations and U.S. states. Its long-term decline can be attributed to the Great Migration and the consequent relocation of the descendants of black slaves throughout the country, with the diffusion of intermarriage among blacks with different exposure to sugar planting. These developments explain why, in the period 1970-2000, slavery replaces sugar suitability as a driver of family structure. Black incarceration, far from being an alternative determinant, actually emerges as a powerful mediator of the legacy of slavery and slave life in sugar plantations, while African cultural traditions bear no explanatory power.

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APPENDIX

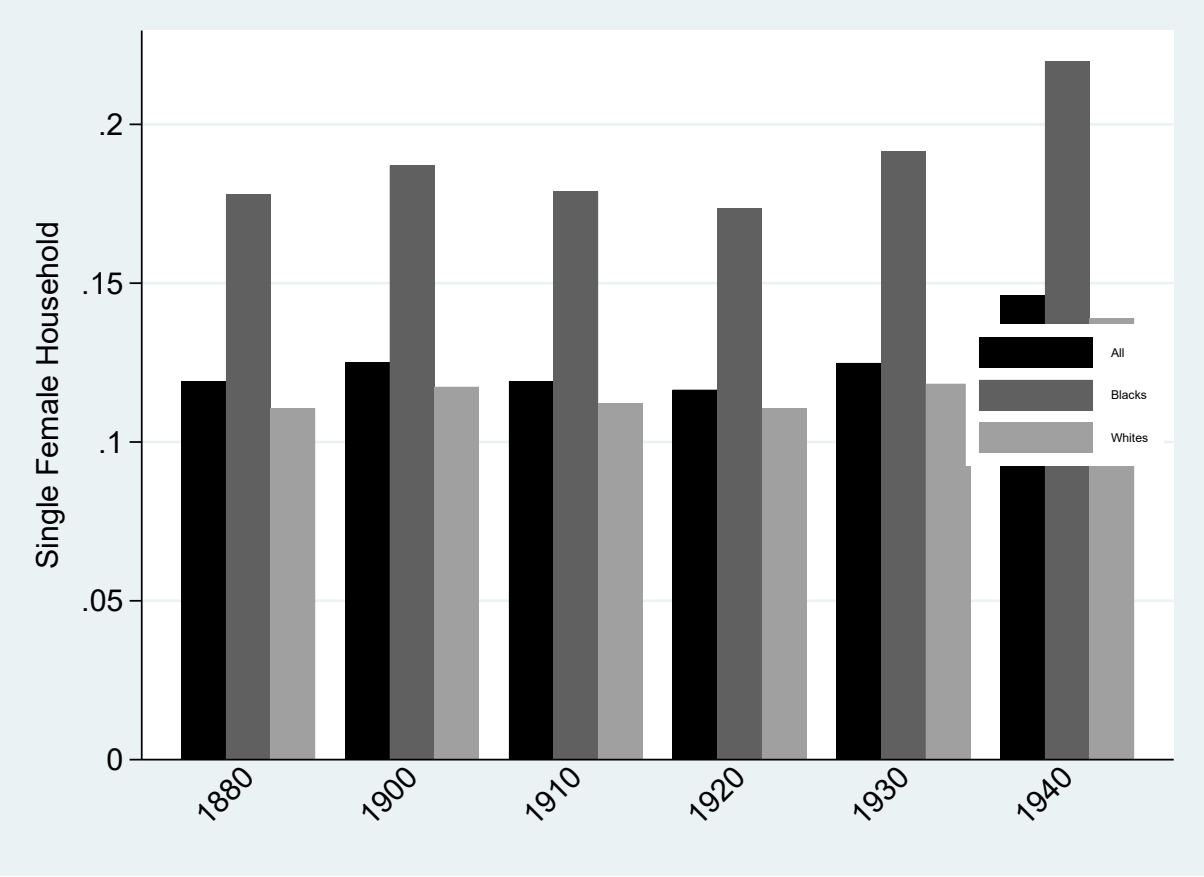

Figure A1: The Share of Single Female Household Heads, 1880-1940

Note: Single female household heads over household heads, overall and by race.

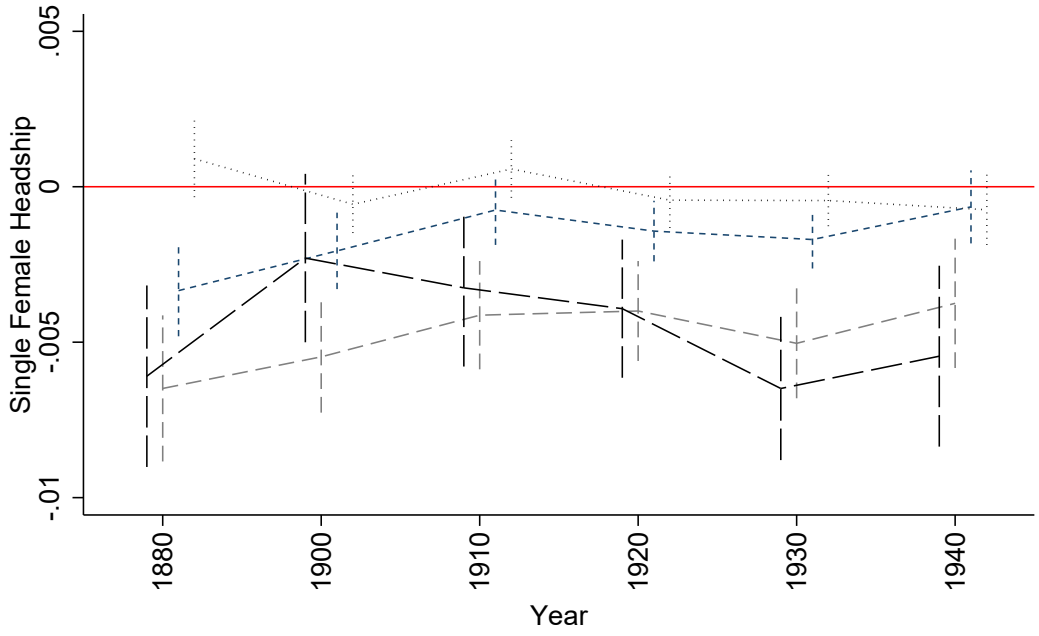

Figure A2: Single Female Headship and Sugar Suitability, 1880-1940 - Pseudo-Panel Including Cohorts in at Least Three Censuses

Note: The dependent variable is single female headship. Only cohorts that are present in at least three Censuses are included. The plots represent the coefficients of sugar suitability obtained from pseudo-panel estimates. Medium-dashed lines represent the sample of all household heads. Short-dashed lines represent a sub-sample excluding widowed and divorced household heads. Long-dashed lines represent a sub-sample of black household heads, again excluding widowed and divorced. Controls include geographical controls (cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density), individual controls (race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area), and cohort, year, and state fixed effects. Standard errors are clustered robust at a county level. Dotted lines represent 90 percent confidence intervals.

Table A1: Variable Definitions and Sources

Variable	Definition	Source
Total Slaves	Number of slaves in the population	U.S. Census - Vital Statistics, 1850
Sex Ratio	Male slaves over female slaves	U.S. Census - Vital Statistics, 1850
Birth Rate	Slave births over slave population	U.S. Census - Vital Statistics, 1850
Infant Share	Children below age 1 over slave population	U.S. Census - Vital Statistics, 1850
Death Rate	Slave deaths over slave population	U.S. Census - Vital Statistics, 1850
Total Population	Total population	U.S. Census - Vital Statistics, 1850
Urban Population	Urban population	U.S. Census - Vital Statistics, 1850
Single Female Headship	Binary variable taking value 1 if the household head is female without a coliving spouse, and 0 otherwise	U.S. Census
Age	Years of age, from 15 to 89	U.S. Census
Race	Categorical variable taking 7 values (1=White, 2=Black/African American/Negro, 3=American Indian or Alaska native, 4=Chinese, 5=Japanese, 6=Other Asian or Pacific Islander, and 7=Other race)	U.S. Census
Marital Status	Categorical variable taking 5 values (1=Married, spouse present, 2=Married, spouse absent, 4=Divorced, 5=Widowed, and 6= Never married/single)	U.S. Census
Number of Children	Number of own children in the household	U.S. Census
Number of Children Below Age 5	Number of own children below age 5 in the household	U.S. Census
Number of Families	Number of families in the household	U.S. Census
Labor Force Status	Binary variable taking value 1 if not in the labor force and 2 if in the labor force	U.S. Census
Duncan Socioeconomic Index	Categorical variable constructed as a weighted sum of occupational education and income measures and taking values from 1 to 100	U.S. Census
Occupational Earnings Score	Median earned income per occupation based on education levels and taking values from 1 to 100	U.S. Census
Metropolitan Area	Categorical variable taking 4 values (1=Not in metro area, 2=In metro area, Central/principal city, 3=In metro area, outside central/principal city, and 4=Central/principal city status unknown)	U.S. Census
Crop Suitability	Sugar, cotton, tobacco, and rice suitability indices for low input levels and rain-fed production, ranging from 1 to 8, with 1 denoting maximal suitability.	FAO GAEZ
Slave Share 1860	Slaves over population in 1860	U.S. Census

Table A1 Continued: Variable Definitions and Sources

Variable	Definition	Source
Soil Nutrients	Soil and terrain condition	FAO GAEZ
Soil pH	Soil and terrain condition	FAO GAEZ
Malaria Endemicity	Index representing the contribution of regionally dominant vector mosquitoes to the force of malaria transmission	Kiszewski et al. (2004)
Temperature	Climatic variable	FAO GAEZ
Precipitation	Climatic variable	FAO GAEZ
Elevation	Soil and terrain condition	FAO GAEZ
Water Basins	Water resources variable	FAO GAEZ
Ruggedness	Mean difference between a central pixel and its surrounding cells	QGIS
Latitude	Geographic coordinate in Y-values	QGIS
Longitude	Geographic coordinate in X-values	QGIS
Population Density	Population over surface area	U.S. Census and QGIS
Sugar Production	Average production of cane sugar in 1000-pound hogsheads in 1850 and 1860	U.S. Census
Rice Production	Average production of rice in pounds in 1850 and 1860	U.S. Census
Treated Counties	Binary variable taking value 1 if a county is in a sugar or rice suitable area and 0 otherwise (or crossed by the border)	FAO GAEZ
Border Distance	Distance from the sugar or rice suitability border	FAO GAEZ
Black Incarceration	Black prison admissions over total prison admissions	Vera
Ethnographic Variables	Set of binary variables for Extended Family (coded on the basis of the categorical variable v8), Nuclear Family (coded on v9), Patrilocality (coded on v12), Matrilineal Descent (coded on v43), and Root and Tubers (as major crop, as opposed to cereals, coded on v29), and set categorical variables for Post-Partum Sex Taboos (v36), Norms of Premarital Sexual Behavior for Girls (v78), Animal Husbandry (v4), Dependence on Agriculture (v5), Intensity of Agriculture (v28), Animals and Plow Cultivation (v39), and Sex Differences in Agriculture (v54)	Murdock (1967)

Table A2: Descriptive Statistics, Individual Data, Census, 1880-1940

	count	mean	sd	min	max
			1880		
Single Female Headship	101750	0.119	0.324	0.000	1.000
Age	101628	43.076	13.991	15.000	89.000
Race	101750	1.136	0.362	1.000	4.000
Marital Status	101750	1.794	1.658	1.000	6.000
Nr of Children	101750	2.416	2.144	0.000	9.000
Nr of Children Below 5	101750	0.639	0.876	0.000	5.000
Nr of Families	101750	1.331	1.034	1.000	29.000
Labor Force Status	101676	1.886	0.318	1.000	2.000
Duncan Socioec. Index	90218	21.056	18.751	4.000	96.000
Occupational Earnings Score	90159	33.133	28.440	1.200	100.000
Metropolitan Area	101750	1.249	0.543	1.000	3.000
Sugar Suitability	101750	7.758	0.754	2.725	8.000
Cotton Suitability	101750	5.925	1.941	1.200	8.000
Rice Suitability	101750	6.754	1.282	1.063	8.000
Tobacco Suitability	101750	4.186	1.247	1.000	8.000
Slave Share 1860	94547	0.111	0.202	0.000	0.925
Soil Nutrients	101750	1.921	0.828	0.000	6.000
Soil pH	101750	25.808	6.859	10.000	77.857
Malaria Endemicity	101750	0.043	0.057	0.000	2.311
Temperature	101750	11.751	3.605	-1.691	23.340
Precipitation	101750	1059.094	221.236	139.780	2023.798
Elevation	101750	244.025	271.658	1.600	3536.923
Water Basins	101750	2.059	3.689	0.000	67.103
Ruggedness	101750	346.155	896.449	3.409	18137.340
Latitude	101750	284598.803	456612.294	-1218283.750	1518435.375
Longitude	101750	970321.935	824618.840	-2303025.250	2199204.000
Population Density	101369	4895261.726	19376234.658	22.753	1.154e+08
Sugar Production	101750	89.768	1059.106	0.000	27748.000
Sugar Treated Counties	101750	0.083	0.277	0.000	1.000
Distance from Sugar S. Border	101750	-0.006	0.005	-0.031	0.006
Rice Production	101750	141797.281	2002700.348	0.000	51285212.000
Rice Treated Counties	101750	0.218	0.413	0.000	1.000
Distance from Rice S. Border	100210	-2.846	4.725	-29.764	7.014
			1900		
Single Female Headship	162231	0.125	0.331	0.000	1.000
Age	162118	44.022	14.034	15.000	89.000
Race	162231	1.134	0.397	1.000	6.000
Marital Status	162231	1.867	1.713	1.000	6.000
Nr of Children	162231	2.186	2.099	0.000	9.000
Nr of Children Below 5	162231	0.525	0.828	0.000	7.000
Nr of Families	162231	1.312	1.057	1.000	30.000
Labor Force Status	162204	1.894	0.308	1.000	2.000
Duncan Socioec. Index	145627	23.773	20.299	3.000	96.000
Occupational Earnings Score	145593	37.620	30.124	1.200	100.000
Metropolitan Area	162231	1.397	0.647	1.000	3.000
Sugar Suitability	162156	7.759	0.767	2.725	8.000
Cotton Suitability	162156	5.999	1.950	1.200	8.000
Rice Suitability	162156	6.800	1.274	1.063	8.000
Tobacco Suitability	162156	4.270	1.313	1.000	8.000
Slave Share 1860	143180	0.097	0.189	0.000	0.925
Soil Nutrients	162196	1.857	0.817	0.000	7.000
Soil pH	162196	26.373	7.318	10.000	97.000
Malaria Endemicity	162196	0.044	0.075	0.000	2.809
Temperature	162196	11.701	3.772	-7.583	23.852
Precipitation	162196	1035.851	248.847	139.780	2221.804
Elevation	162196	266.049	309.715	1.600	3536.923
Water Basins	162196	2.033	3.786	0.000	80.097
Ruggedness	162196	385.389	928.831	3.409	15742.728
Latitude	162196	294832.449	473363.210	-1223146.125	1519304.125
Longitude	162196	861382.404	901690.198	-2303025.250	2199191.250
Population Density	161638	6570893.365	20949477.714	168.539	1.768e+08
Sugar Production	162231	78.492	1002.577	0.000	27748.000
Sugar Treated Counties	162196	0.080	0.271	0.000	1.000
Distance from Sugar S. Border	162196	-0.006	0.006	-0.061	0.007
Rice Production	162231	97859874	1611040.452	0.000	51285212.000
Rice Treated Counties	162231	0.203	0.402	0.000	1.000
Distance from Rice S. Border	159385	-3.568	5.992	-64.017	7.014

Table A2 Continued: Descriptive Statistics, Individual Data, Census, 1880-1940

	count	mean	sd	min	max
			1910		
Single Female Headship	204246	0.119	0.324	0.000	1.000
Age	204100	44.064	14.096	15.000	89.000
Race	204246	1.128	0.395	1.000	6.000
Marital Status	204246	1.824	1.679	1.000	6.000
Nr of Children	204246	2.015	2.020	0.000	9.000
Nr of Children Below 5	204246	0.484	0.796	0.000	5.000
Nr of Families	204246	1.301	1.076	1.000	28.000
Labor Force Status	204224	1.891	0.312	1.000	2.000
Duncan Socioec. Index	182684	25.751	21.358	3.000	96.000
Occupational Earnings Score	182549	40.684	31.163	0.600	100.000
Metropolitan Area	204246	1.470	0.680	1.000	3.000
Sugar Suitability	204184	7.765	0.765	2.725	8.000
Cotton Suitability	204184	6.029	1.940	1.200	8.000
Rice Suitability	204184	6.828	1.270	1.063	8.000
Tobacco Suitability	204184	4.360	1.357	1.000	8.000
Slave Share 1860	174260	0.092	0.183	0.000	0.925
Soil Nutrients	204220	1.846	0.815	0.000	7.000
Soil pH	204220	26.630	7.497	10.000	97.000
Malaria Endemicity	204220	0.046	0.086	0.000	2.809
Temperature	204220	11.773	3.814	-7.695	23.852
Precipitation	204220	26.630	7.497	10.000	97.000
Elevation	204220	280.174	326.050	1.600	3536.923
Water Basins	204220	2.034	3.701	0.000	80.097
Ruggedness	204220	407.767	953.246	3.409	15742.728
Latitude	204220	299226.118	495805.567	-1223146.125	4215343.500
Longitude	204220	771099.392	1051812.827	-6224211.500	2199191.250
Population Density	204028	8966915.047	28375332.674	599.299	1.537e+08
Sugar Production	204246	71.975	972.441	0.000	27748.000
Sugar Treated Counties	204220	0.077	0.266	0.000	1.000
Distance from Sugar S. Border	204220	-0.007	0.007	-0.064	0.007
Rice Production	204246	90444.382	1578548.686	0.000	51285212.000
Rice Treated Counties	204246	0.186	0.389	0.000	1.000
Distance from Rice S. Border	202859	-4.112	7.052	-64.017	7.014
			1920		
Single Female Headship	242977	0.116	0.321	0.000	1.000
Age	242801	44.706	14.099	15.000	89.000
Race	242977	1.120	0.400	1.000	6.000
Marital Status	242977	1.797	1.650	1.000	6.000
Nr of Children	242977	1.906	1.966	0.000	9.000
Nr of Children Below 5	242977	0.439	0.759	0.000	6.000
Nr of Families	242977	1.208	0.849	1.000	30.000
Labor Force Status	242945	1.889	0.314	1.000	2.000
Duncan Socioec. Index	216229	27.155	21.784	3.000	96.000
Occupational Earnings Score	215953	43.964	31.334	0.600	100.000
Metropolitan Area	242977	1.559	0.711	1.000	3.000
Sugar Suitability	242895	7.771	0.763	2.116	8.000
Cotton Suitability	242895	6.085	1.928	1.200	8.000
Rice Suitability	242895	6.861	1.243	1.063	8.000
Tobacco Suitability	242895	4.388	1.361	1.000	8.000
Slave Share 1860	204273	0.085	0.176	0.000	0.925
Soil Nutrients	242977	1.865	0.839	0.000	7.000
Soil pH	242977	26.975	7.664	10.000	97.000
Malaria Endemicity	242977	0.046	0.098	0.000	2.809
Temperature	242977	11.814	3.811	-7.695	23.852
Precipitation	242977	1014.662	275.711	116.758	2386.278
Elevation	242977	281.064	324.911	1.600	3536.923
Water Basins	242977	2.292	4.018	0.000	79.626
Ruggedness	242977	431.376	955.950	3.409	15742.728
Latitude	242977	298630.140	487394.926	-1251709.000	1519304.125
Longitude	242977	758008.006	1024447.755	-2303824.750	2199191.250
Population Density	242972	13940264.774	54387367.214	89.725	3.589e+08
Sugar Production	242977	59.490	844.688	0.000	27748.000
Sugar Treated Counties	242977	0.074	0.261	0.000	1.000
Distance from Sugar S. Border	242977	-0.007	0.007	-0.064	0.007
Rice Production	242977	77063.675	1419331.515	0.000	51285212.000
Rice Treated Counties	242977	0.169	0.375	0.000	1.000
Distance from Rice S. Border	242977	-4.422	7.254	-64.017	7.014

Table A2 Continued: Descriptive Statistics, Individual Data, Census, 1880-1940

	count	mean	sd	min	max
			1930		
Single Female Headship	298004	0.125	0.331	0.000	1.000
Age	297796	45.352	14.204	15.000	89.000
Race	298004	1.114	0.393	1.000	6.000
Marital Status	298004	1.808	1.655	1.000	6.000
Nr of Children	298004	1.717	1.870	0.000	9.000
Nr of Children Below 5	298004	0.347	0.684	0.000	6.000
Nr of Families	298004	1.190	0.798	1.000	29.000
Labor Force Status	297984	1.883	0.322	1.000	2.000
Duncan Socioec. Index	263533	29.331	22.882	3.000	96.000
Occupational Earnings Score	263123	47.220	30.725	0.600	100.000
Metropolitan Area	298004	1.676	0.746	1.000	3.000
Sugar Suitability	297981	7.768	0.788	2.116	8.000
Cotton Suitability	297981	6.126	1.915	1.200	8.000
Rice Suitability	297981	6.867	1.236	1.063	8.000
Tobacco Suitability	297981	4.416	1.360	1.000	8.000
Slave Share 1860	249779	0.078	0.167	0.000	0.925
Soil Nutrients	298004	1.843	0.836	0.000	7.000
Soil pH	298004	27.231	7.784	10.000	97.000
Malaria Endemicity	298004	0.048	0.121	0.000	2.809
Temperature	298004	11.950	3.830	-7.997	23.852
Precipitation	298004	1003.474	284.904	116.758	2386.278
Elevation	298004	280.085	320.625	1.600	3536.923
Water Basins	298004	2.323	3.948	0.000	78.859
Ruggedness	298004	485.976	1017.959	3.409	15742.728
Latitude	298004	290913.079	491527.372	-1263666.875	1519304.125
Longitude	298004	715554.180	1087790.611	-2303824.750	2199191.250
Population Density	298004	13071123.756	42123821.004	108.281	2.934e+08
Sugar Production	298004	52.043	760.154	0.000	27748.000
Sugar Treated Counties	298004	0.073	0.260	0.000	1.000
Distance from Sugar S. Border	298004	-0.007	0.007	-0.064	0.007
Rice Production	298004	61164.965	1244868.993	0.000	51285212.000
Rice Treated Counties	298004	0.159	0.366	0.000	1.000
Distance from Rice S. Border	298004	-4.764	7.585	-64.017	7.014
			1940		
Single Female Headship	350354	0.146	0.353	0.000	1.000
Age	350016	46.657	14.600	15.000	89.000
Race	350354	1.101	0.335	1.000	7.000
Marital Status	350354	1.882	1.702	1.000	6.000
Nr of Children	350354	1.538	1.800	0.000	9.000
Nr of Children Below 5	350354	0.275	0.613	0.000	6.000
Nr of Families	350354	1.123	0.426	1.000	5.000
Labor Force Status	350353	1.829	0.377	1.000	2.000
Duncan Socioec. Index	289006	29.931	22.806	3.000	96.000
Occupational Earnings Score	288740	48.864	29.375	0.600	100.000
Metropolitan Area	350354	1.841	0.936	1.000	4.000
Sugar Suitability	350268	7.757	0.814	2.116	8.000
Cotton Suitability	350268	6.126	1.902	1.200	8.000
Rice Suitability	350268	6.849	1.250	1.063	8.000
Tobacco Suitability	350268	4.429	1.359	1.000	8.000
Slave Share 1860	295346	0.080	0.168	0.000	0.925
Soil Nutrients	350291	1.855	0.832	0.000	7.000
Soil pH	350291	27.117	7.738	10.000	97.000
Malaria Endemicity	350291	0.049	0.126	0.000	2.809
Temperature	350291	12.025	3.825	-1.691	23.731
Precipitation	350291	1003.683	286.788	116.758	2205.195
Elevation	350291	279.142	321.825	1.600	3536.923
Water Basins	350291	2.313	3.920	0.000	78.859
Ruggedness	350291	476.584	965.378	3.409	15742.728
Latitude	350291	281757.618	498472.620	-1263666.875	1519304.125
Longitude	350291	708405.581	1104556.979	-2302540.500	2199191.250
Population Density	350291	13658150.474	43442012.953	452.454	2.969e+08
Sugar Production	350354	55.395	772.791	0.000	27748.000
Sugar Treated Counties	350291	0.077	0.267	0.000	1.000
Distance from Sugar S. Border	350291	-0.007	0.006	-0.031	0.007
Rice Production	350354	62715.879	1260653.181	0.000	51285212.000
Rice Treated Counties	350354	0.164	0.370	0.000	1.000
Distance from Rice S. Border	350291	-4.634	7.082	-30.285	7.014

Table A3: Descriptive Statistics, Individual Data, Census, 1880-1940 - Blacks

	count	mean	sd	min	max
			1880		
Single Female Headship	13085	0.178	0.383	0.000	1.000
Age	13027	39.955	14.267	15.000	89.000
Race	13085	2.000	0.000	2.000	2.000
Marital Status	13085	2.067	1.856	1.000	6.000
Nr of Children	13085	2.410	2.292	0.000	9.000
Nr of Children Below 5	13085	0.736	0.945	0.000	5.000
Nr of Families	13085	1.210	0.660	1.000	17.000
Labor Force Status	13047	1.907	0.291	1.000	2.000
Duncan Socioec. Index	11880	11.495	7.693	4.000	93.000
Occupational Earnings Score	11879	20.697	18.616	1.400	100.000
Metropolitan Area	13085	1.098	0.347	1.000	3.000
Sugar Suitability	13085	6.976	1.253	2.725	8.000
Cotton Suitability	13085	4.648	1.091	1.200	8.000
Rice Suitability	13085	5.561	1.506	1.063	8.000
Tobacco Suitability	13085	4.211	0.944	1.182	8.000
Slave Share 1860	12194	0.429	0.236	0.000	0.925
Soil Nutrients	13085	2.294	0.846	0.000	5.000
Soil pH	13085	25.212	6.075	10.000	54.500
Malaria Endemicity	13085	0.086	0.037	0.000	2.022
Temperature	13085	16.037	2.680	-0.536	23.278
Precipitation	13085	1253.412	175.716	198.943	1639.891
Elevation	13085	125.811	154.535	1.600	3356.786
Water Basins	13085	2.151	4.173	0.000	52.274
Ruggedness	13085	267.008	824.389	3.409	14228.528
Latitude	13085	-243631.865	374625.275	-1148608.625	1259307.625
Longitude	13085	983274.109	540077.702	-2302688.500	2156714.250
Population Density	12944	2065255.200	12571673.885	536.754	1.154e+08
Sugar Production	13085	418.581	2340.127	0.000	27748.000
Sugar Treated Counties	13085	0.361	0.480	0.000	1.000
Distance from Sugar S. Border	13085	-0.001	0.003	-0.029	0.006
Rice Production	13085	824397.111	4816771.090	0.000	51285212.000
Rice Treated Counties	13085	0.606	0.489	0.000	1.000
Distance from Rice S. Border	13045	0.940	2.584	-28.345	7.014
			1900		
Single Female Headship	18497	0.187	0.390	0.000	1.000
Age	18452	40.920	14.306	15.000	89.000
Race	18497	2.000	0.000	2.000	2.000
Marital Status	18497	2.205	1.917	1.000	6.000
Nr of Children	18497	2.162	2.336	0.000	9.000
Nr of Children Below 5	18497	0.566	0.891	0.000	5.000
Nr of Families	18497	1.241	0.800	1.000	20.000
Labor Force Status	18488	1.943	0.232	1.000	2.000
Duncan Socioec. Index	17494	13.177	9.472	4.000	96.000
Occupational Earnings Score	17492	20.967	19.765	1.200	100.000
Metropolitan Area	18497	1.164	0.439	1.000	3.000
Sugar Suitability	18483	6.913	1.289	2.725	8.000
Cotton Suitability	18483	4.659	1.130	1.333	8.000
Rice Suitability	18483	5.523	1.514	1.063	8.000
Tobacco Suitability	18483	4.231	0.947	1.182	8.000
Slave Share 1860	16469	0.411	0.245	0.000	0.925
Soil Nutrients	18492	2.241	0.860	0.000	7.000
Soil pH	18492	25.598	6.444	10.000	97.000
Malaria Endemicity	18492	0.089	0.047	0.000	2.576
Temperature	18492	16.202	2.737	-1.171	23.659
Precipitation	18492	1255.123	178.133	198.943	1639.891
Elevation	18492	124.600	138.931	1.600	3351.378
Water Basins	18492	2.044	4.280	0.000	80.097
Ruggedness	18492	268.411	837.860	3.409	15742.728
Latitude	18492	-268524.708	380401.283	-1223146.125	1395827.375
Longitude	18492	935415.341	539610.146	-2277992.500	2128222.250
Population Density	18331	2763253.019	12505879.393	516.824	1.768e+08
Sugar Production	18497	378.627	2228.316	0.000	27748.000
Sugar Treated Counties	18492	0.381	0.486	0.000	1.000
Distance from Sugar S. Border	18492	-0.001	0.003	-0.028	0.007
Rice Production	18497	606518.136	4046905.476	0.000	51285212.000
Rice Treated Counties	18497	0.637	0.481	0.000	1.000
Distance from Rice S. Border	18344	1.044	2.601	-28.215	7.014

Table A3 Continued: Descriptive Statistics, Individual Data, Census, 1880-1940 - Blacks

	count	mean	sd	min	max
			1910		
Single Female Headship	22112	0.179	0.383	0.000	1.000
Age	22076	41.010	14.062	15.000	89.000
Race	22112	2.000	0.000	2.000	2.000
Marital Status	22112	2.092	1.833	1.000	6.000
Nr of Children	22112	1.991	2.250	0.000	9.000
Nr of Children Below 5	22112	0.511	0.862	0.000	5.000
Nr of Families	22112	1.228	0.786	1.000	22.000
Labor Force Status	22103	1.955	0.207	1.000	2.000
Duncan Socioec. Index	21185	13.423	10.067	4.000	96.000
Occupational Earnings Score	21181	21.127	20.566	0.600	100.000
Metropolitan Area	22112	1.241	0.523	1.000	3.000
Sugar Suitability	22099	6.952	1.290	2.725	8.000
Cotton Suitability	22099	4.696	1.161	1.333	8.000
Rice Suitability	22099	5.592	1.529	1.063	8.000
Tobacco Suitability	22099	4.263	0.964	1.286	8.000
Slave Share 1860	19154	0.394	0.247	0.000	0.925
Soil Nutrients	22112	2.222	0.865	0.000	7.000
Soil pH	22112	25.657	6.521	10.000	97.000
Malaria Endemicity	22112	0.090	0.064	0.000	2.809
Temperature	22112	16.195	2.775	3.251	23.852
Precipitation	22112	25.657	6.521	10.000	97.000
Elevation	22112	130.150	156.108	1.600	2711.073
Water Basins	22112	1.968	4.147	0.000	80.097
Ruggedness	22112	277.975	847.442	3.409	12293.298
Latitude	22112	-266099.460	386956.114	-1223146.125	1378766.000
Longitude	22112	916627.877	582179.841	-6224211.500	2111432.250
Population Density	22110	3635453.101	15807708.935	1527.918	1.537e+08
Sugar Production	22112	329.454	2101.564	0.000	27748.000
Sugar Treated Counties	22112	0.365	0.481	0.000	1.000
Distance from Sugar S. Border	22112	-0.001	0.003	-0.061	0.007
Rice Production	22112	553037.323	3913450.705	0.000	51285212.000
Rice Treated Counties	22112	0.617	0.486	0.000	1.000
Distance from Rice S. Border	22068	0.901	2.961	-64.017	7.014
			1920		
Single Female Headship	24232	0.173	0.379	0.000	1.000
Age	24190	41.969	13.808	15.000	89.000
Race	24232	2.000	0.000	2.000	2.000
Marital Status	24232	2.021	1.779	1.000	6.000
Nr of Children	24232	1.803	2.195	0.000	9.000
Nr of Children Below 5	24232	0.415	0.787	0.000	5.000
Nr of Families	24232	1.219	0.763	1.000	25.000
Labor Force Status	24224	1.948	0.222	1.000	2.000
Duncan Socioec. Index	22994	13.786	10.604	3.000	96.000
Occupational Earnings Score	22984	23.202	21.486	0.600	100.000
Metropolitan Area	24232	1.324	0.572	1.000	3.000
Sugar Suitability	24195	7.019	1.282	2.116	8.000
Cotton Suitability	24195	4.761	1.236	1.333	8.000
Rice Suitability	24195	5.694	1.549	1.063	8.000
Tobacco Suitability	24195	4.264	0.957	1.111	8.000
Slave Share 1860	20498	0.365	0.254	0.000	0.925
Soil Nutrients	24232	2.235	0.902	0.000	7.000
Soil pH	24232	25.889	7.063	10.000	97.000
Malaria Endemicity	24232	0.086	0.045	0.000	1.508
Temperature	24232	15.973	2.934	2.605	23.852
Precipitation	24232	1232.056	195.943	116.758	2221.804
Elevation	24232	129.269	148.547	1.600	2776.846
Water Basins	24232	2.215	4.962	0.000	79.626
Ruggedness	24232	286.628	836.134	3.409	14228.528
Latitude	24232	-230209.026	410375.204	-1251709.000	1378766.000
Longitude	24232	929093.672	596971.959	-2278672.750	2199191.250
Population Density	24227	7241734.756	36928733.138	2313.598	3.589e+08
Sugar Production	24232	284.007	1917.630	0.000	27748.000
Sugar Treated Counties	24232	0.339	0.473	0.000	1.000
Distance from Sugar S. Border	24232	-0.001	0.003	-0.060	0.007
Rice Production	24232	509593.497	3694862.498	0.000	51285212.000
Rice Treated Counties	24232	0.580	0.494	0.000	1.000
Distance from Rice S. Border	24232	0.633	3.219	-62.476	7.014

Table A3 Continued: Descriptive Statistics, Individual Data, Census, 1880-1940 - Blacks

	count	mean	sd	min	max
			1930		
Single Female Headship	28020	0.191	0.393	0.000	1.000
Age	27987	42.072	13.635	15.000	89.000
Race	28020	2.000	0.000	2.000	2.000
Marital Status	28020	2.071	1.791	1.000	6.000
Nr of Children	28020	1.621	2.111	0.000	9.000
Nr of Children Below 5	28020	0.352	0.742	0.000	6.000
Nr of Families	28020	1.243	0.763	1.000	16.000
Labor Force Status	28017	1.938	0.240	1.000	2.000
Duncan Socioec. Index	26334	14.037	11.871	3.000	96.000
Occupational Earnings Score	26327	25.572	22.223	0.600	100.000
Metropolitan Area	28020	1.456	0.629	1.000	3.000
Sugar Suitability	28017	7.079	1.302	2.116	8.000
Cotton Suitability	28017	4.878	1.360	1.600	8.000
Rice Suitability	28017	5.809	1.555	1.063	8.000
Tobacco Suitability	28017	4.252	0.954	1.182	8.000
Slave Share 1860	23807	0.318	0.258	0.000	0.925
Soil Nutrients	28020	2.198	0.914	0.000	7.000
Soil pH	28020	26.300	7.121	10.000	97.000
Malaria Endemicity	28020	0.084	0.070	0.000	2.424
Temperature	28020	15.663	3.216	-6.231	23.852
Precipitation	28020	1213.537	209.416	116.758	2386.278
Elevation	28020	133.883	150.241	1.600	2345.257
Water Basins	28020	2.394	4.824	0.000	78.859
Ruggedness	28020	352.874	940.640	3.409	14228.528
Latitude	28020	-185910.944	447571.591	-1263666.875	1402243.375
Longitude	28020	924222.633	632025.404	-2291311.500	2111432.250
Population Density	28020	10750054.643	42649729.213	108.281	2.934e+08
Sugar Production	28020	241.744	1721.010	0.000	27748.000
Sugar Treated Counties	28020	0.313	0.464	0.000	1.000
Distance from Sugar S. Border	28020	-0.002	0.004	-0.060	0.007
Rice Production	28020	361290.093	3036130.452	0.000	51285212.000
Rice Treated Counties	28020	0.536	0.499	0.000	1.000
Distance from Rice S. Border	28020	0.293	3.590	-62.476	7.014
			1940		
Single Female Headship	32069	0.220	0.414	0.000	1.000
Age	32007	44.003	14.211	15.000	89.000
Race	32069	2.000	0.000	2.000	2.000
Marital Status	32069	2.131	1.800	1.000	6.000
Nr of Children	32069	1.656	2.211	0.000	9.000
Nr of Children Below 5	32069	0.332	0.739	0.000	5.000
Nr of Families	32069	1.198	0.548	1.000	5.000
Labor Force Status	32069	1.851	0.356	1.000	2.000
Duncan's Socioec. Index	27161	14.068	12.570	3.000	96.000
Occupational Earnings Score	27152	26.403	22.521	0.600	100.000
Metropolitan Area	32069	1.626	0.869	1.000	4.000
Sugar Suitability	32061	7.071	1.316	2.116	8.000
Cotton Suitability	32061	4.912	1.384	1.682	8.000
Rice Suitability	32061	5.849	1.558	1.063	8.000
Tobacco Suitability	32061	4.266	0.962	1.182	8.000
Slave Share 1860	27253	0.309	0.259	0.000	0.925
Soil Nutrients	32069	2.181	0.901	0.000	7.000
Soil pH	32069	26.209	7.194	10.000	97.000
Malaria Endemicity	32069	0.084	0.085	0.000	2.809
Temperature	32069	15.639	3.278	2.555	23.731
Precipitation	32069	1205.358	218.199	116.758	1639.891
Elevation	32069	133.928	152.754	1.600	2440.625
Water Basins	32069	2.356	4.674	0.000	78.859
Ruggedness	32069	343.418	897.717	3.409	12293.298
Latitude	32069	-178200.692	457659.068	-1263666.875	1436223.125
Longitude	32069	918188.378	670320.291	-2291311.500	2096906.000
Population Density	32069	12563113.592	46363311.223	2802.464	2.969e+08
Sugar Production	32069	222.399	1609.024	0.000	27748.000
Sugar Treated Counties	32069	0.312	0.463	0.000	1.000
Distance from Sugar S. Border	32069	-0.002	0.004	-0.029	0.007
Rice Production	32069	345035.628	2973715.358	0.000	51285212.000
Rice Treated Counties	32069	0.512	0.500	0.000	1.000
Distance from Rice S. Border	32069	0.119	3.905	-28.459	7.014

Table A4: Descriptive Statistics, County Data, Census - Vital Statistics, 1850

	count	mean	sd	min	max
Total Slaves	1623	1974.315	3642.319	0.000	44376.000
Sex Ratio	968	0.981	0.149	0.100	2.250
Birth Rate	930	0.029	0.012	0.000	0.200
Infant Share	930	0.029	0.012	0.000	0.200
Death Rate	833	0.015	0.006	0.001	0.031
Sugar Suitability	1613	7.563	1.009	2.526	8.000
Total Population	1623	14289.511	23143.277	8.000	515547.000
Urban Population	1623	2202.400	18217.156	0.000	515547.000

Table A5: Single Female Headship and Sugar Suitability, 1880-1940 - OLS

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
	Panel A: Only State Fixed Effects					
Sugar Suitability	-0.0065**	-0.0065**	-0.0071***	-0.0038*	-0.0045**	-0.0021
	(0.0029)	(0.0028)	(0.0026)	(0.0021)	(0.0023)	(0.0023)
Log Slaves/Pop.	0.0270	0.0618**	0.0510*	0.0410*	0.0259	0.0295
	(0.0266)	(0.0310)	(0.0274)	(0.0226)	(0.0234)	(0.0253)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.008	0.005	0.004	0.004	0.003	0.003
Observations	94547	143180	174260	204273	249779	295346
Counties	1995	2002	2002	2002	2002	1990
	Panel B: With Geographical and Individual Controls					
Sugar Suitability	-0.0055***	-0.0050***	-0.0055***	-0.0030***	-0.0029***	-0.0012
	(0.0015)	(0.0015)	(0.0013)	(0.0011)	(0.0010)	(0.0009)
Log Slaves/Pop.	-0.0264**	-0.0388***	-0.0300***	-0.0317***	-0.0121	-0.0150*
	(0.0107)	(0.0120)	(0.0098)	(0.0088)	(0.0079)	(0.0082)
Cotton Suitability	0.0004	-0.0008	-0.0003	-0.0001	0.0008	-0.0002
	(0.0010)	(0.0014)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Rice Suitability	0.0022*	0.0030**	0.0004	-0.0000	0.0025**	0.0026**
	(0.0012)	(0.0014)	(0.0011)	(0.0013)	(0.0011)	(0.0012)
Tobacco Suitability	0.0004	-0.0024**	-0.0006	-0.0005	0.0005	-0.0007
	(0.0010)	(0.0010)	(0.0010)	(0.0009)	(0.0009)	(0.0009)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.365	0.456	0.471	0.446	0.459	0.470
Observations	83112	127390	154877	180703	219625	242741
Counties	1994	2001	2001	2002	2002	1990

Note: The dependent variable is single female headship. Geographical controls include soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Single Female Headship and Sugar Suitability, 1880-1940 - State Level and Spatial Clustering

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
	Panel A: Only State Fixed Effects					
Sugar Suitability	-0.0065	-0.0065	-0.0071	-0.0038	-0.0045	-0.0021
	(0.0028)**	(0.0027)**	(0.0026)*	(0.0021)*	(0.0040)	(0.0030)
	[0.1311]	[0.0711]*	[0.0831]*	[0.0871]*	[0.3273]	[0.5035]
	{0.0029}***	{0.0028}***	{0.0026}*	{0.0021}*	{0.0022}**	{0.0023}
State FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.008	0.005	0.004	0.004	0.003	0.003
Observations	94547	143180	174260	204273	249779	295346
States	41	41	41	41	41	41
	Panel B: With Geographical and Individual Controls					
Sugar Suitability	-0.0055	-0.0050	-0.0055	-0.0030	-0.0029	-0.0012
	(0.0012)***	(0.0017)***	(0.0012)***	(0.0010)***	(0.0020)	(0.0010)
	[0.0250]**	[0.0110]**	[0.0100]**	[0.0120]**	[0.2222]	[0.2382]
	{0.0015}***	{0.0015}***	{0.0013}***	{0.0011}***	{0.0010}***	{0.0009}
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.365	0.456	0.471	0.446	0.459	0.470
Observations	83112	127390	154877	180703	219625	242741
States	40	40	40	41	41	41

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Clustered robust standard errors at a state level in parentheses, wild bootstrap p-values in square brackets, and Conley (1999) spatial HAC standard errors for a window of 100 km in curly brackets: *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Single Female Headship and Sugar Suitability, 1880-1940 - Intermediate Inputs

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
	Panel A: Only State Fixed Effects					
Sugar Suitability	-0.0061**	-0.0072***	-0.0069***	-0.0043*	-0.0066***	-0.0029
	(0.0030)	(0.0027)	(0.0027)	(0.0023)	(0.0024)	(0.0027)
Log Slaves/Pop.	0.0273	0.0594*	0.0509*	0.0394*	0.0197	0.0262
	(0.0267)	(0.0312)	(0.0277)	(0.0226)	(0.0237)	(0.0260)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.008	0.005	0.004	0.004	0.003	0.004
Observations	94547	142753	174260	204273	249779	254650
Counties	1995	1988	2002	2002	2002	1823
	Panel B: With Geographical and Individual Controls					
Sugar Suitability	-0.0049***	-0.0050***	-0.0049***	-0.0029**	-0.0038***	-0.0023**
	(0.0015)	(0.0015)	(0.0014)	(0.0011)	(0.0010)	(0.0010)
Log Slaves/Pop.	-0.0272**	-0.0422***	-0.0331***	-0.0374***	-0.0185**	-0.0219**
	(0.0108)	(0.0123)	(0.0098)	(0.0088)	(0.0080)	(0.0087)
Cotton Suitability	0.0006	-0.0006	-0.0006	-0.0007	0.0005	0.0001
	(0.0011)	(0.0014)	(0.0011)	(0.0010)	(0.0009)	(0.0010)
Rice Suitability	0.0014	0.0009	-0.0022*	-0.0038***	-0.0002	0.0000
	(0.0014)	(0.0014)	(0.0013)	(0.0013)	(0.0012)	(0.0011)
Tobacco Suitability	-0.0001	-0.0033***	-0.0006	-0.0011	0.0003	-0.0013
	(0.0010)	(0.0011)	(0.0010)	(0.0009)	(0.0010)	(0.0011)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.365	0.456	0.471	0.446	0.459	0.473
Observations	83112	127022	154877	180703	219625	209296
Counties	1994	1987	2001	2002	2002	1823

Note: The dependent variable is single female headship. Geographical controls include soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Single Female Headship and Sugar Suitability, 1880-1940 - Farm Size

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
Sugar Suitability	-0.0055***	-0.0050***	-0.0055***	-0.0033***	-0.0030***	-0.0012
	(0.0015)	(0.0015)	(0.0013)	(0.0011)	(0.0010)	(0.0009)
Log Slaves/Pop.	-0.0379***	-0.0446***	-0.0424***	-0.0481***	-0.0297***	-0.0199*
	(0.0136)	(0.0137)	(0.0135)	(0.0114)	(0.0102)	(0.0110)
Cotton Suitability	0.0007	-0.0008	-0.0007	-0.0002	0.0007	0.0000
	(0.0011)	(0.0015)	(0.0012)	(0.0011)	(0.0010)	(0.0011)
Rice Suitability	0.0025*	0.0029**	-0.0005	-0.0005	0.0022**	0.0022**
	(0.0013)	(0.0015)	(0.0012)	(0.0013)	(0.0011)	(0.0011)
Tobacco Suitability	0.0011	-0.0014	0.0009	0.0003	0.0009	0.0000
	(0.0010)	(0.0011)	(0.0011)	(0.0010)	(0.0009)	(0.0009)
R-squared	0.368	0.457	0.473	0.449	0.460	0.472
Observations	81511	123444	149507	174129	211426	233610
Counties	1885	1888	1888	1889	1889	1878
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, residence in metropolitan area, and the shares in the county of farms of 3-9, 10-19, 20-49, 50-99, 100-499, 500-999, and over 1000 acres. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Descriptive Statistics, Individual Data, Census, Pseudo-Panel

	count	mean	sd	min	max
			Full Sample		
Single Female Headship	1359562	0.128	0.334	0.000	1.000
Age	1358459	45.050	14.281	15.000	89.000
Race	1359562	1.118	0.379	1.000	7.000
Marital Status	1359562	1.833	1.677	1.000	6.000
Nr of Children	1359562	1.858	1.961	0.000	9.000
Nr of Children Below 5	1359562	0.409	0.741	0.000	7.000
Nr of Families	1359562	1.218	0.841	1.000	30.000
Labor Force Status	1359386	1.873	0.333	1.000	2.000
Duncan Socioec. Index	1187297	27.219	22.003	3.000	96.000
Occupational Earnings Score	1186117	43.772	30.728	0.600	100.000
Metropolitan Area	1359562	1.601	0.783	1.000	4.000
Sugar Suitability	1359234	7.763	0.782	2.116	8.000
Cotton Suitability	1359234	6.074	1.925	1.200	8.000
Rice Suitability	1359234	6.839	1.254	1.063	8.000
Tobacco Suitability	1359234	4.371	1.348	1.000	8.000
Slave Share 1860	1161385	0.087	0.177	0.000	0.925
Soil Nutrients	1359438	1.858	0.830	0.000	7.000
Soil pH	1359438	26.857	7.598	10.000	97.000
Malaria Endemicity	1359438	0.047	0.105	0.000	2.809
Temperature	1359438	11.874	3.801	-7.997	23.852
Precipitation	1359438	866.808	434.375	10.000	2386.278
Elevation	1359438	275.657	318.010	1.600	3536.923
Water Basins	1359438	2.217	3.882	0.000	80.097
Ruggedness	1359438	439.582	965.508	3.409	18137.340
Latitude	1359438	291177.093	488630.765	-1263666.875	4215343.500
Longitude	1359438	766111.859	1039746.393	-6224211.500	2199204.000
Population Density	1358302	11377811.381	40201929.520	22.753	3.589e+08
Sugar Production	1359562	63.211	868.422	0.000	27748.000
Sugar Treated Counties	1359438	0.076	0.265	0.000	1.000
Distance from Sugar S. Border	1359438	-0.007	0.006	-0.064	0.007
Rice Production	1359562	79217.718	1447050.262	0.000	51285212.000
Rice Treated Counties	1359562	0.176	0.381	0.000	1.000
Distance from Rice S. Border	1353726	-4.289	6.980	-64.017	7.014
			Black Sample		
Single Female Headship	138015	0.191	0.393	0.000	1.000
Age	137739	41.978	14.078	15.000	89.000
Race	138015	2.000	0.000	2.000	2.000
Marital Status	138015	2.097	1.822	1.000	6.000
Nr of Children	138015	1.868	2.234	0.000	9.000
Nr of Children Below 5	138015	0.449	0.820	0.000	6.000
Nr of Families	138015	1.223	0.718	1.000	25.000
Labor Force Status	137948	1.920	0.271	1.000	2.000
Duncan Socioec. Index	127048	13.539	10.893	3.000	96.000
Occupational Earnings Score	127015	23.490	21.362	0.600	100.000
Metropolitan Area	138015	1.365	0.653	1.000	4.000
Sugar Suitability	137940	7.014	1.295	2.116	8.000
Cotton Suitability	137940	4.785	1.265	1.200	8.000
Rice Suitability	137940	5.702	1.545	1.063	8.000
Tobacco Suitability	137940	4.253	0.956	1.111	8.000
Slave Share 1860	119375	0.360	0.256	0.000	0.925
Soil Nutrients	138010	2.219	0.888	0.000	7.000
Soil pH	138010	25.907	6.861	10.000	97.000
Malaria Endemicity	138010	0.086	0.064	0.000	2.809
Temperature	138010	15.905	3.014	-6.231	23.852
Precipitation	138010	1033.918	477.671	10.000	2386.278
Elevation	138010	130.476	150.484	1.600	3356.786
Water Basins	138010	2.216	4.584	0.000	80.097
Ruggedness	138010	307.586	874.349	3.409	15742.728
Latitude	138010	-221287.159	420662.857	-1263666.875	1436223.125
Longitude	138010	929557.401	607771.170	-6224211.500	2199191.250
Population Density	137701	7533091.635	34680475.588	108.281	3.589e+08
Sugar Production	138015	293.833	1935.211	0.000	27748.000
Sugar Treated Counties	138010	0.339	0.473	0.000	1.000
Distance from Sugar S. Border	138010	-0.001	0.003	-0.061	0.007
Rice Production	138015	491043.849	3632123.040	0.000	51285212.000
Rice Treated Counties	138015	0.571	0.495	0.000	1.000
Distance from Rice S. Border	137778	0.571	3.325	-64.017	7.014

Table A10: Single Female Headship and Sugar Suitability, 1880-1940 - Pseudo-Panel

	(1)	(2)	(3)	(1)	(2)	(3)
	Panel A: All			Panel B: Without Widowed and Divorced		
Sugar Suitability	-0.0033***			-0.0012**		
	(0.0008)			(0.0005)		
Sugar S.*1880		-0.0051***	-0.0065***		-0.0024***	-0.0033***
		(0.0011)	(0.0014)		(0.0008)	(0.0009)
Sugar S.*1900		-0.0035***	-0.0055***		-0.0013*	-0.0021***
		(0.0010)	(0.0011)		(0.0007)	(0.0007)
Sugar S.*1910		-0.0022**	-0.0041***		-0.0003	-0.0007
		(0.0010)	(0.0011)		(0.0007)	(0.0007)
Sugar S.*1920		-0.0027***	-0.0040***		-0.0011*	-0.0014**
		(0.0009)	(0.0010)		(0.0006)	(0.0006)
Sugar S.*1930		-0.0036***	-0.0050***		-0.0014***	-0.0017***
		(0.0008)	(0.0011)		(0.0005)	(0.0006)
Sugar S.*1940		-0.0035***	-0.0037***		-0.0012**	-0.0006
		(0.0008)	(0.0013)		(0.0006)	(0.0007)
R-squared	0.450	0.450	0.432	0.331	0.331	0.307
Observations	1008448	1008448	566823	934741	934741	713840
	Panel C: Blacks			Panel D: Whites		
Sugar Suitability	-0.0043***			-0.0000		
	(0.0011)			(0.0004)		
Sugar S.*1880		-0.0055***	-0.0061***		0.0010	0.0009
		(0.0015)	(0.0018)		(0.0007)	(0.0008)
Sugar S.*1900		-0.0021	-0.0023		-0.0002	-0.0006
		(0.0016)	(0.0016)		(0.0005)	(0.0006)
Sugar S.*1910		-0.0032**	-0.0033**		0.0008	0.0006
		(0.0015)	(0.0015)		(0.0005)	(0.0006)
Sugar S.*1920		-0.0034***	-0.0039***		-0.0002	-0.0004
		(0.0013)	(0.0013)		(0.0005)	(0.0005)
Sugar S.*1930		-0.0060***	-0.0065***		-0.0001	-0.0004
		(0.0013)	(0.0014)		(0.0004)	(0.0005)
Sugar S.*1940		-0.0051***	-0.0055***		-0.0004	-0.0007
		(0.0013)	(0.0018)		(0.0005)	(0.0007)
R-squared	0.462	0.462	0.441	0.302	0.302	0.281
Observations	93162	93162	69178	839166	839166	642767
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Race is dropped in Panels C and D. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A11: Single Female Headship and Sugar Suitability, 1880-1940 - Matching

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
			Panel A: All			
Sugar Suitability	-0.0092***	-0.0056***	-0.0067***	-0.0051***	-0.0037**	-0.0052***
	(0.0020)	(0.0021)	(0.0019)	(0.0016)	(0.0016)	(0.0016)
R-squared	0.130	0.124	0.140	0.143	0.164	0.190
Observations	40378	59110	69170	82868	106175	121089
Counties	1978	1994	1999	2002	2002	1990
			Panel B: Without Widowed and Divorced			
Sugar Suitability	-0.0057***	-0.0029**	-0.0034***	-0.0013	-0.0010	-0.0012
	(0.0013)	(0.0013)	(0.0011)	(0.0009)	(0.0008)	(0.0009)
R-squared	0.153	0.151	0.147	0.145	0.172	0.204
Observations	38038	53737	63245	76601	98110	113007
Counties	1977	1994	1999	2002	2002	1990
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A12: Single Female Headship and Sugar Suitability, 1880-1940 - Matching - By Race

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
	Panel A: Without Widowed and Divorced - Blacks					
Sugar Suitability	-0.0098**	-0.0107**	-0.0093**	-0.0050	-0.0077**	-0.0026
	(0.0042)	(0.0051)	(0.0039)	(0.0037)	(0.0031)	(0.0035)
R-squared	0.052	0.102	0.126	0.145	0.234	0.250
Observations	7010	9458	11123	11929	13194	13558
Counties	970	1007	1034	1059	1085	1060
	Panel B: Without Widowed and Divorced - Whites					
Sugar Suitability	-0.0017*	0.0009	-0.0008	-0.0002	-0.0001	-0.0009
	(0.0009)	(0.0009)	(0.0007)	(0.0007)	(0.0007)	(0.0008)
R-squared	0.208	0.182	0.152	0.146	0.161	0.200
Observations	30966	44165	51958	64494	84711	99202
Counties	1969	1991	1994	2001	2002	1990
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Matched Group FE	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A13: Single Female Headship and Sugar Suitability, 1880-1940 - OLS Variants

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
	Panel A: Without Widowed and Divorced					
Sugar Suitability	-0.0033***	-0.0017*	-0.0026***	-0.0005	-0.0008	-0.0004
	(0.0011)	(0.0010)	(0.0009)	(0.0007)	(0.0006)	(0.0006)
R-squared	0.223	0.292	0.314	0.301	0.349	0.392
Observations	78209	116574	142862	167349	203572	226175
Counties	1993	2001	2001	2002	2002	1990
	Panel B: Without Widowed and Divorced - Blacks					
Sugar Suitability	-0.0060**	-0.0035	-0.0056***	-0.0035*	-0.0037**	-0.0041**
	(0.0026)	(0.0031)	(0.0022)	(0.0018)	(0.0018)	(0.0019)
R-squared	0.414	0.441	0.452	0.469	0.487	0.484
Observations	9737	12931	15324	16483	18783	19904
Counties	1109	1137	1164	1163	1185	1133
	Panel C: Without Widowed and Divorced - Whites					
Sugar Suitability	-0.0020**	-0.0001	-0.0008	0.0002	0.0002	0.0004
	(0.0008)	(0.0008)	(0.0006)	(0.0007)	(0.0006)	(0.0006)
R-squared	0.151	0.244	0.279	0.269	0.324	0.378
Observations	68280	103339	127170	150432	184231	205714
Counties	1992	1999	1998	2001	2002	1990
	Panel D: With Children					
Sugar Suitability	-0.0025*	-0.0039***	-0.0044***	-0.0022**	-0.0026***	-0.0014*
	(0.0013)	(0.0013)	(0.0011)	(0.0008)	(0.0009)	(0.0008)
R-squared	0.473	0.566	0.584	0.540	0.567	0.578
Observations	65543	95119	112761	128280	149053	159105
Counties	1989	2001	2001	2002	2002	1990
	Panel E: With Children - Blacks					
Sugar Suitability	0.0021	-0.0064**	-0.0100***	-0.0021	-0.0039	-0.0026
	(0.0025)	(0.0030)	(0.0026)	(0.0024)	(0.0025)	(0.0024)
R-squared	0.707	0.735	0.739	0.723	0.727	0.721
Observations	8031	10337	11823	11709	12611	12868
Counties	1043	1072	1099	1093	1096	1054
	Panel F: With Children - Whites					
Sugar Suitability	-0.0027	-0.0012	-0.0034***	-0.0014	-0.0009	-0.0001
	(0.0017)	(0.0012)	(0.0012)	(0.0009)	(0.0008)	(0.0007)
R-squared	0.371	0.505	0.528	0.485	0.521	0.543
Observations	57449	84670	100804	116330	136106	145883
Counties	1985	1998	1999	2001	2001	1990
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A14: Single Female Headship and Sugar Suitability, 1880-1940 - With Children

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
	Panel A: Households with Children					
Sugar Suitability	-0.0059**	-0.0045**	-0.0053***	-0.0045**	-0.0043***	-0.0057***
	(0.0023)	(0.0023)	(0.0020)	(0.0018)	(0.0016)	(0.0015)
R-squared	0.124	0.096	0.119	0.106	0.125	0.134
Observations	30460	41866	47149	54475	64143	70688
Counties	1963	1989	1993	1999	2001	1990
	Panel B: Households with Children - Blacks					
Sugar Suitability	-0.0032	-0.0185***	-0.0167**	-0.0183***	-0.0180**	-0.0247***
	(0.0075)	(0.0072)	(0.0072)	(0.0069)	(0.0071)	(0.0068)
R-squared	0.067	0.093	0.132	0.114	0.178	0.195
Observations	5508	7256	8247	8197	8185	7948
Counties	881	921	941	945	948	932
	Panel C: Households with Children - Whites					
Sugar Suitability	-0.0033	0.0011	-0.0040**	-0.0021	-0.0019	-0.0023*
	(0.0027)	(0.0022)	(0.0020)	(0.0016)	(0.0015)	(0.0013)
R-squared	0.068	0.073	0.085	0.066	0.085	0.096
Observations	24919	34543	38835	46182	55862	62596
Counties	1946	1982	1998	1998	1998	1998
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Matched Group FE	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Race is dropped in Panels B and C. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A15: Balancedness, 1880-1940

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
			Age			
Treated Counties	-0.1627	-0.0399	0.6658*	0.0581	0.1319	-0.0607
	(0.3651)	(0.3824)	(0.3752)	(0.3540)	(0.3557)	(0.3467)
R-squared	0.005	0.003	0.003	0.001	0.003	0.002
Observations	30516	34615	39670	54819	57284	74341
			Nr of Children			
Treated Counties	-0.1047	-0.1060	-0.0673	-0.0201	-0.1801**	-0.0449
	(0.0971)	(0.1052)	(0.0842)	(0.0880)	(0.0913)	(0.0850)
R-squared	0.002	0.001	0.000	0.000	0.001	0.000
Observations	21179	31452	43772	46976	69317	59819
			Nr of Children Below Age 5			
Treated Counties	-0.0255	-0.0318	-0.0652*	-0.0358	-0.0043	0.0114
	(0.0335)	(0.0308)	(0.0338)	(0.0268)	(0.0239)	(0.0224)
R-squared	-0.000	0.000	0.000	0.005	0.000	0.000
Observations	21828	34365	45330	86902	63482	67982
			Nr Families			
Treated Counties	-0.0148	-0.0275	-0.0123	-0.0247	-0.0072	0.0048
	(0.0220)	(0.0222)	(0.0283)	(0.0205)	(0.0184)	(0.0121)
R-squared	0.001	0.003	0.001	0.002	0.001	0.000
Observations	28430	72611	49780	140160	170992	201526
			Labor Force Status			
Treated Counties	0.0146*	0.0074	0.0119**	0.0163***	0.0108*	0.0115*
	(0.0085)	(0.0061)	(0.0052)	(0.0058)	(0.0060)	(0.0070)
R-squared	0.001	0.002	0.002	0.001	0.001	0.002
Observations	35266	32473	36959	47816	60355	81154
			Duncan Socioeconomic Index			
Treated Counties	-0.7161	-0.2569	-1.0871	-1.5571	-1.8059	-2.0946
	(0.5563)	(0.9719)	(1.0194)	(1.1929)	(1.4551)	(1.6884)
R-squared	0.003	0.004	0.004	0.005	0.002	0.002
Observations	19549	27375	33485	38473	46627	35507
			Occupational Earnings Score			
Treated Counties	1.4365	0.2920	-0.9998	-2.2956	-1.0192	-1.7625
	(1.6765)	(2.7795)	(3.1980)	(3.8156)	(4.2041)	(3.7942)
R-squared	0.001	0.006	0.008	0.004	0.004	0.007
Observations	14623	22477	23509	24711	28513	29117
			Blacks			
Treated Counties	0.1127***	0.1091**	0.0975**	0.1063**	0.0812**	0.0934**
	(0.0387)	(0.0426)	(0.0423)	(0.0458)	(0.0408)	(0.0409)
R-squared	0.113	0.082	0.062	0.049	0.038	0.035
Observations	29459	29290	27212	29308	35219	40970

Note: The table shows differences between treated and untreated counties obtained by running sharp RDD regressions where the treatment equals 1 if sugar suitability occurs. Clustered robust standard errors at a county level in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A16: Single Female Headship and Sugar Suitability, 1880-1940 - IV

	(1) 1880	(2) 1900	(3) 1910	(4) 1920	(5) 1930	(6) 1940
			Panel A: All			
			Second Stage			
Log Sugar Production	0.0145***	0.0080***	0.0093***	0.0072***	0.0050***	0.0070***
	(0.0032)	(0.0027)	(0.0022)	(0.0020)	(0.0018)	(0.0016)
R-squared	-0.092	-0.076	-0.078	-0.075	-0.074	-0.080
Observations	40310	58948	68917	82589	105799	120659
			First Stage			
Sugar Suitability	-0.6364***	-0.6998***	-0.7202***	-0.7015***	-0.7330***	-0.7412***
	(0.0232)	(0.0182)	(0.0164)	(0.0148)	(0.0131)	(0.0122)
F Stat. Excluded Instr.	749.45	1477.88	1919.29	2256.07	3142.68	3721.19
Kleibergen-Paap F Stat.	749.45	1477.88	1919.29	2256.07	3142.68	3721.19
Cragg-Donald F Stat.	1650.009	3084.680	3966.663	4738.235	6829.645	7735.462
Stock-Yogo Crit. Val.	16.38	16.38	16.38	16.38	16.38	16.38
			Panel B: Without Widowed and Divorced			
			Second Stage			
Log Sugar Production	0.0087***	0.0040**	0.0048***	0.0018	0.0013	0.0015
	(0.0020)	(0.0016)	(0.0013)	(0.0012)	(0.0010)	(0.0010)
R-squared	-0.099	-0.079	-0.083	-0.076	-0.078	-0.081
Observations	37890	53464	62845	76182	97601	112382
			First Stage			
Sugar Suitability	-0.6489***	-0.7243***	-0.7224***	-0.7144***	-0.7465***	-0.7556***
	(0.0245)	(0.0194)	(0.0174)	(0.0155)	(0.0138)	(0.0127)
F Stat. Excluded Instr.	702.38	1399.40	1716.52	2118.94	2919.10	3522.60
Kleibergen-Paap F Stat.	702.38	1399.40	1716.52	2118.94	2919.10	3522.60
Cragg-Donald F Stat.	1615.467	3019.482	3692.681	4554.316	6544.618	7510.416
Stock-Yogo Crit. Val.	16.38	16.38	16.38	16.38	16.38	16.38
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Matched Group FE	Yes	Yes	Yes	Yes	Yes	Yes
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: The dependent variable is single female headship. Geographical controls include cotton, rice, and tobacco suitability, the log of the population slave share in 1860, soil nutrients, soil pH, malaria endemicity, temperature, precipitation, elevation, water basins, ruggedness, latitude, longitude, and the log of population density. Individual controls include age, age squared, race, marital status, number of children, number of children below age five, number of families in the household, labor force participation, Duncan socioeconomic index, occupational earnings score, and residence in metropolitan area. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table A17: Descriptive Statistics, Linked Dataset, 1880-1930, Blacks

	count	mean	sd	min	max
Blacks 1930 - Full Sample					
Single Female Headship	4740	0.175	0.380	0.000	1.000
Age	4735	42.371	13.676	16.000	89.000
Age 1880	4731	40.529	13.900	15.000	88.000
Marital Status	4740	2.055	1.790	1.000	6.000
Marital Status 1880	4740	2.020	1.829	1.000	6.000
Nr of Children	4740	1.664	2.107	0.000	9.000
Number of Children 1880	4740	2.465	2.394	0.000	9.000
Nr of Children Below Age 5	4740	0.360	0.751	0.000	4.000
Nr of Children Below Age 5 1880	4740	0.743	0.979	0.000	5.000
Nr of Families	4740	1.252	0.767	1.000	13.000
Nr of Families 1880	4740	1.202	0.591	1.000	10.000
Labor Force Status	4740	1.937	0.242	1.000	2.000
Labor Force Status 1880	4740	1.899	0.303	0.000	2.000
Duncan Socioec. Index	4740	13.148	11.851	0.000	96.000
Duncan Socioec. Index 1930	4740	10.893	9.145	0.000	93.000
Occupational Earnings	4446	25.894	22.114	0.600	100.000
Occupational Earnings 1880	4275	22.565	19.440	1.200	100.000
Metropolitan Area	4740	1.454	0.632	1.000	3.000
Metropolitan Area 1880	4740	1.102	0.358	1.000	3.000
Sugar Suitability	4687	6.945	1.310	2.725	8.000
Cotton Suitability	4687	4.679	1.170	1.700	8.000
Rice Suitability	4687	5.537	1.557	1.063	8.000
Tobacco Suitability	4687	4.199	0.997	1.667	8.000
Slave Share 1860	4413	0.407	0.241	0.000	0.925
Soil Nutrients	4687	2.224	0.867	0.800	5.000
Soil pH	4687	25.590	5.968	10.000	59.200
Malaria Endemicity	4687	0.087	0.053	0.000	1.843
Temperature	4687	16.064	2.816	6.466	23.278
Precipitation	4687	1258.187	181.349	219.226	1639.891
Elevation	4687	128.221	135.578	1.600	2072.753
Water Basins	4687	2.393	4.596	0.000	43.265
Ruggedness	4687	304.465	843.715	3.409	9391.349
Latitude	4687	-254766.199	386918.697	-1212671.375	1117977.000
Longitude	4687	947250.317	540173.631	-2302688.500	2156714.250
Population Density	4687	1707152.645	11208228.716	963.111	1.154e+08
Blacks 1930 - Migrants Sample					
Single Female Headship	4055	0.177	0.382	0.000	1.000
Age	4051	42.243	13.590	16.000	89.000
Age 1880	4046	40.577	13.848	15.000	88.000
Marital Status	4055	2.062	1.797	1.000	6.000
Marital Status 1880	4055	2.024	1.832	1.000	6.000
Nr of Children	4055	1.600	2.059	0.000	9.000
Number of Children 1880	4055	2.415	2.375	0.000	9.000
Nr of Children Below Age 5	4055	0.351	0.744	0.000	4.000
Nr of Children Below Age 5 1880	4055	0.724	0.973	0.000	5.000
Nr of Families	4055	1.265	0.784	1.000	13.000
Nr of Families 1880	4055	1.205	0.587	1.000	10.000
Labor Force Status	4055	1.936	0.245	1.000	2.000
Labor Force Status 1880	4055	1.899	0.303	0.000	2.000
Duncan Socioec. Index	4055	13.127	11.924	0.000	96.000
Duncan Socioec. Index 1930	4055	10.954	9.383	0.000	93.000
Occupational Earnings	3798	26.459	22.192	0.600	100.000
Occupational Earnings 1880	3658	22.655	19.526	1.200	100.000
Metropolitan Area	4055	1.486	0.644	1.000	3.000
Metropolitan Area 1880	4055	1.109	0.368	1.000	3.000
Sugar Suitability	4002	6.986	1.296	2.725	8.000
Cotton Suitability	4002	4.674	1.183	1.700	8.000
Rice Suitability	4002	5.555	1.549	1.063	8.000
Tobacco Suitability	4002	4.190	1.005	1.667	8.000
Slave Share 1860	3766	0.400	0.243	0.000	0.925
Soil Nutrients	4002	2.208	0.869	0.800	5.000
Soil pH	4002	25.633	5.933	10.000	59.200
Malaria Endemicity	4002	0.086	0.056	0.000	1.843
Temperature	4002	15.965	2.821	6.466	23.278
Precipitation	4002	1254.865	182.931	219.226	1639.891
Elevation	4002	130.629	138.475	1.600	2072.753
Water Basins	4002	2.920	4.431	0.000	43.265
Ruggedness	4002	294.858	824.736	3.409	9391.349
Latitude	4002	-242251.964	387889.904	-1148608.625	1117977.000
Longitude	4002	939900.597	543224.940	-2302688.500	2156714.250
Population Density	4002	1877188.541	11872354.955	963.111	1.154e+08

Table A18: Descriptive Statistics, County Data, Census, 1970-2000

	count	mean	sd	min	max
			1970		
Single Female Headship	2012	0.094	0.031	0.037	0.226
Sugar Suitability	2011	7.596	0.976	2.500	8.000
Cotton Suitability	2011	5.571	1.877	1.000	8.000
Rice Suitability	2011	6.562	1.414	1.200	8.000
Tobacco Suitability	2011	4.251	1.340	1.000	8.000
Slave Share 1860	1991	0.156	0.217	0.000	0.925
Soil Nutrients	2011	1.902	0.879	0.000	6.000
Soil pH	2010	26.781	6.530	10.000	77.857
Malaria Endemicity	2011	0.078	0.180	0.000	2.620
Temperature	2011	12.795	4.109	2.953	23.711
Precipitation	2011	1071.061	258.714	161.713	2173.767
Elevation	2011	265.406	254.854	1.622	2596.203
Water Basins	2011	1.967	4.491	0.000	59.548
Ruggedness	2011	307.077	934.286	4.305	16277.379
Latitude	2012	116559.393	520124.422	-1263666.875	1519304.125
Longitude	2012	678021.278	837475.243	-2303824.750	2199191.250
Population	2012	83761.877	272118.809	1095.000	7032075.000
			1980		
Single Female Headship	2012	0.115	0.040	0.045	0.328
Sugar Suitability	2011	7.596	0.976	2.500	8.000
Cotton Suitability	2011	5.571	1.877	1.000	8.000
Rice Suitability	2011	6.562	1.414	1.200	8.000
Tobacco Suitability	2011	4.251	1.340	1.000	8.000
Slave Share 1860	1991	0.156	0.217	0.000	0.925
Soil Nutrients	2011	1.902	0.879	0.000	6.000
Soil pH	2010	26.781	6.530	10.000	77.857
Malaria Endemicity	2011	0.078	0.177	0.000	2.620
Temperature	2011	12.795	4.109	2.953	23.711
Precipitation	2011	1071.103	258.761	161.713	2173.767
Elevation	2011	265.411	254.854	1.622	2596.203
Water Basins	2011	1.967	4.491	0.000	59.548
Ruggedness	2011	307.076	934.286	4.305	16277.379
Latitude	2012	116600.306	520088.201	-1263666.875	1519304.125
Longitude	2012	678043.161	837486.610	-2303824.750	2199191.250
Population	2012	91769.590	277735.619	789.000	7477503.000

Table A18 Continued: Descriptive Statistics, County Data, Census, 1970-2000

	count	mean	sd	min	max
			1990		
Single Female Headship	2012	0.139	0.051	0.049	0.393
Sugar Suitability	2011	7.596	0.976	2.500	8.000
Cotton Suitability	2011	5.571	1.877	1.000	8.000
Rice Suitability	2011	6.562	1.414	1.200	8.000
Tobacco Suitability	2011	4.251	1.340	1.000	8.000
Slave Share 1860	1991	0.156	0.217	0.000	0.925
Soil Nutrients	2011	1.902	0.879	0.000	6.000
Soil pH	2010	26.781	6.530	10.000	77.857
Malaria Endemicity	2011	0.078	0.180	0.000	2.620
Temperature	2011	12.795	4.109	2.953	23.711
Precipitation	2011	1071.061	258.714	161.713	2173.767
Elevation	2011	265.406	254.854	1.622	2596.203
Water Basins	2011	1.967	4.491	0.000	59.548
Ruggedness	2011	307.077	934.286	4.305	16277.379
Latitude	2012	116559.393	520124.422	-1263666.875	1519304.125
Longitude	2012	678021.278	837475.243	-2303824.750	2199191.250
Population	2012	99820.134	307161.490	817.000	8863164.000
Black Incarceration	1704	0.263	0.279	0.000	1.250
			2000		
Single Female Headship	2012	0.156	0.055	0.055	0.438
Sugar Suitability	2011	7.596	0.976	2.500	8.000
Cotton Suitability	2011	5.571	1.877	1.000	8.000
Rice Suitability	2011	6.562	1.414	1.200	8.000
Tobacco Suitability	2011	4.251	1.340	1.000	8.000
Slave Share 1860	1991	0.156	0.217	0.000	0.925
Soil Nutrients	2011	1.902	0.879	0.000	6.000
Soil pH	2010	26.781	6.530	10.000	77.857
Malaria Endemicity	2011	0.078	0.177	0.000	2.620
Temperature	2011	12.795	4.109	2.953	23.711
Precipitation	2011	1071.103	258.761	161.713	2173.767
Elevation	2011	265.411	254.854	1.622	2596.203
Water Basins	2011	1.967	4.491	0.000	59.548
Ruggedness	2011	307.076	934.286	4.305	16277.379
Latitude	2012	116600.306	520088.201	-1263666.875	1519304.125
Longitude	2012	678043.161	837486.610	-2303824.750	2199191.250
Population	2012	111692.497	334517.796	851.000	9519338.000
Black Incarceration	1828	0.309	0.302	0.000	1.125

Table A19: Descriptive Statistics, Ethnographic Variables

	count	mean	sd	min	max
Extended Family	73	0.616	0.490	0.000	1.000
Nuclear Family	73	0.014	0.117	0.000	1.000
Patrilocality	73	0.795	0.407	0.000	1.000
Post-Partum Sex Taboos	14	4.571	1.697	2.000	6.000
Matrilineal Descent	73	0.110	0.315	0.000	1.000
Norms of Premarital Sexual Behavior	32	3.344	1.928	1.000	6.000
Animal Husbandry	69	1.884	1.334	1.000	9.000
Dependence on Agriculture	73	6.137	1.228	1.000	9.000
Intensity of Agriculture	71	3.282	0.759	2.000	6.000
Root and Tubers	71	0.014	0.119	0.000	1.000
Animals and Plow Cultivation	71	1.028	0.237	1.000	3.000
Sex Differences in Agriculture	50	3.440	1.296	1.000	5.000
Sugar Suitability	73	5.499	0.529	3.952	6.000