Did North Carolina Economically Breed-Out Blacks During its Historical Eugenic Sterilization Campaign?

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Abstract

Evidence exists that the state of North Carolina's eugenic sterilization program was racially biased insofar as it specifically targeted black Americans. In this paper, we consider the extent to which state-sanctioned eugenic sterilization in North Carolina was motivated by a desire to reduce the size of a presumably genetically unfit and unproductive surplus population. We utilize data on 2,163 eugenic sterilizations in the state of North Carolina 1958 - 1968[i]. Count data parameter estimates from a specification that conditions county-level eugenic sterilizations on measures of race-specific components of the surplus population reveals that the number of state-sanctioned eugenic sterilizations increased only with a county's black surplus population. Our results suggest that over the 1958-1968 time period North Carolina's eugenic sterilization was apparently tailored to asymptotically breeding-out the offspring of a presumably genetically unfit and undesirable surplus black population. This suggests that the presumption of genetic inferiority was unique to, and a burden born by blacks, as only their eugenic sterilizations in North Carolina were a function of their surplus population shares.

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I. Introduction

At least since Marx (1977) economics and political economy has recognized that capitalist market-based societies generate a population that will not be absorbed fully into the employed work force. To the extent that social policymakers view the surplus population—the unwanted populations that occupy the lowest strata of a society (Tyner, 2013)—as having an optimal size, historically, different proposals have emerged about policy interventions that would produce that optimal size. For example, Malthusians, in the spirit of Malthus (1798) generally advocated a Laissez-Faire approach, allowing mother nature's positive and preventive checks to regulate population. At another extreme were the eugenicists, inspired by Irving Fisher (1912) who advocated state-sanctioned eugenic sterilization for that part of the surplus population deemed genetically unfit. These policies included imprisonment (Chiricos and Delone, 1992; Shelden and Brown, 2000), and labor market policies to exclude the so-called unfit (Bernstein and Leonard, at the 2009).

In 1929 the North Carolina General Assembly authorized the governing body or executive head of any penal or charitable public institution to sterilize   any patient or inmate when it was determined to be in the individual's and/or publics best interest.[ii] At the local level, county boards of commissioners were authorized to order the sterilization, at public expense, of any individual determined to be mentally defective or feeble-minded upon receiving a petition from the individual's next of kin or legal guardian. The Eugenics Board of North Carolina was formally established in 1937 by the General Assembly to review petitions for the sterilization of individuals, and authorized any state hospital to charge appropriate local jurisdictions for sterilization expenses, and North Carolina introduced the nation's first state-supported birth control program (Schoen, 2001). Unlike those in other states, the North Carolina sterilization law also allowed local welfare officials to submit sterilization petitions for their clients. As such, the scope of North Carolina's eugenic sterilization law extended directly to recipients of public welfare.

The Executive Organization Act of 1971 transferred the Eugenics Board of North Carolina to the North Carolina Department of Human Resources. The governor-appointed secretary of the Department of Human Resources exercised managerial and executive oversight over sterilization petitions and proceedings of the Eugenics Board. In 1973, the Eugenics Board was reorganized and became the North Carolina Eugenics Commission. In 1974, the North Carolina General Assembly transferred responsibility for sterilization proceedings to the state judicial system. In 1977 the state formally abolished the North Carolina Eugenics Commission.

Price and Darity (2010) found that for the North Carolina eugenic sterilization program, blacks were apparently special targets, as relative to non-black population shares, only a county's black population share significantly explained the number of sterilizations during the 1958- 1968 time period. This finding raises the possibility that, at least in North Carolina, eugenic sterilization was a policy intervention to eliminate an undesirable black surplus population—an issue we explore in this paper. Indeed a at the dawn of the 20th century, it was posited that blacks constituted a subset of the surplus population, that left to their own devices, would become extinct (Darity, 1983, 1994). This belief Darity (1994) labeled the "Black Disappearance Hypothesis" presumed that blacks, being ill-suited for industrial society as a result of having inferior and maladaptive

genetic traits that predisposed them to high mortality disease, would ultimately die out. Such a characterization is consistent with blacks being viewed as an undesirable surplus population, and given the evidence suggesting that blacks were the special target of eugenic policies in North Carolina, it is conceivable that state-sanctioned eugenic sterilization policies were designed explicitly to "economically breed-out" (Fisher, 1921; Cot, 2005) an unfit and undesirable surplus black population.

In Marx's original formulation of the processes generating the surplus population, one of the key factors was technological change in market societies that increases labor productivity across time. This would create manpower redundancies that would continuously engender a fraction of them unemployable. This effect would occur regardless of the racial composition of the labor force. The projection of stigmatized inferiority on blacks, presumably, would make them more subject for assignment to the surplus population. Furthermore, if there are widely held beliefs that the so-called black underclass is less responsive to policies ostensibly intended to increase social mobility, their value to the profitable functioning of the labor market is reduced, and they become viewed as a dysfunctional segment of the population. They then become being objects of population control, particularly eradication (Darity, 1983).[iii] Why eliminate members of the surplus population? If one subscribes to eugenicist tenets that individual productive capacity is genetic and heritable, then being out of the labor force—neither employed nor seeking employment—is associated with producing no marketable output. To the extent that the presumed genetically unfit are members of the *surplus population*, a eugenicist policy can view them as being candidates for breeding out (Fisher, 1921; Cot, 2005)—limiting their options for sexual reproduction by sterilizing them so as to promote their asymptotic disappearance in the human gene pool.

In this paper, we consider whether eugenic sterilizations in North Carolina were tailored to meet a particular eugenics policy goal—to eliminate an undesirable and presumably genetically unfit and unproductive *surplus population*. A surplus population is viewed as an excess population above a sustainable poverty population in a political jurisdiction. The sustainable county-level poverty population, at least from the perspective of eugenic policy officials, could be determined by the poverty rate, as poverty triggers demand for public expenditures to maintain sustenance for persons outside of the labor force. In this context, as being out of the labor force is associated with individuals not producing any market output, eugenic sterilization can serve as a method to minimize poverty expenditures that maintain a genetically unfit and unproductive *surplus population*, and prevent it from transmitting such heritable traits to biological offspring, who would constitute a burden in the future.

Our inquiry makes several contributions. First, it extends Price and Darity (2010), who found that eugenic sterilizations in North Carolina were racially biased and disproportionately targeted blacks. Our paper considers the extent to which eugenic sterilizations in North Carolina can be rationalized within a eugenicist framework, in which presumably genetically unfit and unproductive individuals end up in the *surplus population*, out of the labor force—a signal they are genetically predisposed to low productivity—and not contributing to market output, become candidates for eugenic sterilization. By eliminating the options to birth offspring, they are bred out asymptotically as their unfit and unproductive offspring will not show up in some future *surplus*

population requiring antipoverty expenditures by political jurisdictions. Whereas Price and Darity (2010) provide no evidence of a particular mechanism by which eugenic sterilizations in North Carolina were distributed across racial groups, our paper considers if North Carolina eugenic sterilizations targeted those racial groups presumably genetically unfit and unproductive as signaled by their membership in the *surplus population*.

Our inquiry also contributes to the emerging subfield of *Stratification Economics* (Darity, 2005), as we examine a process involving the political economy of the provision of public tax-supported goods/services—in this case state-support eugenic sterilization—that generates inequalities between racial groups, similar to inquiries and findings of Alesina et al. (2001), Andrews (1999), Darity and Myers (1998), Jaynes (1989), Logan (2009), Loubert (2005), and Price (2008). As we consider how race may have conditioned a stigma of biological and genetic inferiority, our results provide additional empirical evidence regarding the historical consequences of racial stigma (Loury, 2002; Price, Darity and Headen, 2008).

Our examination of how race may have conditioned state-sanctioned forced sterilizations adds to the literature on how historical American eugenics policies were influenced by demographics (Ramsden, 2008), including group level characteristics such as gender (Schoen, 2001; Sanger, 2007;) and race (Cot, 2005; Darity, 1994; Dimand, 2005; Leonard, 2003; Peart and Levy, 2004; Price and Darity, 2010), particularly the belief that certain groups such as blacks were intellectually inferior relative to whites (Helms, 2012), and if prevented from breeding would maximize in the words of Irving Fisher—the vitality of the capital stock necessary for high material living standards (Bernstein and Leonard, 2009.)

Lastly, our historical inquiry contributes to the literature on the historical role of coercion and violence in economic and political compulsion, particularly as it relates to black Americans. For example, lynchings and the threat of lynchings, were utilized to control the supply of black labor (Christian, 2017), black voting (Jones, Troesken, and Walsh, 2017), and black housing/residential choices (Cook, Logan, and Parman, 2018). Nazi Germany, appealing to eugenic theories, used forced sterilizations on the offspring of black men and white German women, presumably to reduce the population share of blacks in Germany (Haas, 2008). Our inquiry adds eugenic sterilization to the historical arsenal of possible methods used to control the size of the black population in the United States.

The remainder of the paper is organized as follows: In the second section, we provide a simple model that consistent with eugenicist objectives to minimize the number of presumably genetically unfit and unproductive in the population, rationalizes a a positive and perhaps causal correlation between the number of eugenic sterilizations and the size of the surplus population in a political jurisdiction. The third section discusses the data and the empirical methodology, and reports parameter estimates from a specification of county-level eugenic sterilizations. As our sterilization data are discrete counts, we estimate the parameters of count data specifications of the number of sterilizations to estimate how the probability of forced sterilizations changed with respect to changes in a county's various racial *surplus population shares*. The last section concludes.

II. Eugenic Sterilization and Surplus Population: A Simple Model

Bernstein and Leonard's (2009) examination of Progressive Era labor market policy suggests that it was designed to exclude defective groups from the labor market, embracing a eugenics ideology of excluding and punishing unfit workers that dominated government policy. Thus it is plausible that during 1958 - 1968, the eugenics based policy prerogatives of the Progressive Era still motivated eugenic sterilization policies in North Carolina, given path dependency in policy choices.[iv]

To illustrate the plausible relationship between eugenic sterilization, the labor market, and the presumably unfit, assume within a political jurisdiction there are N identical individuals employed by profit-maximizing firms. Each individual has a probability $0 \leq \tau \leq 1$ of withdrawing from the labor force, rendering that individual unfit and unproductive in the sense that the individual produces no official market output, and a probability $0 \leq s \leq 1$ of being eugenically sterilized. Let G and O be the number of eugenic sterilizations and number of individuals in the *surplus population* respectively, in a given political jurisdiction, where $G = g_i \cdots g_n$, and $O = o_j \cdots o_m$. Suppose that consistent with political jurisdictions targeting presumably unproductive and genetically unfit individuals for eugenic sterilization $G \propto \tau$. As $O \propto s$, a relationship between eugenic sterilization and the surplus population follows from the expected value of eugenic sterilizations conditional on individuals being in the *surplus population*.

From Bayes' rule $P(G|O) = [\tau(s \mid \tau)]/\tau$. The mean of $E(G \mid O = o_j)$ over the entire distribution of O is:

$$\sum_j \tau_j E(G|O = o_j) = \sum_i \sum_j \tau_{ij}(s_{ij}|\tau_{ij})g_i = E(G) \tag{1}$$

where E is the expected value operator. As $\sum_j = M$ (the number of individuals in the *surplus population*) then $\partial E(G)/\partial M > 0$. An implication of (1) is that eugenic sterilizations are positively correlated with the size of the *surplus population*, and we explore this relationship with cross-county data from the State of North Carolina from 1958 - 1968.

Our simple theoretical framework provides a rationale for eugenic sterilization as policy to reduce the number of individuals in a population that are deemed genetically unfit. To the extent that the unfit are members of the *surplus population*, and if membership in the *surplus population* signaled that one was indeed unfit, our simple model rationalizes a positive correlation, and perhaps causal relationship, between the number of eugenic sterilizations and the size of the surplus population in a political jurisdiction. In addition, relative to the rationale suggested by Price and Darity (2010) that racial population shares alone governed eugenic sterilization practices in North Carolina, the implications of (1) provide for a different and more specific eugenic sterilization mechanism in which race and fitness—one's membership in the surplus population—is important.

III. Data, Methodology, and Results

We use the data from Price and Darity (2010), which are based on the 1958 - 1968 Biennial Reports of the North Carolina Eugenics Board.[v] These data report the number of performed sterilizations at the county level, and allow three classifications of the type of sterilization performed: 1.) total Sterilizations, 2.) total institutional sterilizations, and 3.) total non-institutional sterilizations. As local officials were empowered to recommend individual sterilizations, aggregating across counties and estimating effects at the county-level is appropriate. Tables 1-2 report by North Carolina counties the total number of institutional and non-institutional sterilizations respectively, from 1958 - 1968.[vi] For institutional sterilizations, there were 15 counties for which there were none, but this was the case for only 4 counties with respect to non-institutional sterilizations. Across both types of performed sterilizations only one county–Clay– reported no sterilizations at all. Including both institutional and non-institutional sterilizations, over the 1958 - 1968 time period , a total of 2,163 sterilizations authorized by the Eugenics Board were performed in North Carolina.

Our empirical strategy is motivated by the theoretical proposition above that the expected value of the number of eugenic sterilizations increases with the size of   a   *surplus population* that may require welfare expenditures to finance its subsistence—at some level. We estimate a given county's surplus population   on the basis of the sustainable   poverty rate in the county population. The sustainable poverty rate   is the maximum population in poverty that can be sustained in a given political jurisdiction. In particular we posit that for a given county, the surplus population is the difference between a county's actual population and the sustainable poverty population.

What determines sustainable poverty rate in a population? In general, as suggested by the literature on human population ecology (Cohen, 1995; Hopfenberg, 2003; Odum, 1953; Sayre, 2008), it is determined by those resources required for human populations to at least subsist. We posit that a county's sustainable poverty population, at least from the perspective of North Carolina eugenic policy officials, was determined by the poverty rate. As Price and Darity (2010) note, relative to sterilization laws in other states the North Carolina law was unique in that it allowed local welfare officials to submit sterilization petitions for their clients. As such, the scope of North Carolina's eugenic sterilization law extended directly to recipients of public welfare. The analyses of Schoen (2001, 2005) and Railey (2002) also reveal the extent to which local welfare expenditures motivated sterilization.

This suggests that a motivation behind state-sanctioned sterilizations in North Carolina was to minimize welfare expenditures triggered by poverty, and eugenic sterilization served as a strategy to minimize expenditures on poverty abatement that would sustain individuals who are presumably genetically unfit and unproductive. Our specification of the sustainable poverty population in a county is the square of the predicted poverty rate for the population. This approach to estimating a sustainable poverty population approximates empirically what Cohen (1995) characterizes as Malthus-Condorcet models of sustainable human populations in which human population growth is conditioned proportionately on some critical resource needed for human sustenance. As the poverty rate is an indicator of the level of human sustenance, it plausibly conditions a sustainable poverty population, particularly the extent to which the size of the population is compatible with increasing, decreasing, or maintaining human sustenance. We measure the   *surplus population* of a county as the difference between the actual population and

the predicted sustainable population. The predicted sustainable poverty population is estimated from a Negative Binomial regression of each county's total number of individuals in a particular racial group as a function of the county poverty rate, and its square.[vii]

Our econometric specification of eugenic sterilizations is based upon its expected value implied by our simple model in (1). As the number of eugenic sterilizations is positively correlated with the size of the *surplus population*, our simple model is consistent with that of Price and Darity (2010), whereby the North Carolina Eugenics Commission tailored and implemented what it viewed as optimal sterilization policies. In particular for each racial group i in the population, there exists an ideal *surplus population* share $0 < O_i \leq 1$ for a given political jurisdiction. There exists a sterilization target S_i^*, that is consistent with these ideal *surplus population* shares O_i'. These *surplus population* shares represent what the state viewed as a solution to minimizing public expenditures on poverty abatement on genetically unfit and unproductive individuals. Formally, we assume that an optimal eugenic sterilization policy is a solution to: $_{argmax}(S_i \mid O_i = O_i')$ for $i = 1, 2, \cdots$ N racial groups. The analysis here extends, and is different from the findings of Price and Darity (2010) as the solution yields a reduced form aggregate sterilization function $\mathbf{S} = \sum S_i^*(O_i)$ that coheres with the expected value representation of eugenic sterilizations in (1), which is a function of the respective racial group *surplus population* shares. Given prior eugenicist beliefs about the ideal *surplus population* shares of particular racial groups, any prior belief that dysgenic traits are disproportionately located in a particular racial group, and/or not existent at all in a particular racial group, corner solutions for racial groups are feasible. In particular, if it is believed that particular racial groups do not harbor any dysgenic individuals, their existing *surplus population* share is ideal and not subject to eugenic sterilization or $S_i = S_i^* = 0$ if $O_i = O_i'$, where S_i^* is the optimal number of eugenic sterilizations for racial group i.

As the dependent variable of interest is integer-value we specify and estimate the parameters of a Negative Binomial regression specification, where the estimated parameters measure the effects of exogenous variables on λ—the expected number of eugenic sterilizations.[viii] We specify and estimate λ as a function of the *surplus population* for each distinct racial group identified in the sample. As in Price and Darity (2010), a fixed effect parameter estimator is used that conditions any unobservables that may affect sterilization costs on population density and the number of poor individuals in a county respectively.[ix]

If eugenic sterilization policy officials were also optimizing sterilizations directly on other unobservable and presumably heritable economic and/or health outcomes, even the fixed effect parameter estimates could suffer from omitted variable bias. To evaluate our parameter estimates for robustness with respect to this potential omitted variable bias, we report fixed effect parameter estimates that add four control variables: 1.) the percent of individuals in a county who were at or below poverty in 1969, 2.) county per capita income in 1969, 3.) the number of individuals in a county in a state psychiatric hospital in 1980, and 4.) the number of individuals in a county in state mental retardation centers in 1980.[x] All parameter estimates are reported as the marginal effects of incident rate ratios, where marginal effects are based on sample averages of the regressors. This permits an assessment of how large the effects are when a parameter has significance. Because we are interested in how race-specific surplus shares condition sterilization probabilities, the marginal

effects tell us how large sterilization probabilities are for a particular racial group relative to all other racial groups. The explanatory adequacy of all parameter estimates are assessed with a Wald chi-square distributed test for the null hypothesis that the exogenous explanatory variables have parameters that are jointly insignificant. For all specifications, Pseudo-R ^{2} (McFadden, 1974) is reported as a goodness-of-fit measure.

The, mean, median and standard deviation of the covariates in our eugenic sterilization specifications are reported in Table 3. We consider parameter estimates of a model with three measures of sterilization (institutional, non-institutional, and total) as the dependent variable, and for each racial group in a county—an estimate of the size of its population surplus. Our estimate of a racial group's surplus population is based on the difference between a racial group's actual population and it population predicted by a Negative Binomial regression of its population as a function of the county poverty rate and its square. The basic idea is that, at least in the mind of eugenic sterilization policy officials, there was some optimal population and poverty rate that minimized public assistance expenditures. Our predicted racial group populations as a function of poverty thus approximates the sustainable population at the county level for each racial group. Any population in excess of this is viewed as undesirable, and given our theory, incentivizes the sterilization of individuals outside of the labor force—members of the *surplus population*—who are actual or potential public assistance recipients.

Negative Binomial parameter estimates for the prediction of each county's racial group sustainable population are reported in Table 4. For all the racial groups under consideration, at least one of the poverty rate variables is statistically significant, suggesting that the poverty rate is a determinant of a county's population. For eugenic sterilization policy officials who also desired to minimized antipoverty expenditures on the presumably genetically unfit, the statistical significance of the poverty rate in explaining county population rendered it consistent with being a sustainable poverty population specification. In this context, the low measure of fit suggested by the reported Pseudo-R ^{2} for each specification does not militate against the sustainable poverty population parameter estimates. As long as North Carolina eugenic sterilization policy officials had at least a partial objective to have a *surplus population* size that minimizes antipoverty expenditures, poverty rates as a determinant of total population informs the sensitivity of antipoverty expenditures to the size of the population needing antipoverty support, some of whom for eugenic policy officials were presumably genetically unfit, and potential candidates for eugenic sterilization.

Table 5 reports our first set of Fixed Effect Negative Binomial parameter estimates for our three sterilization measures as a function of county racial group surplus population.[xi] The specifications consider in sequence, institutional, non-institutional, and total sterilizations as the regressand. The first three columns condition the unobserved effects on county population density, and the last three columns condition the unobserved effects on the number of individuals in the county below poverty.[xii] With the exception of the parameter estimates for institutional sterilizations in column (1) and total sterilizations in column (2), the expected number of sterilizations increases significantly only with the size of a county's black surplus population. That a positive and significant effect for a county's surplus black population is predominant across the specifications suggests that eugenic sterilization policies in North Carolina were racially biased.

This is also consistent with eugenic sterilization motivated by eradicating—"economically breeding out" in the vernacular of Irving Fisher (Cot, 2005; Fisher, 1921)—an undesirable population of surplus blacks. As for magnitude of the risks faced by blacks, the incidence ratios can be converted to the incidence of sterilization per 100,000 blacks. Thus, the parameter estimates reported in Table 4 suggest that on average (e.g. based on approximately 83 percent of the specifications). in North Carolina from 1958-1968, the sterilization rate for blacks was between 2 and 4 per 100,000 blacks, and zero for all other racial groups.

It is conceivable that the objectives of eugenic sterilization policy officials included minimizing the incidence of poverty and maximizing the incidence of wealth—both according to classic eugenics theory presumably determined by heritable biogenetic traits. To the extent that the specifications in Table 5 omit variables that capture these objectives, and they are unobserved and not correlated with population density and the number of poor individuals in a county, the parameter estimates reported in Table 5 could suffer from bias. To evaluate our parameter estimates for robustness with respect to these potential omitted variables, we add additional controls directly into our eugenic sterilization specification, and report the parameter estimates in Table 6. Following Darity and Price (2010) we account for the possibility that sterilization policies in North Carolina were motivated by reducing the population share of individuals determined biologically unfit due to some heritable deficient mental health characteristic—the so-called "feeble-minded." We also include population per square mile in 1960 to render the specifications comparable to the specifications in Table 5.

Even after controlling for other objectives besides eliminating undesirable racial that eugenic sterilization policy officials may have had, the parameter estimates reported in Table 6 conform to those in Table 5. Eugenic sterilizations increased significantly with the size of a county's surplus black population in a majority of the specifications. Moreover, a county's white surplus population share is never significant. For Native Americans, increases in their surplus population are positive and significant in two instances for institutional sterilizations. Interestingly, for other racial groups, increases in their population share has a negative and significant effect on the number of institutional sterilizations. Nonetheless, the surplus black population is solely positive and significant in approximately 67 percent of the specifications , suggesting that in North Carolina, from 1959-1968 eugenic sterilization policies were aimed at eradicating an undesirable surplus black population. As for magnitude, the parameter estimates reported in Table 5 suggest that, similar to the sterilization incidence rates for the parameter estimates in Table 4, from 1958-1968, the sterilization rate for blacks was between 2 and 5 per 100,000 blacks and zero for all other racial groups.

In general, the parameter estimates in Table 5 - 6 are, at least for blacks, consistent with our theoretical framework—the number of eugenic sterilizations is positively correlated with the size of the *surplus population*. Of course, our results suggest it is specifically the black *surplus population* that was correlated with the number of eugenic sterilizations. Similar to the findings of Darity and Price (2010) the parameter estimates in Tables 4 - 5 in Tables 5 - 6 are consistent with genocide. Our results show that while non-black racial groups accounted for the majority of sterilizations over the time period under consideration, their *surplus population* shares did not significantly influence the probability of sterilization. This suggests that non-blacks were sterilized

for reasons other than being presumably genetically unfit and unproductive. In contrast, county level sterilization probabilities increased with respect to a county's black *surplus population*. This suggests that for blacks, eugenic sterilizations were authorized and administered with the aim of reducing their numbers in the future population—genocide by any other name.[xiii]

IV. Conclusion

This paper considered the extent to which eugenic sterilizations in North Carolina over the 1958 - 1968 time period were consistent with eliminating a *surplus population* that was presumably genetically unfit and unproductive. We estimated the parameters of count data specifications where county-level eugenic sterilizations were a function of measures of *surplus population* for racial groups. Our results revealed that in North Carolina from 1958-1968, the probability of eugenic sterilization increased, by and large, with a county's black *surplus population*. Our results suggest that historically, eugenic sterilization policies in North Carolina were tailored not just to control the size of a presumably dysgenic black population as in Darity and Price (2010), but to breeding-out a presumably genetically unfit and unproductive black *surplus population* In particular, our results suggest the state-supported North Carolina eugenics sterilization program aimed to breeded-out asymptotically, the presumably genetically unfit and unproductive offspring of blacks, so they would not show up in some future *surplus population* requiring antipoverty expenditures by political jurisdictions. Indeed, since other racial groups were sterilized without the magnitude of their surplus populations affecting their sterilization incidence, it suggests that at least in North Carolina, the presumption of genetic inferiority was unique to blacks, and a burden born by blacks, as their eugenic sterilizations were a function of their surplus population shares—unlike other racial groups.

Our findings also have policy implications. As genetic technologies such as Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) have emerged with the potential to improve human reproductive health, our results suggest that any health policies that emerge based on innovations such as CRISPR could have racially biased effects. Given North Carolina's past abuse of genetics as factor determining reproductive health outcomes, future genetic-based reproductive health policies across the United States could result in additional racially dystopic outcomes (Roberts, 2009), and further reductions in trust by Black Americans in genetic-based health reproductive health options (Chisolm-Straker and Straker, 2017; Peters, Rose, and Armstrong, 2004). In general, our results cohere with Weinbaum (2013), who emphasizes how reproductive health policies can lead to the exploitation of the reproductive body and reproductive processes based upon the demands of a race-based capitalism.

Table 1
Total Institutional Sterilizations Performed
By North Carolina County of Residence: July 1958 - June 1968

County of Residence	Total Sterilizations	County of Residence	Total Sterilizations
Alamance	4	Alexander	1
Alleghany	0	Anson	2
Ashe	2	Avery	5
Beaufort	4	Bertie	4
Bladen	1	Brunswick	1
Buncombe	7	Burke	8
Cabarrus	6	Caldwell	5
Camden	0	Carteret	3
Caswell	2	Catawba	7
Chatham	1	Cherokee	1
Chowan	0	Clay	0
Cleveland	4	Columbus	4
Craven	5	Cumberland	6
Currituck	1	Dare	1
Davidson	7	Davie	0
Duplin	3	Durham	5
Edgecombe	4	Forsyth	13
Franklin	4	Gaston	19
Gates	2	Graham	1
Granville	0	Greene	3
Guilford	11	Halifax	5
Harnett	0	Haywood	2
Henderson	2	Hereford	2
Hoke	0	Hyde	5
Iredell	8	Jackson	1
Jones	2	Lee	1
Lenoir	7	Lincoln	3
Macon	1	Madison	0
Martin	3	McDowell	4
Mecklenburg	26	Mitchell	4
Montgomery	0	Moore	1
Nash	9	New Hanover	4
Northhampton	2	Onslow	2
Orange	4	Pamlico	1
Pasquotank	1	Pender	1
Perquimans	0	Person	3
Pitt	3	Polk	1
Randolph	4	Richmond	4
Robeson	8	Rockingham	7
Rowan	9	Rutherford	5
Sampson	2	Scotland	3
Stanly	0	Stokes	0
Surry	2	Swain	0
Transylvania	4	Tyrell	1
Union	2	Vance	5
Wake	13	Warren	1
Washington	0	Watauga	1
Wayne	8	Wilkes	4
Wilson	6	Yadkin	2
Yancey	0	Johnston	2

Source: Brown (1935,1964, 1966), Craig (1968), and Winston (1960, 1962).

Table 2
Total Non-Institutional Sterilizations Performed
By North Carolina County of Residence: July 1958 - June 1968

County of Residence	Total Sterilizations	County of Residence	Total Sterilizations
Alamance	36	Alexander	0
Alleghany	1	Anson	1
Ashe	6	Avery	0
Beaufort	8	Bertie	22
Bladen	31	Brunswick	14
Buncombe	22	Burke	1
Cabarrus	30	Caldwell	10
Camden	13	Carteret	7
Caswell	5	Catawba	12
Chatham	8	Cherokee	0
Chowan	19	Clay	0
Cleveland	21	Columbus	24
Craven	10	Cumberland	31
Currituck	2	Dare	1
Davidson	5	Davie	4
Duplin	30	Durham	28
Edgecombe	14	Forsyth	33
Franklin	20	Gaston	39
Gates	17	Graham	0
Granville	1	Greene	7
Guilford	64	Halifax	13
Harnett	15	Haywood	7
Henderson	8	Hereford	62
Hoke	6	Hyde	1
Iredell	29	Jackson	5
Jones	5	Lee	34
Lenoir	16	Lincoln	7
Macon	5	Madison	14
Martin	15	McDowell	3
Mecklenburg	241	Mitchell	1
Montgomery	8	Moore	23
Nash	33	New Hanover	32
Northhampton	13	Onslow	13
Orange	9	Pamlico	15
Pasquotank	19	Pender	15
Perquimans	19	Person	33
Pitt	54	Polk	0
Randolph	17	Richmond	12
Robeson	33	Rockingham	5
Rowan	39	Rutherford	6
Sampson	16	Scotland	84
Stanly	6	Stokes	2
Surry	20	Swain	5
Transylvania	1	Tyrell	2
Union	2	Vance	11
Wake	33	Warren	9
Washington	1	Watauga	3
Wayne	50	Wilkes	34
Wilson	22	Yadkin	4
Yancey	1	Johnston	17

Source: Brown (1935,1964, 1966), Craig (1968), and Winston (1960, 1962).

Table 3
Covariate Summary

Variable	Mean	Median	Standard Deviation
Total sterilizations: July 1958 - June 1968	21.63	15	30.24
Total institutional sterilizations: July 1958 - June 1968	3.58	2.5	3.99
Total non-institutional sterilizations: July 1958 - June 1968	18.05	12.5	27.42
County White Surplus Population in 1960	184.12	-4326.43	28740.17
County Black Surplus Population in 1960	-21.93	-2304.97	11872.25
County Asian Surplus Population in 1960	1.08	-6.66	62.45
County Native American Surplus Population in 1960	-145.26	-73.17	2858.91
County Filipino Surplus Population in 1960	.728	-.771	12.09
County Other Race Surplus Population in 1960	.114	-2.80	14.99
County Population per Square Mile in 1960	94.29	63	92.40
Percent of County Individuals Below Poverty in 1969	.253	.258	.092
County Per Capita Income in 1969	2141.42	2093.5	419.29
Number of Individuals In County served in state psychiatric hospitals in 1980	179.97	105.5	9203.84
Number of Individuals In County served in state mental retardation centers in 1980	33.38	24	33.71

NOTES: Racial-group population data are based on race and sex group county-level census data for 1960 from the University of Virginia Library Historical Census Browser at www.fisher.lib.virginia.edu . Population per square mile, Percent of County Individuals Below Poverty, and Per Capita Income (in 1996 dollars), Number of Individuals served in state psychiatric hospital, and Number of Individuals In County served in state mental retardation centers, are based on census data from the North Carolina Department of Management & Budget at www.data.osbm.state.nc.us/pls/linc .

Table 4
Negative Binomial Parameter Estimates:
Sustainable Population and County Poverty

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Specification:	(1)	(2)	(3)	(4)	(5)	(6)
Population Regressand:	_White_	_Black_	_Asian_	_Native American_	_Filipino_	_Other_
	Population	_Population_	_Population_	_Population_	_Population_	_Population_
Regressors:						
Constant	11.94	13.02	2.52	5.27	-3.83	2.74
	$(.4574)^a$	$(.5011)^a$	$(1.01)^a$	$(1.77)^a$	$(1.71)^a$	$(1.01)^b$
County Poverty Rate	-10.03	-26.48	20.97	-21.29	66.45	12.91
	$(4.23)^b$	$(6.65)^a$	(13.55)	(17.19)	$(21.35)^a$	(12.13)
County Poverty Rate	5.21	50.03	-89.05	87.29	-177.73	-66.22
× County Poverty Rate	(9.39)	$(17.68)^b$	$(33.78)^b$	$(42.31)^b$	$(54.44)^a$	$(30.67)^b$
N	100	100	100	100	100	100
Pseudo-R ^{2}	.024	.014	.059	.029	.039	.039
χ^2_{k-1}: (H $_o$: $\beta_1 = \cdots \beta_k = 0$)	54.18^a	12.15^a	34.91^a	28.76^a	12.44^a	19.35^a

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Standard errors in parentheses.
^{a} Significant at the .01 level
^{b} Significant at the .05   level

NOTES: For each regression specification, the population regressors are for the specific racial groups. Racial-group population data are based on race and sex group county-level census data for North Carolina from the University of Virginia Library Historical Census Browser at www.fisher.lib.virginia.edu.   The 1969 poverty rate data are based on the percent of county individuals below poverty reported in census data from the North Carolina Department of Management & Budget at www.data.osbm.state.nc.us/pls/linc .

Table 5
Fixed Effect Negative Binomial Parameter Estimates
(Unobserved Sterilization Costs Conditioned on Population Density and Number of County Poor)

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Specification:	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Regressand	*Institutional Sterilizations*	*Non-institutional Sterilizations*	*Total Sterilizations*	*Institutional Sterilizations*	*Non-institutional Sterilizations*	*Total Sterilizations*
Regressors:						
County White Surplus	.00001	.000007	.000008	.000006	.000005	.000005
Population in 1960	(.000005) [b]	(.000005)	(.000004) [b]	(.000004)	(.000004)	(.00004)
County Black Surplus	.00001	.00004	.00004	.00002	.00004	.00004
Population in 1960	(.00001)	(.00001) [a]	(.00001) [a]	(.00001) [b]	(.00001) [a]	(.00001) [a]
County Asian Surplus	.00003	-.002	-.002	-.001	-.003	-.002
Population in 1960	(.003)	(.003)	(.003)	(.002)	(.003)	(.002)
County Native American Surplus	.00004	.000009	.00001	.00003	.00002	.00002
Population in 1960	(.00002) [b]	(.00002)	(.00002)	(.00002)	(.00002)	(.00002)
County Filipino Surplus	-.006	.012	.009	.012	.014	.013
Population in 1960	(.017)	(.014)	(.012)	(.013)	(.014)	(.011)
County Other Race Surplus	-.013	-.009	-.011	-.008	-.005	-.007
Population in 1960	(.011)	(.008)	(.008)	(.008)	(.008)	(.007)
N	100	100	100	99	99	99
Pseudo-R²	.234	.151	.156	.209	.146	.147
χ^2_{k-1}: (H$_o$: $\beta_1 = \cdots \beta_k = 0$)	27.80 [a]	46.95 [a]	49.62 [a]	67.36 [a]	108.51 [a]	123.20 [a]

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Standard errors in parentheses.
[a] Significant at the .01 level
[b] Significant at the .05 level
NOTES: All parameter estimates are reported as the marginal effects of incident rate ratios, where marginal effects are based on sample averages of the regressors. Racial-group population data are based on race and sex group county-level census data for North Carolina from the University of Virginia Library Historical Census Browser at www.fisher.lib.virginia.edu. The parameter estimates condition the unobserved sterilization costs on county population per square mile measured as county population per square mile and percent of county individuals below poverty reported in 1970 census data from the North Carolina Department of Management & Budget at www.data.osbm.state.nc.us/pls/linc

Table 6
Augmented Fixed Effect Negative Binomial Parameter Estimates
(Unobserved Sterilization Costs Conditioned on Population Density and Number of County Poor)

Specification:	(1)	(2)	(3)	(4)	(5)	(6)
Regressand	Institutional Sterilizations	Non-institutional Sterilizations	Total Sterilizations	Institutional Sterilizations	Non-institutional Sterilizations	Total Sterilizations
Regressors:						
Number of Individuals In County served in state psychiatric hospitals in 1980	.001 (.00004) [b]	-.0002 (.0004)	.0002 (.0004)	.0008 (.0004)	-.00012 (.0005)	.00005 (.0004)
Number of Individuals In County served in state mental retardation centers in 1980	.004 (.006)	.002 (.007)	.001 (.006)	-.009 (.007)	-.002 (.008)	-.004 (.007)
County population per square mile in 1960	.009 (.003) [a]	.003 (.003)	.006 (.003) [b]	.002 (.001) [b]	.001 (.002)	.002 (.001)
County per capita income in 1969	.0002 (.0003)	.00009 (.0003)	-.0001 (.0003)	.0004 (.0006)	.0003 (.0005)	.0004 (.0005)
County White Surplus Population in 1960	.000007 (.00001)	.000006 (.00001)	.000006 (.00001)	.000009 (.00001)	.000004 (.00001)	.000006 (.00001)
County Black Surplus Population in 1960	-.000002 (.00001)	.00004 (.00001) [a]	.00003 (.00001) [a]	.000001 (.00001)	.00005 (.00001) [a]	.00003 (.00001) [a]
County Asian Surplus Population in 1960	.002 (.003)	-.002 (.003)	-.0007 (.002)	-.0006 (.003)	-.002 (.002)	-.002 (.002)
County Native American Surplus Population in 1960	.00003 (.000017) [c]	.000004 (.00002)	.000009 (.00002)	.00005 (.00002) [b]	.00002 (.00002)	.00002 (.00002)
County Filipino Surplus Population in 1960	-.007 (.015)	.008 (.014)	.002 (.013)	.015 (.013)	.013 (.012)	.013 (.011)
County Other Race Surplus Population in 1960	-.013 (.007) [c]	-.005 (.009)	-.009 (.007)	-.019 (.010) [c]	-.005 (.009)	-.009 (.009)
N	100	100	100	99	99	99
Pseudo-R²	.284	.156	.166	.222	.143	.149
χ^2_{k-1}: (H$_o$: $\beta_1 = \cdots \beta_k = 0$)	61.69 [a]	76.91 [a]	138.80 [a]	75.86 [a]	128.84 [a]	148.96 [a]

Standard errors in parentheses.
[a]Significant at the .01 level
[b]Significant at the .05   level
[c]Significant at the .10 level
NOTES: All parameter estimates are reported as the marginal effects of incident rate ratios, where marginal effects are based on sample averages of the regressors. Racial-group population data are based on race and sex group county-level census data for North Carolina from the University of Virginia Library Historical Census Browser at www.fisher.lib.virginia.edu.   The parameter estimates condition the unobserved sterilization costs on county population per square mile measured as county population per square mile and percent of county individuals below poverty reported in 1970 census data from the North Carolina Department of Management & Budget at www.data.osbm.state.nc.us/pls/linc .

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[i] Eugenic sterilizations in North Carolina consisted of vasectomy (clamping of vas deferens) and castration (the removal of one or both testicles) for males; and salpingectomy (the removal of one or both fallopian tubes) and ovariectomy (the removal of one or both ovaries) for women.

[ii] Our historical account of state-sanctioned sterilizations in North Carolina comes from Darity and Price (2010) and is based on the account provided by Brown (1935) Schoen (2001) and the archival history reported in *Guide to Research Materials in the North Carolina State Archives: State Agency Record*s. Second Edition. 1995.

[iii] In contrast to Darity (1983) Willhelm (1986) argues that all blacks are potential candidates for genocide, and characterizes existing black-white inequality as conditional (Sartre and Sartre; 1968)—a situation in which any black resistance or revolt increases the risk of black extermination.

[iv] Collier and Collier (1991) provide a useful framework for considering how policy choices are subject to path dependence (David, 1985). In general initial historical conditions can define, legitimize and delimit policy choices. As such, policy agents make choices contingent on initial objectives, setting a specific trajectory of policy actions that may prove difficult to reverse in the future. For a critique of path dependency in policy choices see Kay (2005).

[v] For a historical account of the Eugenic sterilization program in North Carolina, see Darity and Price (2010).

[vi] Eugenic sterilizations in North Carolina consisted of *vasectomy* (clamping of vas deferens) and *castration* (the removal of one or both testicles) for males; and *salpingectomy* (the removal of one or both fallopian tubes) and *ovariectomy* (the removal of one or both ovaries) for women.

[vii] Of course, there may be other covariates that determine the population carry capacity of a county. However, to the extent that eugenics policy authorities desired to minimize anti-poverty expenditures on the genetically unfit, minimizing the population eligible for such expenditures suggests that the relevant *surplus population* is that component which is sensitive to poverty rates.

[viii] If a random variable S_i conditional on the mean value λ_i of S_i is a Negative Binomial random variable then:

$$Prob(S_i = s_i|\lambda_i) = \left(\frac{r}{r+\lambda_i}\right)^r \frac{\Gamma(r+s_i)}{\Gamma(s_i+1)\Gamma(r)} \left(\frac{\lambda_i}{r+\lambda_i}\right)^{s_i}$$

for $s_i = 0$, 1, 2 ⋯ n, where r is a dispersion parameter, and Γ is the gamma function. A Negative Binomial regression model (Cameron and Trivedi, 1998) is formulated by specifying for some integer-valued measure of sterilizations S_i for county i, the mean level λ_i, as a function of a vector of exogenous variables (θ):

$$ln\lambda_i = \beta'\theta + \varepsilon_i$$

where β is a coefficient vector, θ is a vector of exogenous variables that determine the expected value of the number of sterilizations S_i for the ith county, and ε_i reflects unobserved heterogeneity causing the mean and variance of λ to differ. The log-likelihood function $L(\beta)$ has a gradient and Hessian given by:

$$\frac{\partial L(\beta)}{\partial \beta} = \sum \left[\theta'(S_i - e^{\beta'\theta+\varepsilon}\right] = 0$$

$$\frac{\partial^2 L(\beta)}{\partial \beta \, \partial \beta'} = \sum \left[-(S_i'S_i)e^{\beta'\theta+\varepsilon})\right] < 0$$

Equating the gradient to zero solves for β, and the negativity of the Hessian ensures a global maximum of the log-likelihood estimator of the coefficients in β.

[ix] This captures the idea that the transaction and information costs of sterilization decline with increases in population density, and with respect to increases in the number of poor individuals in a county—as it would minimize welfare expenditures (Schoen, 2001; 2005; Railey, 2002). Our fixed effect estimator is in the spirit of Hausman, Hall and Griliches (1984) which estimates the parameters of the Negative Binomial regression with the following restrictions:

$$E(\lambda_i) = D_i + \beta'\theta + \varepsilon_i$$

$$Var(\lambda_i) = (1 + e^{D_i})E(\lambda_i)$$

where e is a natural logarithm, and the D_i are county dummies correlated but fixed with some unobserved effect.

[x] These four controls allow for alternative objectives of eugenic sterilization policy officials such as 1) minimizing the incidence of poverty and maximizing the incidence of wealth—which according to classic eugenics theory presumably driven by heritable biogenetic traits and for and 2) this would reduce the population share of individuals determined biologically unfit due to heritable deficient mental ability characteristics – the so-called "feeble-minded". It is possible that our 1980 proxies for the number of individuals in a county with so-called mental defects are poor measures of their contemporaneous measures, and they should not be used. However, Wickens (1972) demonstrates that the parameter bias from omitting poor proxies is greater than the parameter bias with including them.

[xi] We do not estimate and report simple Poisson specifications, nor test the simple Poisson for mean-variance equality—which if rejected justifies a Negative Binomial specification. As a Negative Binomial specification accounts for unobserved heterogeneity, and a simple Poisson specification does not, a Negative Binomial specification is consistent with estimating the parameters of a population sterilization function given uncertainty about the true model.

[xii] In particular, we panel the data not by time, but by population density and poverty population z-scores. For an example of this type of panel structure and fixed effect parameter estimation see Geronimus and Korenman (1992). For both conditioning variables county groups are based on standardized z-scores with endpoints of -3 and + 3.

[xiii] Ratified in January of 1951, the United Nations Convention of the prevention and punishment of the crime of genocide, defines genocide as any of the following acts committed with intent to destroy, in whole or in part, a national, ethnic, racial or religious group: (1) Killing members of the group, (2) Causing serious bodily or mental harm to members of the group, (3) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part, (4) Imposing measures intended to prevent births within the group, and (5) Forcibly transferring children of the group to another group. Our results are consistent with (4).