



# The economics of race and eugenic sterilization in North Carolina: 1958–1968

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## ABSTRACT

Theoretical justifications for state-sanctioned sterilization of individuals provided by Irving Fisher rationalized its racialization on grounds that certain non-white racial groups, particularly blacks due to their dysgenic biological and behavioral traits, retarded economic growth and should be bred out of existence. Fisher's rationale suggests that national or state level eugenic policies that sterilized the so-called biological and genetically unfit could have been racist in both design and effect by disproportionately targeting black Americans. We empirically explore this with data on eugenic sterilizations in the State of North Carolina between 1958 and 1968. Count data parameter estimates from a cross-county population allocation model of sterilization reveal that the probability of non-institutional and total sterilizations increased with a county's black population share—an effect not found for any other racial group in the population. Our results suggest that in North Carolina, eugenic sterilization policies were racially biased and genocidal.

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## 1. Introduction

To the extent that the discipline of economics provides analytical and empirical insights into improving the material well-being of society, historically it has been a source of policy prescriptions that would promote optimal population quantity and quality. For example, both Malthus' (1798) famous essay on population and Ricardo's (1817) consideration on how real wages decline with population growth point toward a conception of an optimum size of population relative to the global natural resources endowment. The echos of their perspective are present in biologist Paul Ehrlich's (1968) strictures about an optimum population size for the United States and for the world as a whole. Disturbingly, Ehrlich's estimates of the optimum are

considerably lower than the current American or global population. Correspondingly Gregory Clark's (2007) more recent exposition on the role of genetically selected populations' alleged contributions to the economic success and rise of Western Europe points toward notions of a biological and genetic optimum composition of population.

Optimum quality and quantity of population is decidedly the terrain of the eugenicists. Indeed, during the first half of the twentieth century the American eugenics movement promoted and implemented policies of eugenic sterilization aimed at reducing the population shares of the biologically unfit—those individuals with “dysgenic” traits—who presumably would undermine prospects for national economic well-being (Leonard, 2005).<sup>2</sup>

<sup>2</sup> As Leonard (2005) characterize it, the eugenics movement, in the United States and elsewhere, aimed at improving human heredity by the social control of breeding based on the assumption that differences in human intelligence, character and temperament were by and large rooted in biogenetic differences.

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While the criteria for determining who was unfit was not necessarily racial, economic theorizing at the dawn of the 20th century clearly suggested that biogenetically, the “Negro” lacked the requisite capacities required for contributing to the growth and prosperity of American society. A central proponent of this type of racialized economic theorizing was the pioneer of modern theories of capital markets—the economist Irving Fisher. Fisher, who in 1923 founded the American Eugenics Society and was its first President (Dimand, 2005), advocated the formation of eugenics boards in every state to implement a program of “breeding out the unfit and breeding in the fit” (Cot, 2005; Fisher, 1921).

Since the economic theory of the period treated black Americans as potential candidates for eugenic control, this paper considers the extent to which they were actual and disproportionate targets of state-sanctioned eugenic sterilizations.<sup>3</sup>

Given that these eugenic practices found their motivation in economic theory, its presence would constitute an “economic breeding-out” of targeted individuals. We explore this phenomenon empirically by using historical cross-county eugenic sterilization data from the State of North Carolina. We specify and estimate the parameters of a population allocation model of sterilization to determine whether the probability of forced sterilizations increased with the share of a county’s various racial groups. If the probability varies with particular racial-group shares, such a correlation would suggest the possibility that, at least in North Carolina, eugenic policies were racist in design and effect; particular racial groups were targeted for reductions in their population share.

Our inquiry 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-supported sterilization—that generates inequalities between ascriptively distinguished groups similar to analyses conducted in Alesina et al. (2001), Loubert (2005) and Price (2008). As we consider how race conditioned a stigma of biological and genetic inferiority, our results provide additional empirical evidence regarding the historical consequences of racial stigma (Price et al., 2008; Loury, 2002). Our examination of how race may have conditioned state-sanctioned forced sterilizations adds to the literature on how American eugenics policies were influenced by demographics (Ramsden, 2008), including individual characteristics such as gender (Schoen, 2001; Sanger, 2007) and race (Peart and Levy, 2004; Darity, 1994; Leonard, 2003; Cot, 2005; Dimand, 2005).

The remainder of the paper is organized as follows. In Section 2, we provide an overview of the history of economic thought as it relates to eugenics. The overview will provide the context for understanding how eugenic sterilization policies were conceived and implemented in

the United States. The data, specifically from North Carolina, as well as the history of its tax-supported sterilization program is provided in Section 3. In Section 4, we present our methodology and results. The North Carolina sterilization data are in the form of counts at the county level; therefore, we estimate the parameters of count data specifications of the number of sterilizations, which, in turn, yields estimates of how the probability of forced sterilizations changed with respect to variations in a county’s various racial population shares. The last section provides conclusions.

## 2. Irving Fisher, economic theory, race, and eugenics policy

In the history of economic thought, the contributions of Irving Fisher stand-out as being of singular importance to justifications for state-sanctioned eugenic sterilization policies. Fisher characterized his theory of interest (Fisher, 1907, 1930) as a theory of “impatience and opportunity”. He theorized that interest rates emerge from the balancing by individuals of preferences for consumption today versus consumption tomorrow.<sup>4</sup>

This straightforward principle, which still informs much of modern economic theory (Thaler, 1997), was the source of additional meta-theorizing by Fisher as to what constituted the foundations of impatience and opportunity—or time preference.<sup>5</sup> Since Fisher viewed the interest rate as an important determinant of an economy’s investment and growth rate, knowing the foundations of time preference could inform strategies (e.g. policy interventions) that would be favorable to improving a society’s living standards.

While Fisher based the broad determinants of interest on economic and personal factors, his early refinements of the theory were such that an important determinant of the personal factors were determined by personal heritable factors that conditioned the behavior of individuals. The genetic extension of Fisher’s theory are apparent in his lectures on the distribution of income to Yale undergraduates between 1901 and 1910 (Aldrich, 1975). In these lectures, Fisher posited that income is proportional to innate ability, implying that the distribution of income reflects the distribution of ability.<sup>6</sup> This necessarily follows if a low rate of time preference produces higher future income. If some individuals are innately predisposed toward low rates of time preference, then their superior position in the income distribution—relative to those

<sup>3</sup> Cot (2005) in her examination and analysis of Irving Fisher’s consideration of what racial-groups merit eugenic attention notes that in 1913, Fisher advocated for the imposing of birth-control measures on the so-called “colored races” in the United States.

<sup>4</sup> As Dimand (2005) notes, Irving Fisher did not originate the theory of “impatience and opportunity”. He merely extended and refined the principle articulated by the classical economists Eugene von Bohm-Bawerk, Nassau William Senior, and Fisher’s approximate contemporary John Rae.

<sup>5</sup> Thaler (1997), makes a case that Fisher was also a pioneer of behavioral economics, as Fisher often appealed to departures from rationality as a method for describing how individuals actually act when making choices.

<sup>6</sup> As discussed and cited by Aldrich (1975), Irving Fisher’s lectures to Yale undergraduates between 1901 and 1910, are archived as: Irving Fisher Papers, Yale University Sterling Memorial Library New Haven, Connecticut.

innately predisposed toward high rates of time preference—can be rationalized.

Fisher posited early that race conditioned the genetic distribution of endowments. In *The Rate of Interest* (Fisher, 1907), *Theory of Interest* (Fisher, 1930), and *Elementary Principles of Economics* (Fisher, 1912), Fisher singled out the Chinese, Indians, Russian peasants, and American Negroes as being innately predisposed toward impatience and lack of foresight. Those innate traits were viewed as “dysgenic”—in the sense that their prevalence in the population increases the number of individuals who are unable to optimize across the present and future in a way that maximizes the wealth and income of society. As a matter of eugenic policy Irving Fisher suggested that they should be bred out (Fisher, 1921, p. 223):

If the birth-control exercised by individual parents could itself be controlled by a eugenic committee it could become the surest means of improving the human race. Society could breed-out the unfit and breed in the fit.

These were the sentiments, informed by economic theory, of Irving Fisher, economist turned social reformer and policy advocate, as first president of the American Eugenics Society in 1922.

A key policy instrument advocated by the American Eugenics society to breed-out the unfit was birth control. Birth control as a policy instrument is consistent with economic theories that significantly attribute an individual's marginal productivity to their genetic endowment. The modern view of this Fisher-inspired approach to economics is succinctly summarized by Miller (1997, p. 391), who argues that given that the distribution of attributes and abilities is conditioned on individual genetic endowments:

It follows that efforts to maximize a nation's standard of living should try to improve its citizens' genetic quality, especially with regard to intelligence and other economically important traits. Improving the genetic quality of citizens calls for having those carrying the genes for desirable traits (as evidenced by their possession of the traits themselves) producing more than their proportionate share of that nation's children.

Miller (1997) proceeds to provide a rationale for the economics of birth control on the grounds that by targeting the birth rates of the poor—who, in his analysis, necessarily are poor as a result of having a genetic predisposition toward impatience and lack of foresight—the average standard of living will be higher.<sup>7</sup>

While there is no evidence that Fisher explicitly singled-out blacks as exclusive targets for being bred-out through birth control, there is evidence that he did so

indirectly. Margaret Sanger, the founder of the American Birth Control League was a life-long member of the American Eugenics Society, and Irving Fisher, himself, endorsed her plans for the First National Birth Control Conference in 1921 (Gordon, 2007), that established the Sanger-led American Birth Control League—which later became the Planned Parenthood Federation of America. In 1938, Sanger initiated the “Negro Project”, aimed at educating black Americans about birth-control practices. The “Negro Project” soon became, under the leadership of the Birth Control Federation of America (BCFA), a program aimed at controlling the reproduction of low income blacks (Schoen, 2005).<sup>8</sup> The leadership of the BCFA held the view that particularly in the South, blacks reproduced excessively relative to whites, resulting in blacks contributing disproportionately to the population of the unintelligent and unfit.

It is the birth-control policy sentiments of the Negro Project that are suggestive of Irving Fisher's indirect influence on how eugenic policies may have targeted black Americans. For Fisher, birth control as a policy instrument potentially had the most direct bearing on eugenically engineering birth rates across demographic categories (Fisher, 1921). Given that, at least in the 1920s, the birth rate of whites exceeded that of non-whites, Fisher (1921) suggested that birth control policies should be targeted at the “colored races”, presumably to maintain the relative superior “germ plasm” of whites who ostensibly possessed the requisite genetic traits consistent with optimum national well-being. In this context, by supporting Margaret Sanger's birth-control organization and endorsing its propaganda, Fisher (1921) provided the scientific credibility for a birth-control program aimed at black Americans.

Fisher's scientific paradigm of biological and genetic determinism in economic behavior, and his enthusiastic support of a social reform movement based on eugenics could have induced path dependency in eugenic birth-control programs directed at black Americans. In general, a policy is path dependent if initial moves in one direction elicit further moves in that same direction and the trajectory of change up to a certain point constrains the trajectory after that point (Kay, 2005).<sup>9</sup> We exploit this insight in our empirical strategy to determine

<sup>8</sup> A project of the BCFA Extension Department, the Negro Project was supervised by a special committee that included Margaret Sanger. It was guided by a national Negro Advisory Council made up of representatives of 25 major black organizations and universities, and included many prominent black leaders. The Negro Project assembled clinical data to influence the adoption of clinics and contraceptive techniques primarily in the American south with demonstration projects in Nashville, Tennessee and Berkeley County, South Carolina.

<sup>9</sup> Collier and Collier (1991) also provide a useful framework for considering how policy choices are subject to path dependence. They indicate that initial conditions can define and delimit policy choices. As such, policy agents make choices contingent on initial objectives, setting a specific trajectory of policy actions that are difficult to reverse.

Paul David (1985) provided the influential impetus for the notion of path dependency in the context of an optimizing choice made at a point in time persisting across time because of the legacy of the choice. Kay (2005) provides a useful critique of appeal to the idea of path dependency in policy choices.

<sup>7</sup> Miller's basic idea is that in the absence of birth control the “dysgenic” poor will increase in number relative to the affluent, which, in turn, ostensibly reduces the number of high ability and high-earning individuals in the population.

whether black Americans were selective targets of eugenic sterilization programs in North Carolina. Given the credibility that Irving Fisher's economic theories provided to notions of dysgenic traits compromising a nation's economic welfare, and his advocacy and support for race-specific birth-control programs, it is plausible that early supporters of race-specific programs such as Margaret Sanger's American Birth Control League and the Negro Project, pursued birth-control policy objectives that disproportionately targeted black Americans. Furthermore, given this initial policy objective, those policies may have remained on a historical trajectory carrying its own momentum.

### 3. North Carolina sterilization data

We examine the effects of race on eugenic sterilization with historical data from the State of North Carolina. The history of state-sanctioned eugenic sterilization in North Carolina began in 1929, when the 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 the public's best interest.<sup>10</sup> At the local level, county boards of commissioners were authorized to order the sterilization at public expense any individual—whether convicted criminal or civilian—determined to be mentally defective or feeble-minded upon receiving a petition from the individual's next of kin or legal guardian.

In 1933 the General Assembly formally established the Eugenics Board of North Carolina to review petitions for the sterilization of individuals. In 1937, the General Assembly 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). 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.

Under the Executive Organization Act of 1971, the Eugenics Board was transferred to the North Carolina Department of Human Resources. The secretary of the Department of Human Resources—appointed by the Governor of North Carolina—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. Finally, in 1977 the

state formally abolished the North Carolina Eugenics Commission.

As one of 30 states to pass eugenic sterilization laws at the turn of the 20th century, between 1929 and abolition of its Eugenics Commission in 1977, the State of North Carolina authorized over 8000 eugenic sterilizations (Schoen, 2001). The overwhelming majority of the sterilizations apparently were motivated by the prerogatives of eugenic science, as Schoen (2001) found evidence that only 468 of the sterilizations were voluntary. Eugenic sterilizations also appear to have been subject to racial bias. Aggregate data reported in the last publicly available report of the North Carolina Eugenics Commission (Casebolt, 1968) indicates that of 7141 sterilizations performed between 1929 and 1968, approximately 39 percent were on black Americans, a level higher than their average population share—approximately 23 percent—in the state over the time period.

We use data from the 1958 to 1968 Biennial Reports of the North Carolina Eugenics Board which report the number of sterilizations performed at the county level.<sup>11</sup> While North Carolina is one of the few, if not the only state to make its sterilization records available, our effort is constrained to the 1958–1968 county-level data for two reasons. First, while individual sterilization records exist, current litigation and difficulty of access preclude research and compilation of data from these sources.<sup>12</sup> Second, while aggregate data prior to 1958 are available, they are not reported in annual sequence for all counties.

Table 1 reports a statistical summary—the mean, median and standard deviation—of all the covariates we use in our analysis. The first three variables represent sterilization data for all 100 North Carolina counties between 1958 and 1968. We disaggregate and report by type of sterilization: total sterilizations, total institutional sterilizations, and total non-institutional sterilizations.<sup>13</sup>

<sup>11</sup> See Brown (1966, 1964), and Winston (1960, 1962).

<sup>12</sup> Conversations we had with officials of the State of North Carolina Furthermore, archives revealed that those records of individuals sterilized are available, they are not user-friendly nor easy to compile coherently. Pending litigation, from individuals alleging they were sterilized wrongfully, also is a barrier to accessing individual sterilization records.

<sup>13</sup> Institutional sterilizations were those administered to individuals confined to state penal, medical, psychiatric, or convalescent institutions. Non-institutional sterilizations were those administered to individuals not confined to state penal, medical, psychiatric, or convalescent institutions.

Petitions for the sterilization of non-institutionalized individuals were submitted to the Eugenics Board by the county directors of public welfare. Petitions for the sterilization of institutionalized individuals were submitted by the superintendents of the institutions. Sterilizations 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.

Of the 7141 performed sterilizations authorized by the Eugenics Board of North Carolina between 1929 and 1968, 1019 were vasectomies, 65 were castrations, 6000 were salpingectomies, and 57 were ovariectomies (Craig, 1968). With respect to gender distribution, approximately 84 percent of the sterilizations were performed on females, with black females accounting for approximately 41 percent of total female sterilizations. Approximately 39 percent of all sterilizations were performed on blacks, with black males accounting for about 28 percent of total male sterilizations.

<sup>10</sup> Our historical account of state-sanctioned sterilizations in North Carolina is based on the reports provided by Brown (1935) and Schoen (2001) and on the archival history provided in *Guide to Research Materials in the Guide to Research Materials in the North Carolina State Archives: State Agency and Records. Second Edition* (1995).



**Table 1**

Covariate summary. State of North Carolina county-level sterilizations and racial-group population shares: July 1958–June 1968

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 share of state white population in 1960	.01	.0062	.0108
County share of state black population in 1960	.01	.0078	.0108
County share of state Native American population in 1960	.01	.0002	.0691
County share of state Chinese population in 1960	.01	0.00	.0279
County share of state Filipino population in 1960	.01	0.00	.0368
County share of state Japanese population in 1960	.01	.0008	.0461
County share of state other race population in 1960	.01	.0014	.0220
White share of county population in 1960	.7265	.7370	.1836
Black share of county population in 1960	.2545	.2458	.1807
Native American share of county population in 1960	.0085	.0002	.0368
Chinese share of county population in 1960	.00004	0.00	.00009
Filipino share of county population in 1960	.00006	0.00	.0002
Japanese share of county population in 1960	.0001	.00004	.0005
Other race share of county population in 1960	.0001	.00004	.0003
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 shares are based on race and sex group county-level census data for 1960 from the University of Virginia Library Historical Census Browser at <http://fisher.lib.virginia.edu/collections/stats/histcensus/php/county.php>. 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 <http://data.osbm.state.nc.us/pls/linc>.

**Table 2**

Fixed Effect Negative Binomial parameter estimates: county and state racial-group population share model (unobserved sterilization costs conditioned on population density)

Specification	(1)	(2)	(3)	(4)	(5)	(6)
		County population share model			State population share model	
Population share regressors						
White share of county population in 1960	2.29 (1.55)	.821 (1.30)	1.50 (1.24)			
Black share of county population in 1960	2.42 (1.55)	2.82 (1.29) <sup>b</sup>	2.99 (1.24) <sup>b</sup>			
Native American share of county population in 1960	2.23 (2.08)	1.11 (1.92)	1.59 (1.76)			
Asian share of county population in 1960	−66.14 (157.43)	−216.46 (167.51)	−181.86 (144.99)			
Filipino share of county population in 1960	−165.65 (531.36)	341.25 (419.20)	229.58 (383.39)			
Other race share of county population in 1960	−275.76 (372.60)	60.08 (357.21)	−79.96 (322.44)			
County share of state white population in 1960				3.88 (9.35)	−42.31 (14.89) <sup>b</sup>	−35.22 (13.89) <sup>b</sup>
County share of state black population in 1960				5.81 (8.41)	22.48 (9.89) <sup>b</sup>	16.24 (8.90) <sup>c</sup>
County share of state Native American population in 1960				.204 (.627)	−.281 (.766)	−.141 (.661)
County share of state Asian population in 1960				3.72 (2.97)	−2.53 (3.04)	−1.55 (2.72)
County share of state Filipino population in 1960				−5.35 (3.95)	2.96 (3.67)	1.91 (3.39)
County share of state other race population in 1960				−7.90 (4.99)	−1.74 (6.17)	−3.70 (5.49)
Diagnostics						
N	100	100	100	100	100	100

Table 2 (Continued)

Specification	(1)	(2)	(3)	(4)	(5)	(6)
		County population share model			State population share model	
Pseudo- $R^2$	.272	.156	.161	.272	.148	.154
$\chi^2_{k-1}: (H_0: \beta_1 = \dots = \beta_k = 0)$	5.68	23.53 <sup>a</sup>	20.95 <sup>a</sup>	7.06	13.68 <sup>b</sup>	12.64 <sup>b</sup>

Standard errors in parentheses.

<sup>a</sup> Significant at the .01 level.

<sup>b</sup> Significant at the .05 level.

<sup>c</sup> Significant at the .10 level.

Notes: racial-group population shares are based on race and sex group county-level census data for 1960 from the University of Virginia Library Historical Census Browser at <http://fisher.lib.virginia.edu/collections/stats/histcensus/php/county.php>. The parameter estimates condition the unobserved sterilization costs on county population per square mile measured as county population per square mile in 1960 reported in census data from the North Carolina Department of Management & Budget at <http://data.osbm.state.nc.us/pls/linc>.

Institutional sterilizations were the dominant type for the time period under consideration, constituting approximately 83 percent of total sterilizations. With respect to institutional sterilizations, there were 15 counties where there were none, but this was the case for only four counties for non-institutional sterilizations. Across both types of 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 2163 sterilizations authorized by the Eugenics Board were performed in North Carolina.

#### 4. Theory, econometric methodology, and results

To motivate our empirical strategy, we take seriously the economic motivations provided by Irving Fisher for state-sanctioned eugenic sterilization policies. We posit that the North Carolina Eugenics Commission tailored and implemented what it viewed as optimal sterilization policies. In particular we assume that for racial group  $i$  that constitutes some fraction  $0 \leq \Theta_i \leq 1$  of the population in a political jurisdiction, there exists a sterilization target  $S_i^*$ , that is consistent with an ideal population share  $\Theta_i'$ . This ideal population share represents a proportion of the racial group that is free of dysgenic traits that would otherwise retard the overall economic well-being of the political jurisdiction. Formally, we assume that an optimal eugenic sterilization policy is a solution to:  $\text{argmax}_i (S_i | \Theta_i = \Theta_i')$  for  $i = 1, 2, \dots, N$  racial groups. A solution yields a reduced form aggregate sterilization function  $\mathbf{S} = \sum S_i^*(\Theta_i)$  which is a function of the respective racial-group population shares.

Given prior eugenicist beliefs about ideal population shares of particular racial groups, any belief that dysgenic traits are disproportionately located in a particular group, and/or not existent at all in a particular racial group, corner solutions for racial groups are feasible. Indeed, if it is believed that specific racial groups do not harbor any dysgenic individuals, their existing population share will not be subject to eugenic sterilization or  $S_i = S_i^* = 0$  if  $\Theta_i = \Theta_i'$ , where  $S_i^*$  is the optimal number of eugenic sterilizations for racial group  $i$ .

Our estimation strategy proceeds from a recognition that our dependent variable is fundamentally integer-valued and constitutes count data. Therefore, we assume that the number of eugenic sterilizations for a county are realizations from either a Poisson, or, if there is heterogeneity, a Negative Binomial count distribution. We

specify and estimate the parameters of relevant Poisson and Negative Binomial regression specifications, where the estimated parameters measure the effects of exogenous variables on  $\lambda$ —the expected number of sterilizations.<sup>14</sup>

Since we are examining the extent to which North Carolina eugenic sterilization policies were biased toward particular racial groups, we specify  $\lambda$  as a function of a county's racial-group population allocation—both within the county, and within the state. It is in this context that our specifications take seriously the classic eugenic assumptions that posit that dysgenic traits are conditioned on or correlated with racial groups in a population.

Because sterilization was presumably a policy prescription to breed out biologically dysgenic individuals, our parameter estimates will indicate the extent to which sterilization probabilities were conditioned on particular racial groups. If, for example, sterilization probabilities differ across racial groups, an implication is that eugenic sterilization was biased and/or a certain trait that triggered sterilization—perhaps latent—was higher among particular groups of individuals in the population. Under an unbiased sterilization policy all racial groups would—conditional on unobservable traits, would face the same sterilization probabilities.

<sup>14</sup> If a random variable  $S_i$  conditional on  $\theta_i$  is a Poisson random variable then  $\text{Prob}(S_i = s_i | \theta_i) = (e^{-\lambda_i} \lambda_i^{s_i}) / s_i!$ , for  $s_i = 0, 1, 2, \dots, n$ .

A Poisson regression model is formulated by specifying for some integer-valued measure of sterilizations  $S_i$  for county  $i$ , the mean level  $\lambda_i$ , as a function of a vector of exogenous variables ( $\theta$ ):

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

where  $\beta$  is a coefficient vector, and  $\theta$  is a vector of exogenous variables that determine the expected value of the number of sterilizations  $S_i$  for the  $i$ th county. The log-likelihood function  $L(\beta)$  has a gradient and Hessian given by:

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

$$\frac{\partial^2 L(\beta)}{\partial \beta \partial \beta'} = \sum [-\sum_i (S_i) e^{\beta' \theta}] < 0$$

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

As a Poisson specification assumes there is no unobserved heterogeneity, the mean and variance of  $\lambda$  are identical. Given the possibility of unobserved heterogeneity, the Poisson model can be modified as a Negative Binomial (Cameron and Trivedi, 1998) where the specification of  $\lambda$  is:

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

where  $\epsilon_i$  reflects unobserved heterogeneity causing the mean and variance of  $\lambda$  to differ.

We consider parameter estimates of a model with three measures of sterilization (institutional, non-institutional, and total) as the dependent variable, and for two distinct set of exogenous population regressors—county racial-group shares and state racial-group shares within a county. The two types of measures of racial-group shares will enable us to evaluate the context in which eugenically targeting racial groups might have been manifest. In particular, if the goal of eugenic sterilization policy in North Carolina was to optimize the population share of racial groups in a political jurisdiction, it could have been based on an ideal state racial population share and/or ideal local racial population share. We use the racial-group categorizations reported in the data, and modify it by combining Japanese and Chinese into one category of Asians, as each group constituted a small fraction of the state's total population, and at least from a phenotypical perspective, may not have been easily distinguishable from one another if, indeed, eugenic policy officials desired to target them.<sup>15</sup>

Since we do not observe the costs associated with any sterilization optimization problem eugenics officials may have been trying to solve, parameter estimates that omit these unobservable costs could be biased. As such, *Tables 2 and 3* report Fixed Effect Negative Binomial parameter estimates for our sterilization specifications with both county and state racial-group population shares as regressors.<sup>16</sup> For each population share specification, the dependent variable is in sequence, institutional, non-institutional, and total sterilizations. While institutional sterilizations are dominated by non-institutional sterilizations, we report across three disaggregated specifications of the dependent variable as we believe it is plausible that for individuals confined to state institutions—where institutional sterilizations took place—eugenic policy officials had superior opportunities to engage in biased implementation of sterilization policies, as they had better opportunity to observe and monitor institutionalized individuals. Moreover, non-institutional and institutional sterilizations can be viewed as two different policy regimes, as the process for institutionalizing individuals into say state psychiatric facilities was distinct from that of only recommending eugenic sterilization. As such, different probability estimates for non-institutional versus institutional sterilizations could inform biases that exist

in the processes that determined the two types of sterilization probabilities.

The parameter estimates in *Tables 2 and 3* condition the unobserved sterilization costs on population density and the number of poor individuals in a county, respectively.<sup>17</sup> Population density is a mechanism which can catalyze economic growth ((Boucekkine et al., 2007; Galor and Weil, 2000)). Unobserved sterilization costs across North Carolina counties plausibly were correlated with population density. Where population density is high (low), sterilization costs are lower (higher). This captures the idea that the transaction and information costs of sterilization decline with increases in population density. For example, greater population density could increase the presence of hospitals and surgeons, thereby lowering the costs of sterilization. Because there is evidence that sterilization in North Carolina targeted the poor to minimize welfare expenditures (Schoen, 2001; Railey, 2002), the unobserved costs of sterilization could have been correlated with the number of poor individuals in a county who were either receiving or were eligible for public assistance. Two diagnostic measures are also reported. The explanatory adequacy of each regression is 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.

With the exception of the case where the dependent variable is total non-institutional sterilizations, the null hypothesis that the county racial population shares jointly have no effect is rejected for all the specifications in *Table 2*.<sup>18</sup> In the case where the dependent variable is non-institutional and total sterilizations, the expected number of sterilization increases significantly with respect to a county's black population share and in the case of whites, decreases significantly. This suggests that for a given county, sterilization probabilities were disproportionately sensitive to the size of a county's black populations share. For Asians and other races, the estimated coefficients, when significant, are negative, suggesting that sterilization probabilities were lower with respect to these racial-group population shares.

The parameter estimates reported in *Table 3*, which condition the unobserved sterilization costs on the number of poor individuals in a county, are similar to the those in *Table 2*.<sup>19</sup> The exception being that in the state racial-

<sup>15</sup> Combining the Chinese and Japanese population shares was suggested by an anonymous referee.

<sup>16</sup> We report Negative Binomial parameter estimates as simple Poisson specifications were always rejected based on a test for the mean-variance equality restriction—an implication of sterilizations having a Poisson distribution. These estimates are available upon request from the authors. All our parameter estimates condition exposure to sterilization on a county's total population as the reduced form sterilization function is assumed to be optimized on ideal total racial population shares. Our fixed effect estimator is that of Hausman et al. (1984) which estimates the parameters of the Negative Binomial regression with the following restrictions:

$$E(\mathbf{S}) = \exp(\mathbf{D} + \beta\mathbf{X})$$

$$\text{Var}(\mathbf{S}) = (1 + e^{\mathbf{D}})E(\mathbf{S})$$

where  $e$  is a natural logarithm,  $\mathbf{X}$  is a vector of exogenous variables, and  $\mathbf{D}$  is a vector of county dummies correlated but fixed with some unobserved effect.

<sup>17</sup> 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).

<sup>18</sup> We use county population per square mile in 1960 as the variable measuring the unobserved fixed effect. It is implemented by forming county groups based on standardized z-scores with endpoints of  $-3$  and  $+3$ . Within county groups, unobserved costs are correlated, but fixed across all county groups. County population per square mile in 1960 data were obtained from the University of Virginia Library Historical Census Browser at <http://fisher.lib.virginia.edu/collections/stats/histcensus/php/county.php>.

<sup>19</sup> The parameter estimates condition the unobserved sterilization costs on standardized values (e.g. standard normal variates between  $-3$  and  $3$ ) of the percent of a county's population that was poor in 1969. This was measured as the percent of county individuals at or below poverty in 1919 reported in census data from the North Carolina Department of Management & Budget at <http://data.osbm.state.nc.us/pls.linc>.

**Table 3**

Fixed Effect Negative Binomial parameter estimates: county and state racial-group population share model (unobserved sterilization costs conditioned on poverty population)

Specification	(1)	(2)	(3)	(4)	(5)	(6)
		County population share model			State population share model	
Population share regressors						
White share of county population in 1960	2.37 (1.56)	.839 (1.31)	1.58 (1.25)			
Black share of county population in 1960	2.02 (1.57)	2.63 (1.30) <sup>b</sup>	2.70 (1.25) <sup>b</sup>			
Native American share of county population in 1960	1.54 (2.23)	.896 (2.01)	1.22 (1.86)			
Asian share of county population in 1960	−111.15 (145.11)	−227.78 (158.33)	−195.60 (135.77)			
Filipino share of county population in 1960	68.37 (479.43)	351.09 (427.09)	249.98 (384.51)			
Other race share of county population in 1960	−117.11 (363.40)	85.52 (345.40)	−35.90 (307.48)			
County share of state white population in 1960				−10.15 (12.48)	−7.29 (13.09)	−3.39 (11.04)
County share of state black population in 1960				5.36 (10.81)	18.61 (9.86) <sup>c</sup>	12.47 (8.69)
County share of state Native American population in 1960				.102 (.677)	−.667 (.869)	−.588 (.756)
County share of state Asian population in 1960				.783 (2.74)	.132 (3.05)	.931 (2.67)
County share of state Filipino population in 1960				−1.06 (3.68)	−.445 (3.97)	−1.30 (3.49)
County share of state other race population in 1960				−4.47 (5.31)	−5.04 (6.24)	−6.32 (5.46)
Diagnostics						
<i>N</i>	100	100	100	100	100	100
Pseudo- <i>R</i> <sup>2</sup>	.263	.153	.158	.259	.143	.151
$\chi^2_{k-1} : (H_0 : \beta_1 = \dots \beta_k = 0)$	4.18	13.01 <sup>b</sup>	10.48 <sup>c</sup>	4.39	6.36	6.36

Standard errors in parentheses.

<sup>a</sup> Significant at the .01 level.<sup>b</sup> Significant at the .05 level.<sup>c</sup> Significant at the .10 level.

Notes: racial-group population shares are based on race and sex group county-level census data for 1960 from the University of Virginia Library Historical Census Browser at <http://fisher.lib.virginia.edu/collections/stats/histcensus/php/county.php>. The parameter estimates condition the unobserved sterilization benefits on standardized values (e.g. standardized normal variates between −3 and 3) of the percent of a county's population that was poor in 1969, measured as the percent of county individuals at or below Poverty in 1969 reported in census data from the North Carolina Department of Management & Budget at <http://data.osbm.state.nc.us/pls/linc>.

group share specifications (columns 3–6), none of the coefficients are jointly significant. This suggests that if indeed eugenic officials were using sterilization as a mechanism to limit poverty, blacks were still sterilization policy targets with respect to minimizing their share of the population as a share of total county population, but not as a share of the state population.

Collectively, the parameter estimates in Tables 2 and 3 are consistent with the interpretation that if state and county eugenics policy officials had distinct conceptions about ideal racial population ratios and /or which racial groups should be objects of the sterilization policy, both state and county officials behaved as if the population share of blacks should be targeted for reduction. The probability of sterilizations increased significantly with the black population share both at the county level and when measured relative to the county's state share of blacks in the entire state.

For total sterilizations, the fact that among all racial groups, the black population ratio is the only share that is

positive and significant in Tables 2 and 3 suggests that North Carolina's eugenic sterilization policy not only was biased but genocidal, insofar as positive and significant sterilization probabilities conditioned on a county's black population has the effect of reducing the size of the black population.<sup>20</sup> That the results in Tables 2 and 3 differ only in how unobserved sterilization costs are specified—the sign and significance of the black population parameters are similar for the specifications where there is joint significance of all parameters. This suggests that the racial

<sup>20</sup> The United Nations Convention of the prevention and punishment of the crime of genocide, ratified in January of 1951 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.



**Table 4**  
Negative Binomial parameter estimates augmented with controls: county and state racial-group population share model

Specification	(1)	(2)	(3)	(4)	(5)	(6)
	County population share model		County population share model		State population share model	
Population share regressors						
Constant	–1.96 (2.26)	.833 (2.57)	.687 (2.10)	–1.22 (1.75)	.177 (2.51)	.268 (2.02)
White share of county population in 1960	1.18 (1.52)	.341 (1.37)	.474 (1.14)			
Black share of county population in 1960	1.44 (1.55)	3.25 (1.38) <sup>b</sup>	2.86 (1.15) <sup>b</sup>			
Native American share of county population in 1960	3.85 (2.27) <sup>c</sup>	3.30 (2.68)	3.19 (2.17)			
Asian share of county population in 1960	195.38 (172.79)	156.19 (225.91)	162.19 (183.25)			
Filipino share of county population in 1960	–302.85 (498.40)	–164.16 (556.32)	–184.75 (444.24)			
Other race share of county population in 1960	–530.27 (386.33)	–604.62 (408.51)	–611.85 (343.53)			
County share of state white population in 1960				44.89 (18.49) <sup>b</sup>	17.83 (28.69)	21.86 (23.65)
County share of state black population in 1960				19.02 (14.85)	57.14 (23.32) <sup>b</sup>	47.39 (18.78) <sup>b</sup>
County share of state Native American population in 1960				1.85 (.755) <sup>b</sup>	.157 (1.39)	.492 (1.12)
County share of state Asian population in 1960				–3.25 (2.84)	–6.15 (4.83)	–5.19 (3.91)
County share of state Filipino population in 1960				6.31 (3.69) <sup>c</sup>	8.62 (6.67)	7.60 (5.28)
County share of state other race population in 1960				–8.55 (6.17)	–4.66 (8.12)	–5.41 (6.55)
Controls						
Number of individuals in county served in state psychiatric hospitals in 1980	.0009 (.0004) <sup>b</sup>	–.000004 (.0007)	.0002 (.0005)	.001 (.0004) <sup>b</sup>	–.0002 (.0008)	.0001 (.0006)
Number of individuals in county served in state mental retardation centers in 1980	.003 (.004)	.011 (.006) <sup>c</sup>	.009 (.005) <sup>c</sup>	–.012 (.007) <sup>c</sup>	–.003 (.009)	–.004 (.008)
County population per square mile in 1960	.002 (.005)	.002 (.002)	.002 (.002)	.001 (.009)	.002 (.002)	.002 (.002)
Percent of county individuals at or below poverty in 1969	.608 (2.55)	–1.12 (3.30)	–.601 (2.66)	1.72 (2.50)	2.81 (3.57)	2.79 (2.86)
County per capita income in 1969	.0006 (.0006)	.0002 (.0008)	.0003 (.0006)	.0006 (.0006)	.0005 (.0008)	.0005 (.0007)
Diagnostics						
N	100	100	100	100	100	100
Pseudo-R <sup>2</sup>	.152	.086	.102	.171	.072	.089
$\chi^2_{k-1}$ : (H <sub>0</sub> : $\beta_1 = \dots = \beta_k = 0$ )	72.65 <sup>a</sup>	66.97 <sup>a</sup>	83.69 <sup>a</sup>	81.85 <sup>a</sup>	56.33 <sup>a</sup>	73.09 <sup>a</sup>
$\chi^2_1$	12.23 <sup>a</sup>	601.72 <sup>a</sup>	536.0 <sup>a</sup>	3.09 <sup>b</sup>	605.89 <sup>a</sup>	515.46 <sup>a</sup>

Standard errors in parentheses.

<sup>a</sup> Significant at the .01 level.

<sup>b</sup> Significant at the .05 level.

<sup>c</sup> Significant at the .10 level.

Notes: racial-group population shares are based on race and sex group county-level census data for 1960 from the University of Virginia Library Historical Census Browser at <http://fisher.lib.virginia.edu/collections/stats/histcensus/jhpc/county.php>. Number of individuals in county served in state psychiatric hospitals, Number of individuals in county served in state mental retardation centers, county population per square mile in 1960, percent of county individuals at or below poverty in 1969, and per capita income in 1969 (in 1996 dollars) are based on census data from the North Carolina Department of Management & Budget at <http://data.osbm.state.nc.us/pls/linc>.

bias of sterilization policy in North Carolina was predicated upon racial population share ideals—at least in terms of county population shares.

The parameter estimates in [Tables 2 and 3](#) are consistent with genocide in several ways. First, while blacks were not the only victims of eugenic sterilization, during the period 1958–1968 they accounted for a disproportionate number of state ordered sterilizations relative to their share of the North Carolina population. Indeed, while non-black racial groups accounted for the majority of sterilizations over the time interval under consideration, their population shares do not significantly explain their likelihood of sterilization. While this effect could reflect the fact that relative to blacks, non-black racial groups were more evenly dispersed spatially across the state, that sterilization probabilities are only sensitive to the black population share in both county and state share population specifications suggest that the spatial distribution of racial-groups shares is not confounding the parameter estimates.

For non-black racial groups, our parameter estimates suggest that eugenic sterilizations were authorized and administered for reasons unrelated to their population shares, whereas, for blacks eugenic sterilizations were authorized and administered with the aim of controlling their population share.

Of course, it is possible that in North Carolina sterilization policy officials were also optimizing sterilizations directly on other desired and presumably heritable economic and/or health outcomes, and not necessarily on racial population shares as our specifications and parameter estimates in [Tables 2 and 3](#) imply. Consequently, our fixed effect parameter estimates could suffer from omitted variable bias, caused by unobservables not accounted for in our fixed effect estimates. To evaluate our parameter estimates for robustness with respect to these potential omitted variables, we add additional controls directly into to our population-group allocation model of eugenic sterilization.

The parameter estimates in [Table 4](#) consider whether 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 driven by heritable biogenetic traits. We capture this by adding to the specification for each county the percent of individuals who were at or below poverty in 1969 and county per capita income in 1969. To control for the costs of sterilization, we also include population per square mile in 1960 to render the specification comparable to the population exposure specifications in [Tables 2 and 3](#). We also 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 capture this by adding as controls two proxy variables from a later time period, since no measures capturing the mental health characteristics of a county’s population were available in close time proximity to the 1958–1968 time period under consideration. Our proxy variables measuring the mental health characteristics of a

county’s population are: (1) the number of individuals in a county served in a state psychiatric hospital in 1980 and (2) the number of individuals in a county served in state mental retardation centers in 1980.<sup>21</sup>

Relative to the parameter estimates in [Tables 2 and 3](#), there are some differences for the parameter estimates with augmented controls in [Table 4](#). For institutional sterilizations, the probability increases with respect to the Native American population share for the county share specification, and with respect to increases in the white, Native American, and Filipino population in the state share specification. Because these specifications control for the individual mental health characteristics of a county and because institutional sterilizations were a small fraction of total sterilizations, this suggests that perhaps whites, Native Americans, and Filipinos constituted a large fraction of institutional sterilizations as a result of being deemed mentally deficient. This implication is reinforced by the fact that the populations shares of these racial groups is insignificant when the regress and is non-institutional and total sterilizations—only the black population share is significant.

That the sign and significance of a county’s black population share remains the same for institutional and total sterilizations—a pattern that is approximately identical to the parameter estimates reported in [Tables 2 and 3](#) where there are no controls—suggests that our results are fairly robust with respect to omitted variables that capture other possible policy objectives of eugenic sterilization officials in North Carolina. Thus, even if eugenic sterilization policy officials in North Carolina had other stated policy objectives unrelated to racial-group population shares in a county or state, our results suggest that actual total sterilization outcomes were conditioned primarily upon a county’s black population share.

## 5. Conclusion

Were eugenic sterilization policies racist in intent, design and effect? Eugenic sterilization policies were motivated historically by appeals to social Darwinism and economic theory which posited that certain racial and social groups were “biologically unfit” and “dysgenic”. It was argued that their behavior constrained economic well-being for the total population.<sup>22</sup>

For eugenicists, economic well-being could be optimized if the biologically unfit dysgenic racial groups were sterilized—economically bred-out. This policy sentiment

<sup>21</sup> 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. If true, one could make a case for not using them at all—omitting them. However, [Wickens \(1972\)](#) demonstrates that the parameter bias from omitting poor proxies is greater than the parameter bias with including them.

<sup>22</sup> The historical motivations of eugenics apparently have not disappeared in contemporary times. In 2008, a Louisiana state legislator introduced a bill that would pay poor women \$1000 to have their fallopian tubes tied to minimize the growth of a population in Louisiana that would be dependent upon federal and state-supported income assistance ([Waller, 2008](#)). As far as we know, this bill did not pass and become a law.

was inspired by Irving Fisher, an enthusiastic supporter and champion of eugenics at the turn of the 20th century. While Fisher later moderated his views on the so-called biologically unfit and dysgenic characteristics of blacks, others continued to maintain such views. Fisher's early support of eugenics policy organizations could have induced a policy path dependency that resulted in black Americans being disproportionate targets of eugenic sterilization.<sup>23</sup>

Using data from North Carolina on official eugenic sterilizations conducted between 1958 and 1968, we have considered the extent to which sterilization probabilities were conditioned on the share of blacks in the population. This is one way in which an optimal eugenics policy could manifest itself given its presumption of a positive correlation between biological unfitness, dysgenic traits and racial-group population shares. Our results, based on count data parameter estimates show that in North Carolina, the incidence of sterilization was conditioned on race, as the probability of institutional and total sterilization rose with the black population share. This effect also was unique and appears to be robust as total sterilization probabilities were not sensitive to the population shares for any other racial group. Nor were our results altered by inclusion of control variables measuring eugenic sterilization policy objectives unrelated to racial-group population shares such as individual mental health and poverty status. While other racial groups were sterilized under North Carolina's eugenics programs, our results suggest that since sterilization probabilities were not sensitive to their population shares, these other racial groups were sterilized for reasons other than controlling their population share. Such a eugenics policy prescription apparently was reserved for North Carolina's black population.

Like Price et al. (2008), our findings have implications about the need for and efficacy of policy interventions designed to achieve equal treatment for groups subjected to discriminatory treatment and stigmatization. Racial stigma and its attendant presumption of inferiority—biogenetic or otherwise—has consequences for the historical trajectory of black–white disparities in social and economic outcomes. In this context, traditional public policy interventions based on ensuring equal treatment of blacks can have limited efficacy, as historically based racial stigma constrains whites to view blacks as being less than equal. The eugenics movement clearly viewed blacks and whites as biologically and genetically unequal, and not worthy of equal treatment.

Our results show that in North Carolina, eugenics policy did not treat blacks and whites equally. The stigma of a belief in black biogenetic inferiority shaped a vulgar social

outcome in North Carolina—racially disparate state-sanctioned eugenic sterilization.

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<sup>23</sup> There were several other influential economists associated with the American Economics Association at the turn of the 20th century who were also ardent eugenicists, and subscribed to what Darity (1994) characterized as the “Black Disappearance Hypothesis”. These economists posited, like Irving Fisher, that blacks were inherently ill-suited for life in a market-based, industrial society as a result of evolved inferior biogenetic traits, and as such, ultimately would become extinct.

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