Bad men, good roads, Jim Crow, and the economics of southern chain gangs

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September 2020

Abstract: Penology in the Jim Crow South centered on the chain gang. Gangs ostensibly served three purposes: their severity served as a deterrent; their putting convicts to work on roads and other public improvements reduced the taxpayers' costs of infrastructure; and their discriminatory implementation reinforced the social order defined by Jim Crow. Drawing on insights from the economics of crime literature, this paper analyzes the chain gangs along the latter two dimensions. First, it finds that the costs of using gangs in road maintenance were not significantly lower on average than using wage labor. Second, a hit rate-style test reveals that judges sent black defendants to the chain gang at disproportionate rates. The results are more consistent with a racial animus model of disparate outcomes than statistical discrimination. The results are also consistent with a model of judges minimizing the opportunity cost of administering criminal justice at the expense, perhaps, of reducing the social costs of crime.

"Bad men on bad roads make good roads, while good roads make
good men." – Davis (1916, p.41).

Introduction

Economists' workhorse models of crime suggest that optimal
enforcement of and punishments for violations of the criminal code should be
determined by the seriousness of the offense and the effect of punishment on
marginal deterrence (Becker 1968; Polinsky and Shavell 1992; Friedman 2001).
Recent contributions, however, recognize that law enforcement is driven by
incentives other than minimizing the social costs of crime. Enforcement agents
may act on biases, prejudices, and preferences with respect to race, gender, age,
or other observable offender characteristics (Knowles, Persico and Todd 2001;
Fryer 2016). Efforts to minimize the social costs of crime are traded for
maximizing the utility of agents who act, at least in part, on their own
preferences. Enforcement agents, too, may respond to fiscal or financial
incentives provided by revenue-maximizing bureaucrats (Makowsky and
Stratman 2009; Makowsky, Stratmann and Tabarrok 2019). Traffic
enforcement officers, for example, might be more likely to issue traffic
citations or impose higher fines for violation when local municipalities
experience budget deficits. Officers may also target non-residents when doing
so reduces the officers' expected cost of issuing summonses.

This paper applies the insights of these three approaches to the study
of criminal enforcement to better understand the operation of South
Carolina's Jim Crow-era chain gang. South Carolina's experience was not
unique. Davis (1916, p.38) observes that the "question of utilizing convict or
prison labor upon works of public improvement … is the subject of legislation
in practically every state," and Steiner and Brown (1969/1927) argue that
convicts in the South Atlantic states, other than Florida, worked under similar
conditions on similarly organized chain gangs. South Carolina's system is,

therefore, likely to be representative of the gang system across the South.[1] Although the system evolved over time, the fundamental feature of the system was that criminal offenders, both felons and misdemeanants, mostly black men, served their terms of incarceration at hard labor working on roads under "degrading and humiliating circumstances" (Davis 1916, p.38).

Using hand-coded data from the South Carolina Highway Department and Greenville County's magistrate courts, this paper offers an analysis of the chain gang in Prohibition-era South Carolina. First, the evidence suggests, contrary to the assertions of contemporaries and historians, that the use of gangs did not necessarily reduce taxpayers' costs of building and maintaining the state's roads. South Carolina's gangs were more efficient at road maintenance than road building, but only if gangs could be maintained at or near optimal size. Statistical evidence reveals that using gangs for road maintenance reduced costs by less than 10 percent. Cost-minimizing highway superintendents would equalize the costs of convict and free labor at the margin, and the evidence points to their behaving in this way.

It will come as news to no one that blacks lived, worked, and played under a racially discriminatory system in the Jim Crow South. Whites instituted a segregated system built on prejudicial treatment: black children attended different, typically less well funded, schools; blacks received health care in different, typically less well equipped, hospitals; blacks worked in different, typically less well paying, jobs; black criminal defendants alleged to have breached a particularly salient racial code of conduct received different, typically less well adjudicated, justice – they sometimes ended up at the end of a lynch mob's rope (Margo 1990, Collins and Thomasson 2004, Heckman and Donohue 1991, Williams 2017). Researchers, by and large, treat Jim Crow as an institutionalized exercise in Becker's (1957) taste-based discrimination. But within Becker's approach there is a difference between the average and the marginal discriminator. If black workers are aware of differences in

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[1] Lichtenstein (1993, 1996) studies Georgia's system. Miller (2012) traces the evolution of convict labor in Florida from the post-Civil War convict lease system through the rise and fall of the chain gang and its replacement by the state prison farm. For a description of life on the chain gang, see its depiction by a contemporary federal appeals court in the Appendix A.

discriminatory treatment among employers, for example, they may target their job-seeking efforts toward employers less likely to discriminate against them (Alston and Ferrie 1993). In the case of crime, rational black offenders will respond to the threat of discriminatory treatment by choosing the type, seriousness, and location of their criminal activities in a way that reduces the ultimate effect of discriminatory behavior on outcomes, such as prison sentences (Guryan and Charles 2013, p423). One consequence of this endogenous response is that racial differences in sentences may be smaller than expected differences in sentence severity based on average differences in conviction rates. An alternative approach to Becker's taste-based model holds that systematic racial differences in pre-criminal-market settings such as education and employment invites race-based statistical discrimination (Arrow 1972). Believing that blacks' opportunity cost of crime is lower, on average, than similarly situated white defendants, white judges and juries attribute blacks with greater criminality and in an effort to reduce criminal activity, through deterrence and incapacitation, are more likely to convict and to impose harsher sentences on black than white defendants. Understanding this, blacks respond by altering their criminal behaviors.

Knowles, Persico and Todd (2001) develop an outcomes-based test designed to distinguish between statistical discrimination and taste-based discrimination in the stop-search-arrest stage of the criminal justice system. Persico (2009) extends the approach to other stages, including the prosecutorial and judicial stages, and contends that it generates a comparable statistical discrimination equilibrium, but only if officers of the court are not rewarded for discriminatory treatment of defendants. If an unbiased court's objective is to maximize the likelihood of convicting the guilty, the equilibrium result is that likelihood of convicting is equal across all subgroups, conditional on arrest and charging, as well as criminals' endogenous responses to the court's practice. If, due to prejudice, the court convicts one subgroup at a higher rate than others, the likelihood of convicting the guilty will be lower in the preferred group. The result is reduced deterrence and incapacitation effects among the preferred group, and society will experience a greater than optimal

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crime rate if the elasticity of crime among the preferred group is greater than that among the discriminated-against group. The Knowles, Persico and Todd (2001) outcomes test distinguishes statistical discrimination (equal probabilities) from prejudice (unequal probabilities).

The second result, motivated by the Knowles, Persico and Todd's (2001) "hit-rate" approach, and using data from Greenville County, South Carolina's courts show that the judicial system did not equalize the probabilities of conviction and sentencing to the chain gang. Disproportionally more blacks than whites were sentenced to terms of hard labor on the county's chain gangs. Conditional on several individual and contextual characteristics black defendants were sentenced to the gang at higher rates than whites. The overall odds that black men were sentenced to the gang were approximately twice the odds for white men. But when we consider narrowly defined groups, it is apparent that the most severe punishments were meted out to young black men, a group lacking effective political voice. This result is consistent with the Makowsky and Stratmann (2009) opportunity cost and political economy hypotheses. Officers of the court engaged in a type of tax exporting in that disfranchised, young black men worked the roads, and cost minimization in that disfranchised young black men were unlikely to contest the charges or appeal their convictions.

The chain gang results are consistent with both a Becker-type racial animus hypothesis and the Makowsky and Stratmann political economy and opportunity cost approach. Additional evidence on magistrates' decisions to release defendants on recognizance or good-behavior bonds points to the latter as a motivating force in chain gang commitments, which does not preclude a pure discrimination effect. Blacks and whites were equally likely to be released on recognizance. The disparate treatment then manifested itself in gang commitments. Whites found guilty were more likely to pay monetary fines than serve on the gang. Blacks found guilty were more likely to serve a term at hard labor than pay a fine. This finding adds some subtlety to the interpretation of the Jim Crow South's criminal justice system. It appears that it did not yield disparate race-based outcomes at every stage of the process.

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The largest disparity was in the punishments meted out to different types of defendants.

2. Institutional background

2.1 The public finance of roads

The introduction of mass-produced automobiles in the early twentieth century increased public demand for good, or at least passable, roads. The Good Roads Movement emerged, which called for a rationalization of the nation's road network, the construction of more hard-surface roads, and the improved maintenance of existing roads. Accomplishing all three goals required an overhaul of road provision and maintenance procedures. As late as 1912 South Carolina still relied, in part, on the ancient common law system under which every able-bodied man between the ages of 18 and 50 years was required to devote up to eight 10–hour days per year to supervised road maintenance or construction (American Highway Association 1918, p.126). Compliance rates were low, and effort among compliers was reportedly half-hearted. Local roads, as a result, were poorly maintained and often impassable during the rainy season.

Table 1 shows that by the early 1920s the state, its counties, and its municipalities collected revenues from several sources earmarked to finance the costs of road construction and maintenance. First, in lieu of laboring on the roads, able–bodied men could pay a commutation tax of $1 to $3 that road commissioners earmarked for road work. Across the state in 1922, commutations accounted for nearly 15 percent of highway revenues. Second, if one-fourth of a county's registered voters petitioned for it, county assessors were required to hold a referendum on the imposition of a property tax levy of no more than 2 mills, or, $2 per $1,000 assessed value, to be spent on road improvements, which would go into effect if approved by a majority of voters (American Highway Association 1918, p.127). Many voters were willing to pay for better roads; a majority of voters in 28 of South Carolina's 46 counties

voted in favor of such taxes, which represented nearly one-fourth of highway revenues across all counties.

Table 1

Total South Carolina road statistics, 1922

	Total	Fraction of expenditures
Soft surface miles (#)	1,909.9	
Autos taxed (#)	81,417	
Total road expenditures ($)	447,260	
Original assessment county road tax ($)	729,692	0.245
Added assessment county road tax ($)	11,093	0.004
Penalty county road tax ($)	10,786	0.004
Commutations ($)	439,750	0.148
Automobile registration fees ($)	527,718	0.177
Federal aid ($)	727,738	0.244
Gasoline tax ($)	530,321	0.178

Notes: expenditures exclude bridge construction costs.

Sources: miles and expenditures from SC Highway Commission (1922); remaining rows from SC Comptroller General (1922)

A third funding source flowed from the state treasury. Eighty percent of all motor vehicle registration fees collected by the state from residents of a county were returned to that county to be spent on road construction and maintenance. Statewide, drivers registered 81,417 vehicles in 1922, which generated $527,700 in fees. At the end of the decade, more than 275,000 vehicles were registered, which generated more than $2.6 million in fees (SC State Highway Commission 1929, p.25). Gasoline taxes, in addition, represented about 18 percent of total highway revenues.

Additional funding for road construction and maintenance, which accounted for about 25 percent of all revenues, was provided by the federal government under the terms of the Federal Road Act of 1916. South Carolina's apportionment increased from $71,800 in 1917 to $1.4 million in 1921. At decade's end, after more than 4,000 miles of completed road construction, South Carolina still claimed more than $750,000 in federal funds for the year

(SC Highway Department 1929, p.12)   States and counties were required to match federal funds from taxes and registration fee distributions.

A popular alternative to taxation (among law–abiding, tax–paying voters, at least) was to put able–bodied convicts to work on the roads. South Carolina's criminal code of 1912 provided that, in any case in which a convicted criminal was subject to a term of imprisonment, that the sentence be served "at hard labor on the public works of the county in which convicted, if the county maintains a chain gang, without regard to the length of sentence" (Bethea 1912, v.2, p. 244). Thus, convicted misdemeanants served for 30 days; men convicted of noncapital homicide or manslaughter might be sentenced to upwards of 20 years on the gang. The only convicts sent to the state penitentiary were those convicted of a capital offense (first-degree murder or rape) or those considered physically unable to work at hard labor on a chain gang. Not only did the state and counties save money on prisons and jails when convicts served on chain gangs, the federal government allowed them to leverage these savings. The federal government matched eligible state and county road building expenses, including expenditures on chain gangs (Myers 1993).[2] Historians have long recognized the connection between the effect of the federal subsidy on chain gang commitments. Even absent the subsidy, the derived demand for well–maintained roads that followed from expanding vehicle ownership and a widening highway network created incentives to set criminal defendants to work on the roads.

The extent to which county chain gangs were involved in the construction of roads, highways, and bridges in South Carolina during the chain–gang era varied by county. Three counties – Berkeley, Orangeburg, and Saluda – did not operate a chain gang. In a few other counties – Charleston being the most prominent example – gangs worked on new construction projects. In most counties, however, crews of convicted felons and

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[2] The 1916 Federal Road Act provided that the federal allocation would represent a maximum of 50% of eligible expenses, not to exceed $20,000 per mile, but federal allocations could exceed the 50% rule for bridges of greater than 20-foot span (SC Highway Commission 1920, p.16). Top soil roads cost about $5,000 per mile; gravel cost about $7,500 per mile; concrete and macadam cost as much as $53,000 per mile in 1920 (p.31).

misdemeanants were, by the early 1920s, responsible only for repairing existing roads (SC Board of Charities and Corrections 1919, p.93). Most of the work involved grading soil and gravel roads, as well as ditching and clearing brush from roadsides. Counties relied on two types of teams to maintain roads and highways: chain gangs and wage–labor groups called "patrols" (SC Highway Commission 1920, p.9).[3]

In counties with chain gangs, convicts were put to work and the state and county provided trucks and road grading machines, in addition to mule teams, wagons, hand tools, and, of course, the accoutrements of convict labor, including guards, dogs, weapons, shackles, mobile kitchens, and moveable incarceration units. Patrols, on the other hand, were made up of men who lived along the roads on which they worked. Counties paid wages to the patrols and provided road drags, some machinery and hand tools, but the patrol members usually furnished their own teams and wagons. The highway commissioners reported that "satisfactory patrolmen [were] hard to find" in sufficient numbers as the state and county road network was built out (SC State Highway Commission 1920, p. 35).

2.2 Extending South Carolina's road network

Voter demand and federal subsidies led South Carolina to embark on an ambitious road-building program that included both hard-surface and soft-surface roads. The state's plan, approved by the federal government, included a network that connected every county seat with the seats of all adjacent counties. In 1915 South Carolina had virtually no hard-surface roads and few miles of soft-surface roads under state maintenance. By 1930 the state had a substantial network of completed hard- and soft-surface roads, many more miles of road under construction, and an ambitious plan for future construction (see, for example, maps in SC Department of Transportation 1930).

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[3] New construction projects in most counties were outsourced to private contractors who bid on construction proposals.

Federally subsidized miles of hard–surface roads increased by more than 1,000 between 1919 and 1929; soft–surface road (soil, sand, gravel) mileage increased by more than 4,000 miles (SC State Highway Commission 1929, p. 49). More roads meant more routine maintenance and repair. By the end of the decade, the state and its counties were responsible for maintaining more than 5,600 miles of improved roads. Maintenance and repair costs, even when gangs were used, were not inconsequential. In the six months after July 1, 1920 the highway commission reported an annual average cost per mile of road maintained of $323 (approximately $4,000 in 2018 dollars) that did not include the use costs of capital equipment (SC Highway Commission 1920, p.35). Heavy equipment, road marking, and signage were budgeted separately. In the year ending December 31, 1929 the commission reported average annual per mile maintenance costs of $332 for hard–surface roads and $419 for soft–surface roads (SC State Highway Department 1929, Table 10). One tradeoff for the state was the greater initial cost of hard–surface roads versus the higher annual maintenance costs of soft–surface (soil, sand, and gravel) roads, a choice that depended, in part, on anticipated traffic load.[4]

The second tradeoff was wage labor versus convict labor. It is generally accepted by historians that counties saved on labor costs by sentencing criminal convicts to work on roads. When the average low-skilled cotton mill hand was paid about $1.25 per day, the cost of housing, clothing, and feeding a convict on the chain gang was just $0.20 per day; the cost of guards added another $0.20 per day and miscellaneous expenses another $0.15 (SC State Board of Charities 1915, p.139). At 55 cents per day, the average daily cost of a convict was more than the 35-cent daily jail fee assessed men and women arrested in Greenville County and held until they were released on bail, but it was less than one-half the wages of free labor (see Jail Books (1918-1921) at Greenville County 2019). Moreover, most contemporaries believed that punishments meted out for shirking motivated convicts to work more hours

[4] In 1924 the highway commission reported that high–volume roads were more likely to be hard–surface roads, which complicated direct per–mile comparisons of maintenance costs on hard– and soft–surface roads. It also reported that it was instituting traffic surveys to better allocate maintenance funds based on traffic flows (SC Highway Commission 1924, p. 24).

and exert more effort per hour than could be reasonably expected from free labor. Miller (2012) reports that convicts worked at brisk paces between sunup and sundown with brief meal breaks. Shirkers suffered a range of punishments from denial of food to severe lashings to time in the box.[5]

Although the general public may have believed that convicts represented an inexpensive labor force, informed contemporary observers doubted whether lower provisioning costs translated into genuine cost savings (Steiner and Brown 1969/1927; Pennybacker, Fairbank and Draper 1916). In 1919 Charleston County, for example, maintained two camps housed in permanent structures and decisions about which roads the gangs would build or repair were under central direction (SC Board of Charities and Corrections 1919, p.93). The commissioners believed that Charleston's gangs were reasonably productive. Clarendon County, on the other hand, had 33 school districts and the law required that one of the county's gangs work for no less than 10 days on roads in each district. On the day the commissioners inspected one such gang, they found the convicts working "on the best road in the county, which needed work the least, but which had to be worked for the stated period" (SC Board of Charities and Corrections 1919, p.94). The commissioners recommended that South Carolina impose statewide control of gangs, prioritize repairs across the states, and distribute gangs more rationally. Nothing came of the recommendation; gangs remained under county control throughout, and any potential cost savings were likely negated by the inefficiencies inherent to the system.

2.3 Courts and convicts

Men of all ages and races found themselves sentenced to county gangs. Although convicted felons served the longest sentences and worked under the harshest conditions, most gang convicts were misdemeanants tried and

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[5] When state authorities banned lashings and beatings, gang supervisors instituted use of the sweat box: a 3-foot by 3-foot by 6-foot box, placed in the sun, in which the prisoner was forced to stand for the entire day without food and with limited water (Miller 2012). Most prisoners confined to the box lost consciousness after a few hours. Belligerent convicts and unrepentant shirkers sometimes spent several consecutive days in the box.

sentenced in municipal magistrate courts to short terms of service. County magistrates, who presided over courts of initial jurisdiction, issued warrants and heard preliminary examinations in all criminal cases. In cases involving a serious felony, magistrates determined whether there was sufficient evidence to support the charge. If so, they held over the case for a criminal trial in the Court of General Sessions and determined bail, when appropriate. In misdemeanor cases — any crime for which the maximum punishment was either 30 days or a fine of $100, including larceny involving goods worth less than $20 — magistrates had exclusive jurisdiction and tried cases based on information rather than indictment.[6] After having the charges read, magistrates could, at their option: (1) release the defendant for want of evidence; (2) release the defendant on his or her own recognizance at good behavior (a so-called peace bond) for up to one year; (3) conduct a bench trial and determine a sentence if the defendant was found guilty; or (4) empanel a jury if the defendant requested one, and adjudicate the case, often within a day or two of the arrest. If a defendant was found guilty, the magistrate imposed a term at hard labor, or a fine in lieu of labor, or, rarely, both (Bethea 1912 v.2, pp.220-221).

In addition to misdemeanors, magistrates had concurrent jurisdiction with the Court of General Sessions in felony cases of riot, assault and battery, petit larceny, receiving stolen goods, obtaining goods under false pretenses, and carrying a concealed weapon. The maximum term for felony assault and battery and misdemeanor carrying a concealed weapon was 12 months at hard labor; simple or petit larceny carried a maximum penalty of 90 days and was adjudicated in magistrate court. Under the state constitution of 1895, the Court of General Sessions had appellate jurisdiction for cases adjudicated in magistrates' courts (Bethea 1912, v2, p.623). Any criminal defendant convicted

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[6] In criminal cases, an indictment, an information, and a complaint all initiate a criminal case and inform the defendant of the charges against him or her. An indictment is handed down by a grand jury, which has heard evidence presented by a prosecutor and determined that sufficient evidence exists to warrant a full trial. An information is a formal charge that describes the charges against and defendant, as well as the facts supporting the charge(s). An information does not require a grand jury vote; an information is presented by an officer of the court who has determined that there is probable cause that a crime was committed.

in magistrates court could appeal the conviction to the county court, and beyond.[7]

In 1910s South Carolina, the governor appointed county magistrates with the advice and consent of the state senate. Magistrates held their term of office for two years but could be suspended and replaced by the governor for dereliction of duty or incapacity. The legislature determined the number of magistrates to serve each county and tended to provide one magistrate for each rural township and two or more for urban areas. In Greenville County, for example, the legislature provided for 20 magistrates two of whom served the city of Greenville at an annual salary of $400 in 1912. Magistrates serving rural and suburban townships received annual salaries between $75 (Saluda) and $150 (Greer). Magistrates also appointed their own constables, who were paid the same salary as the magistrate. Counties paid the operating costs, including salaries, of the magistrate's courts. (Bethea 1912, v.1, p.402).

Greenville City's magistrates were the only ones in the county whose appointments represented full–time employment in that they heard cases nearly every weekday. Joseph L. Ballenger and Jonathan M. Daniel, magistrates for Greenville City heard 259 and 264 cases in 1917; Wade H. Poole, magistrate for West Greenville, heard 208 cases (Miller 1917). Magistrates serving rural townships sometimes adjudicated as few as a dozen criminal cases each year. City magistrates' annual compensation was not lucrative, but it was competitive. Klein (2009, Table 9) estimates per worker income in non–agricultural service occupations in South Carolina at $381, which is about the same as the salaries of Greenville City's magistrates (Klein 2009, Table 9). Some considered the remuneration sufficiently attractive to retain their positions through several two–year terms; Ballenger served for a decade.

3. The economics of convict labor and highway maintenance

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[7] A Georgia case involving a magistrate sending a black man to a disproportionate sentence to the chain gang eventually reached the Supreme Court of the United States. See *Wimbish v Jamison*, 1904, which summarized in Appendix A.

Jim Crow-era politicians justified the imposition of hard time on the chain gang for misdemeanants and felons alike to a combination of retributive justice, criminal deterrence, and the fiscal savings of using convict rather than wage labor on road maintenance. This section offers some insights into whether South Carolina realized cost savings from the use of convict labor.

There is reason to believe that the employment of gang labor on the state's roads was not a cost-saving measure. South Carolina's Board of Charities and Corrections (1919, p.15) reported that "the present chain gang system is both inefficient and unduly expensive." Their conclusion accords with those drawn by Pennybacker, Fairbank and Draper (1916) and Steiner and Brown (1969/1927), who argue that gangs used in road construction, not maintenance as in South Carolina, was not less costly than wage labor. Pennybacker, Fairbank and Draper (1916, p.30) argue that the typical county chain gang of 15 to 25 convicts was too small to achieve efficiencies in the construction of hard-surface roads and too large to achieve efficiencies on soft-surface roads. Although their argument can be interpreted as a discussion of economies of scale and minimum efficient scale, they do not have counts of gang size or gang labor input. Rather they have miles completed and total costs, and they calculate average costs per mile of completed construction in Virginia between 1909 and 1915. The summary data reported in Pennybacker, Fairbank, and Draper (1916) is plotted in Appendix B. The graphs reveal that convict labor was not less expensive in road construction, regardless of road type (see Figures B1-B3).

The data reveal, however, that average costs per mile of grading roads, the principal employment of South Carolina's chain gangs, was minimized at just more than $1,000 per mile for an approximately 15-mile section of road in Virginia (see Appendix Figure B4). Whereas the Virginia data reports costs of new construction, South Carolina's convicts mostly repaired and (re-)graded already-constructed roads, so it is likely that the minimum efficient length of road per gang was greater than 15 miles. And unlike Virginia, which appears to have used either free or convict labor exclusively on each road project, South Carolina adopted a more flexible approach in which convicts and wage

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workers sometimes worked separately and sometimes side-by-side even though Pennybacker, Fairbank and Draper (1916) and Steiner and Brown (1969/1927) counseled against the practice because the intermingling of free and convict labor created disciplinary problems that raised monitoring costs (Virginia Highway Department 1915).

Previous discussions of the efficient use of gangs on road focus on two features familiar to economists: fixed costs and scale economies. Gangs, regardless of their size at any particular moment operated with a basic infrastructure that included either a permanent or moveable camp made up of food preparation, sleeping and sanitary facilities, however rudimentary the latter often was, as well as tools, mules, and machinery. Gangs also operated under the watchful supervision of armed guards, typically one daytime guard per approximately 15 convicts, a night-shift guard for the entire camp, and a gang superintendent or manager (Pennybacker, Fairbank and Draper 1916). Gangs also usually employed a cook and an animal minder, although these functions were sometimes assigned to trustees, or long-term convicts who showed no inclination to run away and had not violated camp rules. Given the nontrivial fixed costs, average fixed costs per convict will decline throughout the relevant range. The marginal costs of basic maintenance were low and approximately constant; meals consisted mostly of corn, pork, dilute coffee and, perhaps, some fresh vegetables and fruit in season. Clothing was basic and uniform. The use of guards and mules were lumpy in that contemporary descriptions depict expansion paths along a near-Leontief-type production function; that is, efficiency implies approximately fixed proportions between guards and convicts (1:15), as well as between basic hand tools, likes shovels or rock hammers, and convicts (1:1), mules and convicts, and road graders and convicts, and so on.

Assume for simplicity that the only inputs to chain gangs are guards and convicts, subject to a fixed-proportion technology, while the only inputs to wage-labor patrols are wage workers and supervisors subject to a standard continuous production function, such as one the results from a Cobb-Douglas-type technology. Assume, too, that the costs of maintaining

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subsistence among gangs are low and approximately constant, and that gang members themselves exhibit relatively low productivity due to constant turnover of the gang workforce, as well as the poor health and low incentives for diligent effort among convicts.[8] The result will be a constant but relatively high marginal cost curve for chain gangs. If, in addition, we assume that a guard is added instantaneously every time the convict-to-guard ratio exceeds the optimal ratio, the marginal cost curve will exhibit a spike at those points (i.e., 16 convicts, 31 convicts, and so on if the ratio is 15:1). Assume, as well, diminishing marginal productivity in wage-labor patrols, which will yield the standard U-shaped marginal and average cost curves that are rising in the relevant range of miles under repair. If Pennybacker, Fairbank and Draper's (1916) interpretation is correct, the marginal cost of wage labor is below the marginal cost of convict labor when only short sections of road are under repair, which requires few workers. The marginal cost of wage labor is above the marginal cost of convict labor when long sections, requiring more labor, are under repair.

The economic problem facing southern administrators is to minimize road maintenance costs given local taxpayers' preferred quantity and quality of a county's roads, which yields a demand for workers, whether wage labor or convicts. Given the relative marginal costs of wage and convict labor, maintenance projects with only few miles under repair will rely on wage labor. Projects with many miles under repair will rely on convicts. Counties with project of intermediate length may use some combination of wage and convict labor if the demand curve for road maintenance is such that it passes through the marginal cost curves in the neighborhood of where the horizontal gang cost curve intersect with the rising wage-labor cost curve.

Data come from the South Carolina Highway Commission's Annual Reports (1921 - 1924). The commission reported cost and mileage data by road

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[8] Steiner and Brown (1969/1927) and Pennybacker, Fairbank and Draper (1916) report high rates of venereal disease, including advanced cases of syphilis, among convict road gangs; tuberculosis was not uncommon. One of Pennybacker, Fairbank and Draper's many recommendations was to separate diseased from healthy convicts, and to treat diseased convicts.

section under maintenance by county and labor force. Although some counties relied exclusively on wage labor (patrols) and convict labor, most counties employed a combination of convict and wage labor, sometimes on the same road sections. Table 2 provides the basic statistics where the unit of observation is the road section under repair. The sample is restricted to soft-surface roads, which was the type of road maintained by chain gangs. The average section under maintenance was 34.4 miles and average cost per mile was $351.30. Approximately one-fifth of the state's road were worked by gangs alone; 42% of roads were worked by wage-labor patrols, and the remaining 36% were maintained by a combination of convicts and wage workers. The commission's annual reports also rated the quality of the road under maintenance, most of which were rated "Fair" to "Good." Less than one-tenth of road sections maintained received higher ratings, which points to counties prioritizing maintenance on lower quality roads.

Table 2				
Summary statistics for SC road maintenance, 1921-1924				
Variable	Mean	Std. Dev.	Min	Max
Cost / mile	351.302	119.640	124.020	619.290
ln (cost / mile)	5.799	0.364	4.820	6.429
Soft surface miles	34.380	30.628	0.200	129.100
ln (soft surface miles)	2.949	1.306	-1.609	4.861
Gang	0.213			
Gang and patrol	0.358			
Patrol	0.429			
Fair condition	0.135			
Fair-good	0.323			
Good	0.450			
Good-excellent	0.082			
Excellent	0.011			
Notes: 317 road sections.				
Sources: SC State Highway Commission (1921-1924)				

Figure 2 presents a scatterplot of cost per mile of road maintenance against miles of road under maintenance from the commission's reports. Regrettably, the commission did not record the number of workers or hours worked on the road sections, but it is not unreasonable to assume that miles and worker-days are functionally related. Black diamonds represent gangs, blue squares represent wage-labor road patrols, and red circles the sections worked by both. Three lines in colors corresponding to the data points trace out the estimated central tendencies of per-mile costs using a quadratic functional form and no additional covariates. The resulting curves are U-shaped and the 95% confidence intervals (not plotted) all overlap, but the curves suggest that wage labor was marginally less costly per mile than gangs on short road sections and that gangs were marginally less costly per mile than wage labor on longer road sections.

Figure 2: Average costs per mile of road maintenance
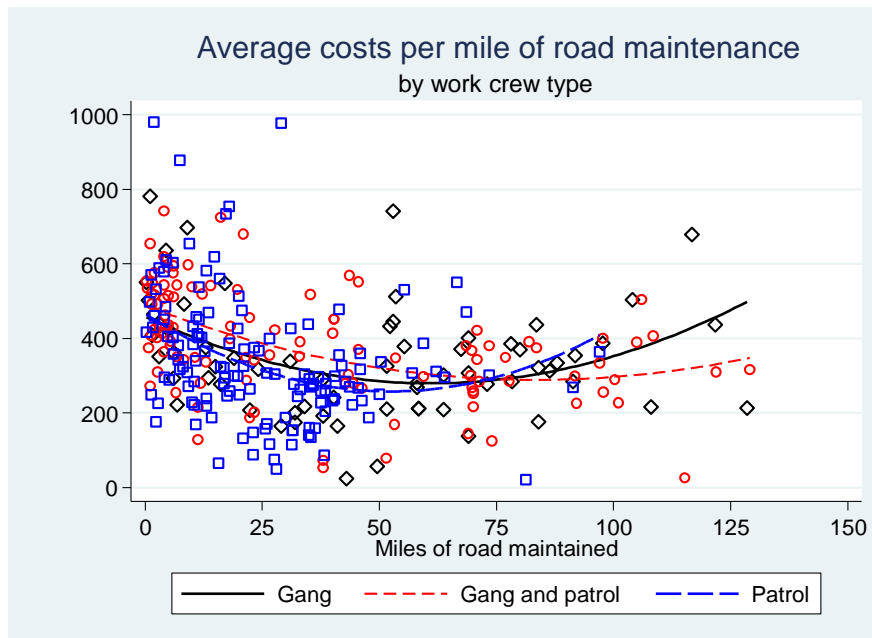
A formal empirical analysis of the cost data involves testing whether the annualized maintenance cost per mile is lower for gangs than for patrols

or combinations of gangs and patrols (the reports do not provide information on the average number of men working on gangs or patrols, which will tend to attenuate the estimated effects). To test the hypothesis, I estimate the following fixed-effect regression from a multi-year panel of road section-level data:

$$\ln(costpermile)_{ct}$$
$$= \alpha + \beta_l labor_{ct} + \beta_m \ln(miles)_{ct} + \gamma_{condition}$$
$$+ \gamma_{months} + \gamma_{county} + \gamma_{year} + \varepsilon_{ct}$$

The *labor* variable is a pair of indicator variables; the first equals one if the road crew is a gang, and zero otherwise; the second equals one if the road crew is a combination of gang and patrol and zero otherwise. The excluded category is the patrol. If the use of convicts reduced the costs of road maintenance, the coefficients will be negative. Because the unit of observation is the road section repaired there are multiple observations for most counties in most years. If a county worked more than one road crew, there is an entry for each such crew. Reported work crews included gangs, patrols, and combinations of gangs and patrols. It is not clear whether gangs and patrols worked together or separately, but some segments worked by gang–patrol combinations were less than two miles in length, which suggests that they coordinated their efforts if they did not work side-by-side.

The coefficient on the natural logarithm of miles variable will indicate any (dis)economies of scale in road maintenance. Cost (dis)economies may also be captured in the *Months* fixed effects, because it was costly to move gangs and camps between work sites. The longer a gang worked out of one base, the lower the costs of relocating and down time. The regressions also include fixed effects for road condition (excluded category = fair), year (excluded category = 1921), and county. County fixed effects capture all relevant time-invariant factors within a county that influence the per-mile cost of road maintenance, but these results need to be interpreted cautiously because not every county employs each type of road crew.

Table 2 provides key summary statistics for the road maintenance cost data. The average cost per mile was $351 and the average maintenance crew maintained about 34 miles of soft-surface roads. The regression analysis considers only soft-surface roads for two reasons: (1) counties were directly responsible for relatively few miles of hard-surface roads, some counties none at all; and (2) as discussed earlier, construction and maintenance costs were considerably different for hard- and soft-surface roads. The data also reveal that about 21 percent of soft-service roads were maintained exclusively by chain gangs. Another 36 percent were maintained by a combination of gangs and free-labor patrols; and 43 percent were maintained by patrols alone. Thus, it was not the case that most county roads in the state were maintained by chain gangs. Twice as many counties relied on patrols alone as counties that relied on gangs alone. Finally, the state highway commission classified a county's roads as either Fair, Fair-Good, Good, Good-Excellent, or Excellent. Few sections of road were deemed excellent; most were considered good or just marginally so.

Table 3: Estimated costs of gang and free labor in road maintenance

VARIABLES	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) FE	(6) FE
Gang	0.004	0.082	0.082	0.095	0.077	-0.127
	(0.973)	(0.399)	(0.400)	(0.307)	(0.400)	(0.289)
Gang & patrol	0.160*	0.153**	0.100	0.111*	0.106	-0.049
	(0.089)	(0.049)	(0.165)	(0.089)	(0.146)	(0.555)
ln(miles)		-0.162***	-0.088***	-0.089***	-0.088***	-0.085**
		(0.000)	(0.001)	(0.001)	(0.005)	(0.022)
Constant	5.722***	6.183***	5.758***	5.748***	5.758***	5.539***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	314	314	314	314	314	314
R-squared	0.017	0.147	0.209	0.224	0.254	0.451
Year FE			Yes	Yes	Yes	Yes
Quality FE			No	Yes	Yes	Yes
Months FE			No	No	Yes	Yes
County FE			No	No	No	Yes
Robust pval in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 3 presents the regression results. The dependent variable is the natural logarithm of maintenance costs per mile. Fixed effects controls are entered stepwise. Column 1 includes only two indicator variables for road crew type (the excluded category is Patrol). This regression points to no cost advantage for counties that used gangs or patrols and gangs, instead of patrols alone. Column 2 includes the natural logarithm of miles of roads under maintenance to capture any economies in maintenance. Columns 3 through 6 sequentially add Year, Road Quality, Months Worked, and County fixed effects. Column 6, which includes all the fixed effects. The first feature to note is the apparent existence of economies of scale around the average length of road section maintained. Coefficient estimates in columns 3 through 6 point to a cost elasticity of -0.085 to -0.089. That is, holding the type of labor force constant, a ten percent increase in mileage reduced per mile costs by about 8.5 to 9.0 percent. Column 6, which includes all the fixed effects, reveals that the use of gangs led to a 12 percent cost saving relative to patrols, but the coefficient is not precisely estimated. The use of convicts and wage labor together is associated with per mile costs about 4.9 percent lower than the use of wage labor alone.

Compared to the use of patrols, the data provide little evidence that the use of gangs in combination or alone reduced road maintenance costs in a statistically significant or economically meaningful fashion. But the evidence is not consistent with statements of contemporary critics, such as Pennybacker, Fairbank and Draper (1916) that gangs were grossly inefficient so that the costs of convict labor were greater than wage labor. The results are consistent with a hypothesis that state and county authorities and road repair managers chose a road crew type – gang, patrol, or a combination – that they believed to be the low-cost option for a given maintenance project. If managers were cost minimizing agents of taxpayers, they would have equalized the marginal cost of a mile of road repair across labor types. The data here are average, rather

than marginal costs, but the long-run equilibrium in a competitive market equates the two.

The empirical findings reported here are not fully consistent with Pennybacker, Fairbank and Draper (1914) and Steiner and Brown (1969/1927), who doubted whether the use of convict road gangs created a genuine cost savings on road work. South Carolina's Board of Charities and Corrections (1919, p.15), too, wrote that "the present chain gang system is both inefficient and unduly expensive." South Carolina's commissioners contended that gangs were too small and the labor turnover too high to provide cost-effective road maintenance. It does not appear to be the case that gangs were notably less efficient than wage labor when deployed in gang-appropriate employments. It also does not appear to be the case that they were more efficient, on average.

The available data does not afford an opportunity to determine whether putting convicts to work on the roads, housing them in substandard quarters, and feeding them a nutrient-deficient diet of corn and pork was less expensive than warehousing them in county jails and state prisons. But assessments of South Carolina's county jails provided in the annual reports of the Board of Charities and Corrections (1919) depict similarly wretched jail conditions – damp, drafty, poorly maintained structures, filthy linens, inadequate sanitary facilities, and bad food – that could not have been much more costly to taxpayers than convict labor camps. (Appendix C provides some representative descriptions of jail and gang conditions.) If convicts were not more productive at road work, on average, than wage labor and were no less costly to taxpayers than warehousing them in rudimentary, unsanitary jails, southerners must have believed that gangs served some purpose other than cost-saving. It is to that issue that the paper now turns.

4. The political economy of the chain gang

Economic models of deterrence predict that the punishment for criminal acts will increase with the severity (or social costs) of the crime. Standard models assume agents in the criminal justice system act to minimize

the social costs of crime. Magistrates who preside over criminal courts of initial hearing, however, face various and perhaps competing incentives to determine whether to convict a defendant, whether to fine or sentence him or her to a term on the chain gang, and, if so, the length of the sentence within limits established by statute or practice. Decisions to convict and sentence to the chain gang depend on the disutility of judicial effort, the preferences of superiors and voters, the personal preferences of the magistrates, including any prejudices or biases, and their personal commitment to community safety (Shleifer 2010, Knowles, Persico and Todd 2001, Makowsky and Stratmann 2009).

Although magistrates were answerable only to the governor, who had the appointive and removal power, it is reasonable to think that magistrates were responsive to preferences of local voters, taxpayers, and politicians. The governor will be responsive to all three groups to various degrees, and his decision to appoint, reappoint or remove a magistrate will be influenced by local voters' expression of approval or disapproval with the magistrate, including the extent to which those decisions are consistent with the county's crime rate, its fiscal position, and the conditions of the roads. If a magistrate values his appointment more than the next-best alternative, he will respond, at the margin, to the preferences of local voters.

Makowsky and Stratmann's (2009) *political economy* approach to enforcement incentives posits that the utility function of maximizing local law-enforcement agents includes a tax-exporting argument. In the modern case of traffic violations, for example, police face strong incentives to write more citations when the local public treasury is in deficit and to differentially cite and impose larger fines on nonresident, nonvoting violators of traffic laws. A parallel approach to magisterial behavior predicts that magistrates respond to local fiscal and road conditions and whether the defendant, as well as his family and friends and any others likely to be negatively affected by a defendant's

incarceration are taxpayers and likely voters.[9] If a criminal defendant lacks effective political voice, magistrates are more likely to convict and sentence to the gang. Poor, property-less, disfranchised southern blacks are analogous to Makowsky and Stratmann's (2009) out-of-state drivers in that they are, for practical purposes, noncitizens and therefore bear the brunt of a tax-exporting criminal justice system. History tells us that the onus of road work fell on young black men almost all of whom were ineligible to vote and likely would have voted for Republicans had they been eligible rather than for Democrats favored by Jim Crow-supporting white voters (Clarke 1906a, 1906b, Lichtenstein 1993, Miller 2012, Wright 1999). Because young black men at the time had no meaningful political voice, they were more vulnerable to receive severe punishments in criminal proceedings than similarly situated adult white men, who were not systematically disqualified from political participation.

Makowsky and Stratmann's (2009) *opportunity cost* approach predicts that magistrates are more likely to sentence young men to the chain gang when the cost to the defendant of contesting the sentence is higher and the expected cost to the magistrate of sending a defendant to the gang is lower. Every defendant who appeared in a magistrate, municipal, or county Court of General Sessions in Jim-Crow-era South Carolina, for example, had the right to a jury trial (six jurors in magistrate court). Empaneling a jury slowed the proceedings and imposed other costs on the courts broadly and the magistrates personally. Magistrates, then, should have been less likely to try and sentence defendants who were more likely to demand a jury trial. Because only registered voters were eligible for jury duty and nearly all registered voters were white, black defendants had little reason to believe that their case would receive an impartial hearing. Faced with biased adjudication black defendants were less likely than whites to contest the charges. White defendants, on the other hand, were more likely to face a sympathetic jury, especially when conviction meant

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[9] The political economy model developed here differs from Myers (1993). In her model, economic competition between blacks and whites drives disproportionate punishments for blacks, and more so during recessions.

service on the county chain gang alongside black men.[10] White misdemeanants were, therefore, more likely than blacks to be released on a peace bond or after paying a fine (see, for example, Greenville City Police Court 1910-1911). Blacks were more likely to receive a term at labor on the gang.

The opportunity cost hypothesis, further, predicts that defendants who are less likely to appeal a conviction are more likely to be convicted. All defendants convicted in a magistrate, municipal, or police court retain the right to appeal to the Court of General Sessions. If a defendant appeals, the magistrate has to offer a written report of the charges, a summary of the testimony and proceedings, and the sentence, including the magistrate's justification for conviction and sentence. If a court stenographer kept a transcript, the magistrate is required to include that as well. The appeal is then sent to General Sessions, where it is docketed and heard when the court next convened (Bethea 1912, v.2). Just as jury trials slow the operation of the magistrate court, appeals from magistrate courts slow the criminal courts and impose additional costs. Magistrate court cases that do not involve a jury are likely to reduce operating costs and raise revenues for the county by the imposition of fines. Appeals reduce the value to the relevant jurisdiction of a conviction and either a fine or a sentence of hard labor on the gang.

The opportunity cost hypothesis is not only consistent with a pure racial bias hypothesis – racial animus resulted in a disproportionate share of blacks sentenced to the chain gang – it illuminates the structural nature of prejudice and bias in the criminal justice system. Bias was built into the system, cooked into the sauce, as it were. Jim Crow-era black codes created a social, economic, and legal system characterized by unremitting, inescapable, oppressive racial prejudice. Magistrates reported, ultimately if not directly, to voters who were mostly white landowners. Even if a magistrate harbored no racial animus toward black defendants, the incentives were such that blacks

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[10] South Carolina law mandated segregated chain gangs, but inspectors regularly uncovered and reported cases in which blacks and whites served together. See, for example, SC State Board of Charities and Corrections (1915, p.144) where the Board reports: "We have thus far found only one exclusively white chain gang in the State," despite a 1911 act which mandated "a separation of the sexes and races be at all time observed."

could not expect to receive justice on the same terms as whites. The structural foundations of prejudice, of course, does not preclude magistrate bias. If magistrates are prejudiced, they would exhibit a preference toward sentencing blacks rather than whites to the gang. This suggests that a larger proportion of black than white defendants will be sent to the gang, which accords with any personal biases held by the magistrates and the biases of the voters they answer to.

The principal prediction that emerges from the standard Becker (1968) model informed by the Makowsky and Stratmann (2009) opportunity cost hypothesis and Knowles, Persico and Todd (2001) model is that magistrates concerned with both public safety and reappointment will balance the marginal social costs of not incarcerating a criminal and the marginal opportunity cost of incarcerating politically enfranchised defendants. Persico's (2009) generalization of the KPT (2001) approach posits that judges or magistrates care about convicting the guilty, and unbiased judges will maximize the probability of convicting the guilty. If magistrates focus on convicting blacks, blacks will engage in less criminal activity. Whites, knowing that magistrates are concerned with black convictions will engage in more criminal activity. A maximizing judge, or one concerned with minimizing the social cost of crime, may increase his or her efficiency by equating conviction probabilities across race.

In practice, even in the Jim Crow South, not every white defendant will have his case dismissed or pay a trivial fine after conviction and not every black defendant will be sentenced to hard labor. The social costs of releasing murderers, robbers, and rapists of either race are substantial. The opportunity costs are (relatively) low. Racial disparities should be less the more socially costly the allegations. The tradeoff for men charged with being drunk and disorderly, on the other hand, are such that the social costs are small and the opportunity costs relatively large, which affords magistrates the latitude to act on personal or social prejudices and engage in biased sentencing. One potentially testable prediction of the opportunity cost approach is that the offense of the marginal white sentenced to gang will be more serious than the

offense of the marginal black convict. A second, more readily testable, prediction is that, within any class of crimes, blacks will be more likely than whites to be sentenced to the gang.

The above approach yields three hypotheses. First, if magistrates are rewarded solely for minimizing the social costs of crime, the equilibrium will be characterized by equal probabilities of conviction and a sentence to be served on the chain gang across all groups, particularly blacks and whites for a given quality of evidence. Second, if magistrates are rewarded solely for advancing a discriminatory, racialized Jim Crow agenda, the equilibrium will be characterized by unequal probabilities of conviction and sentences to be served on the chain gang, such that black defendants are far more likely to be convicted and more likely to be sentenced to the gang. Third, if magistrates are rewarded for advancing Jim Crow while maintaining a certain (non-maximized) level of public safety, the equilibrium will be characterized by similar, but not necessarily equal, probabilities of conviction and sentences to gang for defendants charged with serious criminal acts (i.e., murder, robbery, rape, etc.), but unequal probabilities for defendants charged with less serious felonies and misdemeanors (i.e., disorderly conduct, larceny, vagrancy, etc.). Deviations away from the public-safety equilibrium reflect the responsiveness of magistrates to career advancement through the prejudicial treatment consistent with white voters' support for observing the proscriptions defined by Jim Crow black codes.[11]

To test the opportunity cost hypothesis, I follow empirical strategies motivated by the outcome-based tests developed by Ayres and Waldfogel (1994) and Knowles, Persico and Todd (2001) and used in a host of subsequent

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[11] The equilibrium result in the magistrate court will have upstream consequences in terms of potential criminals' decisions to seek employment in criminal and legitimate labor markets. Under a Jim Crow-type system, police, too, face incentives to deliver defendants to the courts who are more likely to be convicted, which leads them to disproportionately target the discriminated-against group. Defendants appearing in magistrate court will be selected based on unobservable choices by police in determining who to arrest and for which crimes. Because magistrate courts serve as courts of initial hearing, magistrates' decisions will have downstream consequences, including but not limited to criminal dockets in Courts of General Sessions with a disproportionate number of black defendants. Defendants appearing in General Sessions will be selected on prior police charging choices and magistrates' choices.

studies (i.e., Anwar and Fang 2006; Close and Mason 2007; Antonovics and Knight 2009; Fryer 2019). Outcome-based tests are agnostic on the motivations of decision makers in the criminal justice system, but they can reveal when decisions have a disparate impact that is inconsistent with enhanced productivity of the decision maker (Fagan et al 2010). It must be kept in mind that disparate impact does not equal prejudicial or discriminatory behaviors (Fryer 2019, Fryer 2020, Durlauf and Heckman 2020). There is no single empirical method applied to administrative data that can definitively answer whether authorities act in a biased fashion and causal inference remains elusive (Ridgeway and MacDonald 2010). I reiterate, the Jim Crow South was constructed on a system of racial animus; it was separate and unequal. Disparate outcomes are anticipated. What is unclear is the extent to which whites were willing to sacrifice public safety in their pursuit of apartheid.

5. Evidence on the opportunity-cost hypothesis, Jim Crow, and race

Makowsky and Stratmann's (2009) opportunity-cost hypothesis predicts that magistrates face incentives to engage in the chain-gang equivalent of tax-exporting, which is accomplished by convicting disfranchised citizens and those unlikely to demand a jury trial or to appeal their convictions. Each action points to disproportionate conviction of young black men. At the same time voters care about the crime rate and the effectiveness of criminal justice as mechanisms of deterrence and incapacitation. Thus, magistrates face a tradeoff at the margin between satisfying concerns with public safety (i.e., convicting dangerous *and guilty* defendants) and voters' commitment to Jim Crow-style racial oppression (i.e., convicting black men, guilty or not, dangerous or not). A test of the relative strength of the latter will be, in effect, a test of the extent to which magistrates deviate from behaviors consistent with the former.

5.1 Data

The individual-level data used to investigate the applicability of the Makowsky and Stratmann (2009) opportunity cost hypothesis, which is, in

effect, a joint test of the racial bias hypothesis, is drawn from Greenville, South Carolina's jail records between 1917 and 1927. The sheriff was charged with maintaining the county jail and every person arrested for a felony or serious misdemeanor was committed to the jail pending a hearing before one of the county's magistrates, and would remain until released on bond, upon payment of a fine, or until released to the custody of a chain gang supervisor, the sheriff, or some other officer of the court. The jail keeper then created an entry concerning each arrested defendant. He recorded the defendant's name, the crime with which he or she was charged, the name of the magistrate hearing the case, the date of arrest and commitment to the jail, the date of release, the race, age, and sex of the arrestee, the name of the court officer ordering the release of the prisoner, and the disposition of the case, namely, whether the defendant was released on bond, committed to the chain gang, or sent to the penitentiary, asylum, or youth reformatory. The jailers rarely reported the length of sentences to the gang or the penitentiary, so these data are not analyzed. A representative page from the jail keeper's logbook appears in Appendix D.

Table 4: Characteristics of white and black magistrate court defendants

Variable	Whites Mean	Blacks Mean	Difference Z-statistic	p-value
Chain gang	0.148	0.236	5.21	0.000
Allegation				
Assault & battery	0.176	0.290	6.28	0.000
Public disorder	0.407	0.118	14.52	0.000
Concealed weapon	0.024	0.049	3.19	0.001
Gambling	0.092	0.256	10.29	0.000
Larceny	0.180	0.213	1.91	0.056
Vagrancy	0.121	0.073	3.63	0.000
Age quintile				
15–21 years	0.296	0.210	4.49	0.000
22-25	0.268	0.248	1.02	0.308

26-30	0.226	0.333	5.52	0.000
31-35	0.077	0.103	2.04	0.041
36-82	0.133	0.107		

Magistrate

Ballenger	0.197	0.258	3.37	0.000
Batson	0.110	0.139	2.01	0.044
Burns	0.010	0.008	0.48	0.631
Capell	0.004	0.024	4.20	0.000
Cooley	0.301	0.227	3.79	0.000
Daniel	0.116	0.176	3.91	0.000
GJones	0.095	0.039	4.92	0.000
James	0.012	0.011	0.17	0.865
King	0.010	0.037	4.28	0.000
Poole	0.122	0.070	3.92	0.000
Smith	0.011	0.003	1.92	0.055
Stradley	0.012	0.007	1.09	0.275

Hearing day (arrest day often day earlier)

Sunday	0.202	0.222	1.12	0.263
Monday	0.152	0.162	0.59	0.562
Tuesday	0.143	0.118	1.66	0.096
Wednesday	0.104	0.120	1.13	0.258
Thursday	0.113	0.118	0.42	0.674
Friday	0.095	0.074	1.70	0.089
Saturday	0.191	0.186	0.03	0.764

Year

1916	0.047	0.066	1.96	0.050
1917	0.165	0.213	2.81	0.005
1918	0.059	0.131	5.84	0.000
1919	0.109	0.099	0.78	0.435
1920	0.069	0.064	0.48	0.631
1923	0.098	0.103	0.34	0.728
1924	0.133	0.088	3.27	0.001
1925	0.135	0.089	3.28	0.001
1926	0.123	0.084	2.91	0.004
1927	0.061	0.064	0.25	0.803

Arrest Month

January	0.064	0.063	0.09	0.928
February	0.067	0.073	0.56	0.575
March	0.090	0.105	1.18	0.238
April	0.097	0.101	0.03	0.749

May	0.083	0.076	0.54	0.589
June	0.073	0.074	0.11	0.921
July	0.103	0.103	0.07	0.944
August	0.080	0.077	0.19	0.849
September	0.093	0.096	0.18	0.857
October	0.082	0.093	0.93	0.352
November	0.092	0.074	1.47	1.416
December	0.077	0.065	1.09	0.276
N	1306	878		

The magistrate data set, which is summarized by race in Table 4, contains records on 1,306 white and 878 black defendants charged with six crimes commonly adjudicated in magistrates' courts between 1917 and 1927. Data for the three years 1921 and 1922 are not included because the deputy who maintained the jail commitment ledger did not record chain gang commitments in those years. Because no women were committed to Greenville County's chain gang, I drop data on 741 defendants identified as women. I drop 43 observations on defendants under 15 years of age because they were not eligible for gang service, and 32 observations in which age was not recorded. I also drop cases in which an individual magistrate heard less than 50 total cases during the ten-year interval and cases involving crimes with less than 50 arrests, namely receiving stolen goods, and obtaining goods under false pretenses.

Of the crimes that magistrates were authorized to adjudicate, I dropped 20 cases in which defendants suffered from mental illness (concisely summarized as "lunacy" in the records) because these individuals were either committed to the asylum or simply released. I dropped 84 cases of adultery, 54 cases of bigamy, and 204 cases of nonsupport (or abandonment) of family because none of these defendants were sentenced to the gang. All of the public disorder crimes – drunk, disorderly conduct, and drunk and disorderly – were combined to form a single group. The resulting sample is made up of 2,184 black and white men accused of committing one of six less serious crimes,

including assault and battery, public disorder, carrying a concealed weapon, gambling, petit larceny, and vagrancy.

A simple population comparison benchmarking test points to disparate treatment. Although blacks represented slightly less than 25 percent of Greenville's population, black men represented 40 percent of all defendants brought before a magistrate. Blacks represented 53 percent of defendants charged with assault and battery, 58 percent of those charged with carrying a concealed weapon, 65 percent of those charged with gambling, 44 percent of alleged larcenists, and 29 percent of vagrants. As is well known, however, a population-based benchmarking test does not provide much insight into systematic disparate treatment unless the population at risk for arrest is a randomly assigned subset of the overall population.

Sample proportions reported in Table 4 reveal notable racial differences when comparisons are drawn within the sample of criminal defendants. Blacks were more likely than whites to be sentenced to the chain gang. Blacks were more likely than whites to be charged with assault and battery, carrying a concealed weapon, gambling, and larceny. Whites were nearly four times as likely to be arrested on a public disorder charge and, somewhat surprisingly, on a vagrancy change. Racial differences in the age of defendants are also apparent. White defendants were more likely to be in the youngest age group (15 – 21 years); blacks were more likely to be in the middle quintile (26 – 30 years).

The busiest magistrates were Ballenger (served 1916-1920), Batson (1923-1927), Cooley (1923-1927), and Daniel (1917-1920) who served as magistrates for the city of Greenville, and Poole (1917-1923) G. Jones (1923-1927) who adjudicated cases in the textile mill district of West Greenville. The remaining magistrates served smaller communities elsewhere in the county. An important empirical issue is whether cases were randomly assigned to magistrates. All magistrates heard all types of cases; they all sentenced defendants to the chain gang, though not equally so; they all heard cases with black and white defendants; and they all heard cases every day of the week, though the busiest days were Saturday and Sunday, which is consistent with

more arrests on Friday and Saturday nights than other days of the week (See Appendix E). There is no evidence in the records consistent with a magistrate hearing more or less of any type of case. While crime was not randomly distributed across the county – crime was, then as now, more common in cities – there is nothing to indicate that defendants made strategic choices that would have led them to be differentially selected into a particular magistrate's courtroom (Glaeser and Sacerdote 1999).

Before turning to the tests, it is important to understand the constraints facing magistrates. First, they had jurisdiction over misdemeanors and less-serious felonies. The maximum misdemeanor sentence was 30 days; the maximum sentence for assault and battery was one year. Although deputies in charge of the ledgers did not consistently report sentence, among those observation in which they recorded sentence lengths, the most common sentence was 60 days followed by 90 and 30 days. Second, space on Greenville County's chain gangs was scarce. In 1915 the county operated four separate chain gangs, one each with 30 and 17 inmates and two with 24 convicts (SC Board of Charities and Corrections 1915, pp154-55), which are values consistent with Pennybacker, Fairbank and Draper's (1916) contention that the optimal gang size was between 15 and 30, depending on the type of work done by the gang. In three of these camps all the beds were taken on the day the state inspectors visited the camp. Space for newly sentenced convicts, therefore, became available only as previously sentenced convicts completed their sentences.

Figure 3 provides a weekly histogram of gang commitments by Greenville's magistrates. On average, magistrates committed 0.89 new convicts per week. The one week maximum was eight new commitments, which occurred in the last week of April 1917. Many weeks saw zero gang commitments, especially in 1919 and 1920 when most weeks saw zero commitments and the county suspended operations of two of its gangs. It is not clear how, or even whether, magistrates coordinated their sentencing so as not to commit nonoptimal numbers of convicts to the gang. But because most of the commitments came from the city of Greenville and the mill district of

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West Greenville, it would have been straight forward for gang supervisors to provide status reports to the courts. Moreover, the city's magistrates convened their courts every day, often on the same days at the same times, which would have facilitated coordination in filling spaces. Capacity constraints for the county's gangs required magistrates to engage in selective rather than indiscriminate sentencing. The issue is whether the characteristics of the crime or the defendant were determinative.

Figure 3: Average weekly commitments to Greenville's gangs
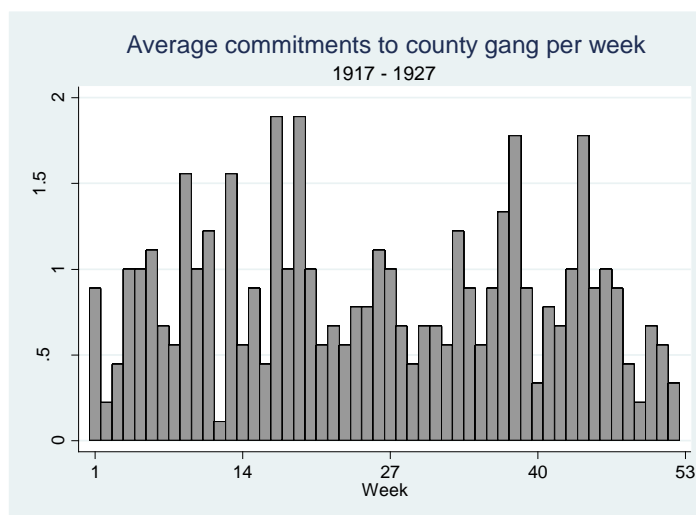
5.1 *"Guilt rate" tests*

Rather than regression tests, which may be subject to omitted variable bias if the econometrician does not observe all the relevant case, defendant, and magistrate characteristics, and selection bias if the econometrician does not understand how police determine who to arrest and charge, Persico (2009) argues that the appropriate test of racial bias in criminal justice is to compare the probabilities of conviction across observable characteristics and test for systematic differences between the probabilities, which is the equivalent of the KPT (2001) "hit rate" analysis. Such tests do not suffer from omitted variable bias because unobservable characteristics are incorporated into the average propensity to convict for a crime within a group (Persico 2009, p.43). Similarly,

if magistrates and defendants are unbiased rational actors, potential selection bias is mitigated because, selected on the decision to try a case presented to it by the police, the court's decision to convict should be race neutral (Ridgeway and MacDonald 2010).

Ayres (2002) cautions, however, that the researcher must still condition outcome tests for racial unbiasedness by appropriate categories, otherwise the results are subject to the subgroup validity problem. It is possible, for example, for race-neutral officers' decisions to appear racially biased if blacks and whites tend to participate in specific crimes at different rates. In such circumstances, although hit rates are the same within each crime, aggregation might make it appear that hit rates differ by race across all crimes.

In their critique of Arnold, Dobbie and Yang's (2018) outcomes test in bail hearings, Canay, Mogstad and Mountjoy (2020) show that outcome tests may come to incorrect conclusions, especially concerning bias against the marginal defendant, if judges harbor biases with respect to any non-race characteristics, an outcome test may be an invalid test for racial bias even if the characteristics judges are biased toward are not correlated with race or interact with race in the judges' decision making. The test proposed here differs from the ADY (2018) in that their model assumes that judges hearing bail requests approve or deny such requests based on observable (to the judge) case and defendant characteristics believed (by the judge) to predict pre-trial misconduct. The judges' objective in bail hearings is to minimize pre-trial misconduct.

The ADY (2018) model then assumes a different objective, namely minimizing pre-trial misconduct than the KPT (2001) model, which posits an objective of maximizing successful searches conditional on a stop. The test proposed here is closer in spirit to the KPT (2001) test because the presumed motivation – a career-enhancing (successful) conviction conditional on arrest and charge – is closer in spirit to theirs. Still, Canay, Mogstad and Mountjoy (2020) caution that outcome tests provide reliable inference regarding racial bias only when (1) we can be reasonably certain that decision makers harbor no other biases with respect to characteristics unobserved by the researcher;

(2) decision-makers' bias is constant across members of the discriminated-against group; (3) errors in the decision-makers' choices are uncorrelated with unobserved characteristics; (4) decision makers have no objectives other than the outcome of interest that can vary across individuals based on unobserved characteristics. Taken together these four conditions are so stringent that they can invalidate nearly every proposed test using data with any plausibly relevant unobserved characteristics. Is it possible that judges harbor biases against the young? The short? The ugly? Research shows they may (Mocan and Tekin 2010, Bodenhorn, Moehling and Price 2012). The practical issue at hand is whether the magistrates' other biases are secondary to the one under study; whether a common, if not constant, racial animus is held toward most blacks; whether errors in judgment are reasonably unsystematic; and whether magistrates, as agents of principals once removed, pursue a broadly defined objective of public safety through their sentencing behaviors.

The "guilt rate" test statistic for an appropriately specified null hypothesis of unbiasedness of magistrate sentencing is a test for the equality of conviction rates across all observable characteristics, including race. A test of unbiasedness then is a test for the statistical insignificance of the Pearson χ^2 statistic, which is defined as:

$$\sum \frac{(p_r - p)^2}{p} \sim \chi^2 (R - 1),$$

where R is the number of relevant categories (i.e., R =2 if there are two races or sexes), p_r is the estimated proportion sentenced to the gang by race, and p is the expected or counterfactual proportion under the null hypothesis. Tests of racial bias set p equal to the proportion of white defendants convicted and sentenced to the gang (p_w), and test for equality across races.

Table 5: Guilt rate tests for magistrate court sentencing to the chain gang

	Cases, whites	Cases, blacks	% white sent to gang	% black sent to gang	Chi-sq p-value
A. All cases	1306	878	0.148	0.237	0.00
B. Age quintiles					
15 - 21 years	328	160	0.134	0.294	0.00
22 - 25	408	242	0.169	0.293	0.00
26 - 30	295	292	0.159	0.195	0.26
31 - 35					
36 - 82	261	171	0.126	0.193	0.06
C. Magistrates					
Ballenger	256	225	0.039	0.111	0.00
Batson	143	121	0.189	0.240	0.31
Cooley	391	198	0.174	0.212	0.26
Daniel	151	153	0.073	0.288	0.00
G Jones	123	34	0.211	0.500	0.00
Poole	158	61	0.241	0.475	0.00
D. Crimes					
Assault and battery	230	255	0.052	0.133	0.00
Public disorder	90	20	0.169	0.192	0.57
Concealed weapon	31	43	0.097	0.233	0.13
Gambling	120	225	0.117	0.187	0.09
Larceny	235	187	0.145	0.332	0.00
Vagrancy	158	64	0.253	0.625	0.00
E. Hearing day of the week (arrests were typically preceding day)					
Sunday	264	195	0.125	0.195	0.04
Monday	199	142	0.201	0.183	0.68
Tuesday	187	104	0.160	0.317	0.00
Wednesday	136	105	0.140	0.295	0.00
Thursday	147	104	0.109	0.327	0.00
Friday	124	65	0.088	0.200	0.03
Saturday	249	163	0.177	0.203	0.51

Sources: author's calculation from data described in text and Table

Table 5 reports the results of an analysis in the spirit of the hit-rate test proposed by Knowles, Perscio and Todd (2001). Under the null hypothesis of unbiased sentencing, the proportion of whites sentenced to hard labor on the chain gang will be equal to the proportion of blacks so sentenced. Panel A reports the guilt rate without conditioning on any defendant or case characteristics: 14.8% of whites and 23.7% of blacks appearing before a magistrate and charged with a misdemeanor or lesser felony were sentenced to the gang. The result is consistent with the Makowsky and Stratmann (2009) hypothesis, namely that law enforcement officials disproportionately target and punish the disfranchised and those unlikely to impose administrative costs on the official.

The remaining panels document disparate outcomes by race conditional on several categories, including the defendants' ages, the magistrates before whom the appeared, the alleged crimes, and the day of the week on which the defendants' cases were heard. Disparate impacts at younger ages for black men is also consistent with the opportunity-cost hypothesis. Young black men were marginally literate, lacked political voice, rarely called witnesses to testify on their behalf, and even less often appeared with legal representation (Greenville City Municipal Court 1910; Greenville County Court of General Sessions 1919 – 1931).[12] Magistrates who committed young black men to the gang were unlikely to impose administrative costs on the court or personal costs on themselves.

Panel C reports what Ridgeway and McDonald (2010) label an internal benchmarking test, or one that looks for evidence of individual enforcement behaviors that result in racially disparate outcomes by comparing individual magistrate behaviors to those of other magistrates or the average magistrate. Batson and Cooley do not appear to have engaged in sentencing that resulted in racially disparate outcomes; they sentenced a higher proportion of blacks

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[12] Between 1919 and 1931, only 19% of blacks appearing in Greenville County's Court of General Sessions charged with serious but noncapital felonies appeared with legal representation. The jail records do not note when defendants had attorneys, but the fraction appearing with representation in a magistrate's court was surely much less. See Greenville County, Court of General Sessions (2020).

than whites to the gang, but the differences are statistically insignificant. The other four busy magistrates seemingly engaged in sentencing that resulted in disparate outcomes. Ballenger and Daniel served the same jurisdiction as Batson and Cooley so they saw a comparable mix of crime and defendants, though the former two magistrates served when the authorities cracked down on the city's gambling houses in 1917 and 1918. It is unclear that the crackdown targeted black gambling, but a disproportionate fraction of defendants was black – 62% in 1917 and 86% in 1918. Jones and Poole, as noted previously, adjudicated cases in the West Greenville mill district and it is well known that textile mill owners hired few blacks, so relatively few blacks would have lived, worked, and played in the district (Donohue and Heckman 1991). Nearly half of all black men appearing before these magistrates were sentenced to hard labor on the gang. Given the small population of black families in the mill district, a magistrate's unequal treatment of blacks would cost the magistrate little and, perhaps, may have bought him some goodwill among the white mill workers who were his neighbors.

Panel D points to disparate sentencing based on the crime for which the defendants were convicted. Black defendants convicted of simple assault, larceny, and vagrancy were sentenced to the county gang at twice to nearly three times the rate of white defendants. Panel E reveals that black defendants arrested in the middle of the week were convicted and sentenced to the gang at higher rates than whites. Black and white defendants arrested on Fridays and Sundays were sent to the gang at statistically similar rates.

Conditional on almost any observable case characteristic, blacks were sentenced to a term at hard labor at higher rates than whites, though some magistrates exhibit less disparate sentencing patterns than others. The results are consistent with the Makowsky and Stratmann (2009) opportunity cost hypothesis, namely that magistrates convicted and sentenced defendants in accordance with Jim Crow policies, which would have enhanced their standing with their constituents and reduced the opportunity costs of their choices.

Statistical tests of various types assume, among other things, that the distributions of control variables are equivalent across races. But it possible, even likely, that the distribution of case features of black defendants differs from the case features of white defendants, including the alleged crime, the day of the week or month of the year in which the defendant is arrested, the magistrate hearing the case. If true, it is not clear that an estimated race coefficient adequately controls for other confounding variables. Moreover, estimates on race variables can be sensitive to small changes in specification, including the use of interaction terms (Ridgeway 2006).

Propensity score analysis provides a tool that can adjust for different distributions of the control variables. Propensity score analysis allows the researcher to consider magistrate hearings for a target or treated group and weight hearings for a comparison or control group so that the comparison group's distribution of control variables more closely resembles the unweighted distribution of the treated group. Using logit or probit estimation, the method identifies a group of control-group individuals whose case characteristics have the same joint distribution of characteristics of treated-group individuals. The important feature of this procedure is that it controls for features common among a treated group that increases the likelihood that they will be arrested and appear before a magistrate. Blacks, for example, might live in higher crime neighborhoods than whites, they may congregate in venues targeted by police for more vigilant law enforcement, they may be out and about on different days of the week or times of day.

Once the treated and control defendants are matched on relevant and observable case features, an investigation into disparate outcomes, which may point to bias, involves a comparison of the case outcomes for treated and control defendants. Ridgeway (2006, p6) notes that one advantage of propensity score matching is that "the creation of a comparison group occurs before ever looking at the [post-trial] outcomes … and thus mitigates the threat of model selection bias for which multivariate regression approaches" are prone. Propensity score matching does not eliminate all the known problems

surrounding the use of multivariate regression. If, for example, certain case features appear only in the treated group, propensity score matching is subject to the same problems as regression. If blacks and whites lived in segregated neighborhoods, and specific police patrolled those neighborhoods or specific magistrates adjudicated cases for only those neighborhoods, it is not possible to find members of a control group that match members of the treated group. Propensity score techniques make it easy to diagnose such problems.[13]

Table 6: guilt-rate tests using propensity score matched defendants

Sample	Controls	Treated	Control	Difference	t-stat
Unmatched		0.239	0.148	0.091	5.38
Matched	Age, crime, magistrate	0.239	0.123	0.116	3.92
Matched	Age, crime, magistrate, year, month, day of the week	0.239	0.128	0.111	4.55

Notes: propensity-score matching with logit and five nearest neighbors, using psmatch2 in Stata
Sources: author's calculations from data described in text and Table

Table 6 reports the results of a "guilt-rate" test after matching and balancing on the propensity score for white and black defendants in Greenville County. (The results of the balancing tests are reported in Appendix F.) Nearly one-quarter of black defendants tried in Greenville's magistrates' courts were sentenced to the county chain gang. Nearly 15% of white defendants were. The matching estimator predicts that less than 13% of whites with the same characteristics as blacks – whether the controls are just age, crime and magistrate, or the full set of observables – would have been sent to the gang. The differences are statistically significant and point to disparate racial outcomes.

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[13] See Rosenbaum and Rubin (1983) and Imbens and Rubin (2015) for technical derivations of matching estimators. Ridgeway (2006) provides a valuable derivation of its use in criminological studies. I employ the psmatch2 procedures in Stata v.15 in the present study.

As was noted in Section 2.3, magistrates had the option of releasing a defendant charged with a misdemeanor or less-serious felony on an own-recognizance bond, which operated in much the same way that peace bonds operate in modern Canada or contingent docket designations in South Carolina's 1920s Courts of General Sessions. Early twentieth-century South Carolina magistrates established bail for each defendant facing any crime not punishable by death or imprisonment for life. Unless the magistrate believed a defendant charged with more serious crime was unlikely to appear at trial or represented a danger to the public, magistrates established the terms of release, which included the defendant signing an unsecured bond in an amount not exceeding the maximum fine for criminal charge (Bethea 1912). The defendant did not need to own assets worth the specified amount and he did not have to offer a surety worth that amount. The bond amount established in a recognizance was a simple acknowledgement of a debt to the state that became payable only if the defendant failed to comply with the terms of the release (South Carolina Judicial Branch 2020).

The common terms of release included a requirement that the defendant keep the peace and not engage in another criminal offense for a period up to 12 months. In the county Courts of General Sessions a state solicitor who faced trying a weak case or one in which he believed there were compelling mitigating circumstances, but not want to dismiss, the solicitor might designate the case to the court's contingent docket. Cases on the contingent docket remained there without a scheduled trial date unless the defendant later appeared before the court charged with a different crime. Having failed to keep the peace, the old charged were refiled and the defendant faced multiple charges.

Magistrate court engaged in something similar in releasing defendants on own-recognizance or good-behavior bonds. Recognizance releases occurred with no finding of guilt, no conviction, and no criminal record. The defendant agreed to keep the peace. Failing to do so was itself a criminal offense and subject to criminal penalties comparable to those that resulted

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from a contempt of court finding. Recognizance releases differed from a determination of guilt and a penalty that was suspended for good behavior, which was relatively little used in Greenville city's police and the county's magistrate courts.[14]

Table 7: Recognizance bond release rate tests for magistrate court					
	Cases, whites	Cases, blacks	% white released on bond	% black released on bond	Chi-sq p-value
A. All cases	648	301	0.728	0.711	0.58
B. Age quintiles					
15 - 21 years	107	34	0.748	0.882	0.10
22 - 25	232	99	0.716	0.626	0.11
26 - 30	142	90	0.732	0.728	0.86
31 - 35					
36 - 82	162	73	0.728	0.726	0.97
C. Magistrates					
Batson	127	92	0.701	0.706	0.93
Cooley	357	163	0.765	0.755	0.80
G Jones	111	30	0.721	0.533	0.05
D. Crimes					
Assault and battery	141	138	0.808	0.826	0.70
Public disorder	277	47	0.653	0.745	0.22
Concealed weapon	10	10	0.800	0.400	0.07
Gambling	20	19	0.600	0.474	0.43
Laceny	123	59	0.813	0.729	0.20
Vagrancy	77	28	0.740	0.321	0.00
E. Hearing day of the week					
Sunday	91	24	0.703	0.875	0.09

[14] Under sentences suspended for good behavior, a magistrate, in lieu of fine, imprisonment, or a term on the chain gang, could impose a good behavior condition. Failing to keep the peace during the specified period resulted in the imposition of the suspended fine or term of incarceration (Childress 1994).

Monday	109	64	0.670	0.688	0.81
Tuesday	101	50	0.732	0.620	0.16
Wednesday	81	57	0.667	0.614	0.53
Thursday	81	37	0.852	0.703	0.06
Friday	84	23	0.786	0.783	0.97
Saturday	101	46	0.713	0.848	0.08

Sources: author's calculation from data desribed in text and Table

Table 7 reports the results of the hit rate-type tests for defendant release on recognizance. The sample is limited to the period from January 1923 through December 1927, which was the only period during which the deputy or deputies charged with keeping the record book recorded releases on bond. And because South Carolina law required a bond release hearing within 48 hours of arrest, the sample is limited to men released within 2 days of initial incarceration, on the assumption that men released on bond after longer periods of incarceration were released on a cash bond that required more than two days to arrange.[15]

The first row of the table shows that about 70% of black and white defendants were released on recognizance, and the difference is not statistically significant. Subsequent panels report the results by age for which there is no statistical difference; by magistrate, two of whom did not treat blacks and whites in different fashion, and one who may have; by crime, for which the only racial difference is for vagrancy; and by day of the week, for which there is no statistical difference.

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[15] The results are qualitatively similar if the period between arrest and release is limited to one day or extended to as many as five days.

Table 8: recognizance bond tests using propensity score matched defendants

Sample	Controls	Treated	Control	Difference	t-stat
Unmatched		0.808	0.830	-0.022	0.77
Matched	Age, crime, magistrate	0.808	0.765	0.043	0.85
Matched	Age, crime, magistrate, year, month, day of the week	0.808	0.862	-0.054	1.49

Notes: propensity-score matching with logit and five nearest neighbors, using psmatch2 in Stata

Sources: author's calculations from data described in text and Table

Table 8 reports the results of two propensity score matching exercises for recognizance releases. There is no evidence of disparate treatment by race after controlling for differences in the distributions of defendants' characteristics.

Comparisons of Tables 5 and 7 or Tables 6 and 8 reveal a previously unappreciated subtlety to racial disparities in the dispensation of Jim Crow-era criminal justice. Black defendants did not experience disparate treatment in every aspect of minor offense criminal adjudication. Blacks and whites were equally likely to be released on recognizance. But young black who were found guilty were much more likely to be sentenced to a term of hard labor on one of the county's chain gangs. Whites convicted of similar crimes were more likely to pay a fine to secure release. What is unclear is whether the option of paying a fine in lieu of time on the chain gang was not offered to blacks or whether blacks faced a wealth constraint that precluded their paying the fines.

The information recorded in the sheriff's jail books does not include a sufficiently large sample to analyze the fine versus days on the gang alternatives. Deputies recorded the fine-days alternative in only 122 cases and did not record whether the defendant paid the fine or served the time. The days-fine alternative did not differ by race. Whites, on average, faced the alternative of 38.3 days or $36.42; blacks faced the alternative of 35.4 days or

$29.27. (Appendix F provides a scatterplot of the tradeoff.) Just as blacks did not experience disparate treatment in bond releases, the available evidence suggests that they were not treated differently in terms of the fine-gang option offered by magistrates.

5.4 Regression tests

The use of multivariate regression analysis to look for racially disparate treatment controlling for potentially confounding factors is unlikely to generate plausibly causal inference if there is a correlation between race and the controls included in the regression equation. In the case of magistrates sentencing defendants to county chain gangs, it is likely that the distribution of evidentiary facts and arrest features for blacks will differ from the distribution of facts and features for whites. If so, it is not clear that any estimate of the effect of race will reflect the true effect if confounding factors included in the regression do not capture the relevant confounding factors. Unless the magistrate court hearings for blacks and whites occur under sufficiently similar circumstances, regression estimates will be sensitive to the variables and any estimated interactions between them in the estimating equation.

Despite the issues surrounding regression-based inference, I follow Fryer (2019) and estimate racial disparities in gang commitments and bond releases. I estimate logistic regressions of the following general form:

$$\ln\left[\frac{\Pr\,(Gang_{it} = 1)}{1 - \Pr\,(Gang_{it}=1)}\right] = \beta_1 black_{it} + \beta_2 age_{it} + \beta_3 black * age + \beta_4 black * \delta_{it} + \delta_{it} + \gamma_i + \vartheta_t + \varepsilon_{it},$$

where Gang$_{it}$ is a dichotomous variable that equals one if the defendant is sentenced to the gang at time t. Whites are the excluded racial category. The regressions include controls for defendant age, the alleged crime (δ_{it}), the sitting magistrate (γ_i), and various time controls, including year, month, and

day of the week (υ_t). The data is not as rich in individual characteristics as that available to Fryer (2019) in his study police use of force, but the regressions should provide some insights into any possible disparate treatment.

Table 9: Racial differences in gang commitments and bond releases

	Gang commitment (1)	Release on bond (2)
a. No controls	1.790	0.898
	(0.199)**	(0.173)
b. + defendant age	1.849	0.880
	(0.211)**	(0.168)
c. + crime	2.415	0.749
	(0.301)**	(0.153)
d. + magistrate	2.735	0.706
	(0.354)**	(0.147)
e. + year, month, day	2.645	0.834
	(0.354)**	(0.203)
f. + race x crime	2.740	1.160
	(0.970)**	(0.479)
g. + race x age	4.419	2.318
	(1.939)**	(2.036)
Observations	2143	817
Sample years	1917-1927	1923-1927
** p-value <0.001		
Robust standard errors in parentheses.		
The table reports odds ratios from logistic regressions.		

Results presented in Column 1 and Row a of Table 9 show that blacks were 79 percent more likely than whites to serve at hard labor relative to a white raw mean of 14.8 percent and the black raw mean of 23.7 percent (see first row in Table 5). Although the difference in gang commitments appears to be large, it is consistent with the difference in the white and black raw means. Column 2 and Row a show that blacks were 10 percent less likely than whites

to be released on recognizance relative to a white raw mean of 72.8 percent. This odds ratio, too, is consistent with the raw means by race.

Row b adds controls for defendant's age. Whereas Fryer (2019, p1231) argues that age can be considered exogenous in modern police-civilian interactions, it cannot be assumed that the ages of defendants brought before South Carolina's Jim Crow magistrates were exogenous. The opportunity-cost hypothesis predicts that disorderly young black men were specifically targeted for arrest, conviction and gang labor because older white men believed young black men were inherently dangerous, that they represented a particular threat to white female virtue, and, importantly, they lacked political voice (Kotch 2019). Nevertheless, adding controls for age to the regressions increases the odds that a black men is sent to the gang relative to the odds that a white man is sent to the can to 1.85, or an 85 percent greater likelihood. Black men remain about 10 percent less likely to be released on bond.

Row c adds controls for crime, which are unlikely to be exogenous because arresting officers could choose the charge. Was the defendant just drunk? Or was he also disorderly? Was an argument that escalated to thrown punches disorderly conduct? Or did it rise to assault and battery? Absent some more substantive allegation, of course, the police and the courts could readily invoke a charge of vagrancy to send young men to gang. South Carolina labeled as vagrants anyone who made their living from gambling, horse racing, those who engaged in a musical or theatrical presentation without an appropriate license, those who failed to follow a remunerative occupation, and "all persons who lead idle and disorderly lives" (Wolfe et al 1922, p211). Given that many whites considered blacks prone to idleness and dissolution, securing a vagrancy conviction was not difficult. And, once convicted of vagrancy, a gang sentence was almost assured. Controlling for other factors, the odds that a defendant convicted of vagrancy was sent to the gang was between 5 and 6 times the odds that a defendant convicted of assault and battery was sent to the gang.

After controlling for the criminal charge, blacks were 2.4 times as likely to be sentenced to the gang. Black defendants were 25 percent less likely than whites to be released on recognizance. Adding controls for magistrates, as well

as year, month, and day of week of the arrest, does not materially change the estimated odds ratios. Adding the race-by-crime interaction does not change it, either. But the addition of the race-by-age interaction increases the odds that a black defendant is sent to the gang to 4.4 times the odds that a white is sent to the gang. Race and age were the determinative features of a gang sentence. Consistent with the opportunity cost hypothesis, disfranchised, disorderly young black men populated South Carolina's Jim Crow-era chain gangs.

6. Concluding comments

A host of prominent studies have documented the costs and economic inefficiencies associated with the South's black codes. Higgs (1989), for example, finds that the early twentieth-century racial wage gap was due, in part, to southern states' discriminatory provision of educational resources. Donohue and Heckman (1991) document that the wage gap was due, in part, to discriminatory hiring and job assignments that were eliminated only through federal affirmative-action enforcement. Jim Crow also included zoning laws designed to exclude blacks from public goods-rich communities and neighborhoods (Halcoussis and Lowenberg 1998). In general, southern black codes constructed walls between the races in marriage, education, employment, public accommodation, and transportation (Woodward 1957). Jim Crow did not always stand in the path of equal treatment, however, which was forthcoming when equal treatment advanced white well-being. Black neighborhoods were provided with clean water and sewers when whites were convinced that doing so reduced white morbidity and mortality (Troeksen 2004). In the balance, however, discriminatory white southerners, through their Jim Crow policies, introduced economic inefficiency and reduced both black and white welfare (Wright 1999). Discrimination is not costless for the discriminator. Southern incomes were 20 to 40 percent lower than incomes elsewhere in the United States, and the difference was attributable at least in part to Jim Crow.

This paper investigates law enforcement and penology in the Jim Crow South, which is a relatively understudied source of the region's economic

inefficiency. The results generate two broad conclusions. First, the chain gang generated no real cost savings in road construction and maintenance. Second, persistent discriminatory sentencing to the chain gang mitigated any deterrent effect the chain gang may have had. Law enforcement officials concerned primarily with public safety would have equalized convictions and gang commitments across observable characteristics. Rather, enforcement authorities responded to the incentives created by the state's black codes, which lowered the costs of prejudicial sentencing. If the logic of the Knowles, Persico and Todd (2001) game-theoretic model held in the Jim Crow South, one implication of prejudicial sentencing was a higher than efficient offending rate among white prospective criminals and a lower than efficient offending rate among blacks. Whether the net result was an inefficiently high overall crime rate turns on the relative elasticities of criminality to punishment between the two groups. Historians have documented the South long history of violence and relatively high crime rates, which points to inefficiencies, but a better understanding requires more and better data (Ayers 1986, Bruce 1979).

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Appendix A: outline of magistrate court proceedings

The broad outlines of a typical magistrate court hearing can be gleaned from *Wimbish v. Jamison*, which was heard by the Supreme Court of the United States in 1905.[16] Although Wimbish originated in the recorders court in the city of Macon, Bibb County, Georgia, the proceedings followed practice of municipal courts across the South in the early twentieth century.

In the early morning hours of Sunday March 13, 1904, Henry Jamison, a black day laborer between 55 and 60 years of age, was arrested on a drunk and disorderly charge by two of Macon's police officers. Jamison and a friend were drunk, and talking and cursing loudly in a doorway of a business closed for the night. The arresting officers took Jamison into custody and used the police call box to request the wagon to transport him back to the city barracks (jail). Once in the barracks, Jamison continued to shout profanities, which disturbed the other prisoners and desk officers. The duty officers cited him for "disorderly in the barracks," in addition to the original drunk and disorderly charge lodged by the arresting officers. Jamison was taken to a basement cell, presumably until sober and quiet.

Jamison was arraigned on both charges in the recorders court on Monday morning, March 14. He was taken directly from his cell in the barracks to the court. No written charges were presented to the defendant, but the charges were read at the hearing. The arresting officers and the duty officers were present and testified to Jamison's drunkenness and profanity. The recorder asked Jamison if he had any witnesses to call or wished to have any subpoenaed. He did not, but had he called a witness who was not present the recorder would continue the case until the witnesses could be present. The recorded then asked Jamison if he had an attorney or wanted to contact one. He did not, but had Jamison said he wanted an attorney the recorded would continue the case until the attorney was in the court.

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[16] *Wimbish v. Jamison*, 199 U.S. 599 (1905).

After the officers offered their version of the events of Sunday morning, the court asked the defendant if he wished to make a statement. Jamison replied only that he was drunk and had no recollection of the circumstances surrounding his arrest or his behavior in the barracks. The recorder issued a summary finding that Jamison violated a municipal ordinance, which read that: "Any person who shall be found in the streets drunk, or acting in a disorderly, riotous or tumultuous manner, or who shall be guilty of any act against the public safety, morality and decency … shall be arrested by the officers of the police force, and confined in the city prison until such time as he can be brought before the recorder to be dealt with as he may think proper and necessary" (Supreme Court of the United States 1905, p.32). The maximum sentence under Georgia statutes of 1880 and 1881 was six months on the chain gang.

The recorder found Jamison guilty on both counts and imposed a fine of $25 or 90 days on the chain gang for the original drunk and disorderly charge, and a fine of $35 or 120 days for the second charge. Unable to pay the fine, Jamison was transported to the gang at noon on Monday, March 14. He was given a set of gray and white striped convict clothes, had heavy iron manacles connected by a chain riveted on each leg, was handed a shovel, and by mid-afternoon was put to work on a road crew alongside other misdemeanants as well as serious felons.

A contemporary judge offered the following depiction of the typical chain gang experience, including Jamison's:

> "The sufferers wear the typical striped clothing of the penitentiary convict. Iron manacles are riveted upon their legs. These can be removed only by the use of the cold chisel. The irons on each leg are connected by chains. The coarse stripes, thick with the dust and grime of long torrid days of a semi-tropical summer, or encrusted with the icy mud of winter, are their sleeping clothes when they throw themselves on their pallets of straw in the common stockades at night. They wake, toil, rest, eat, and sleep, to the never-ceasing clanking of the manacles and chains of this involuntary slavery. Their progress to and from their work is public and from dawn until dark, with brief intermission, they toil on the public roads and before the public eye. About them as they sleep, journey and labor, watch the convict guards armed with rifle and shot gun. This is at once to make escape

impossible, and to make sure the swift thudding of the picks and the rapid flight of the shovels shall never cease. … And the fact more baleful and more ignominious than all, with each guard stands the whipping boss, with the badge of his authority. This the evidence discloses to be a heavy leathern strap about two and a half or three feet long, with solid hand grasp, and with broad, heavy and flexible lash. … If we may accept the uncontradicted evidence of the witnesses it is true that on the Bibb County chain gang for no day is the strap wholly idle and not infrequently it is fiercely active" (Supreme Court of the United States 1905, pp. 38-39).

We are aware of this case because after Jamison spent five days on the gang two Macon attorneys asked the US district court for the Southern District of Georgia, located in Savannah, for a writ of habeas corpus, which was granted. The writ was issued based on whether the recorders court proceedings violated Jamison's due process protections and whether the punishment was disproportionate to the crime, and thus "infamous" at law (which is not a direct Eighth Amendment challenge).

Judge Speer heard arguments from attorneys representing Jamison and the city of Macon in Savannah on March 23, 1904 and framed the issues: (1) whether the recorder can, without any official pleading and without the intervention of a jury, convict a citizen twice for a single violation of a minor municipal ordinance; and (2) whether such a "deplorable and degrading punishment adjudged by such a court for minor municipal offenses tolerable under the American System?" (Supreme Court of the United States 1904, p. 35). Speer recognized that no state or federal court had considered these issues. Speer determined that the system violated Jamison's constitutional rights because there was no finding of fact by the recorder, no finding of guilt or innocence; "it is a sentence and nothing more" (ibid, p.37). Judge Speer ordered Jamison released.

Speer's decision ran counter to existing precedent and was widely commented on at the time (see, for example, Anonymous 1904 and Huebner 2015). Macon appealed to the Supreme Court of the United States, which in a *per curiam* decision, quashed the habeas corpus writ and denied Jamison's petition. Judge Speer, an atypical southern jurist who offered several decisions

that challenged Jim Crow during his time on the federal bench, ignored the Supreme Court's ruling and refused to allow Jamison's detention. A year later the Georgia Supreme court heard a similar case, and found that under the Georgia constitution a city recorder had no authority to sentence a defendant found guilty of a minor misdemeanor to the chain gang (*Pearson v. Wimbish* 124 Ga. 701 (1906), Huebner 2015, p.57).

Appendix B: Average construction costs per mile by road type in Virginia, 1909-1915

Figure B1: Average construction costs per mile on sand roads in Virginia, 1909-1915
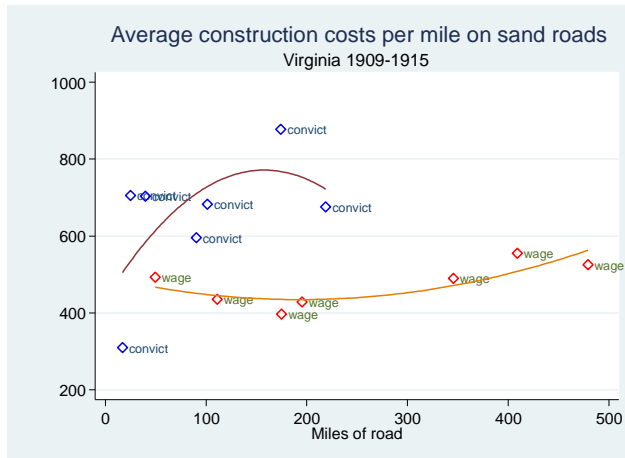
Source: Pennybacker, Fairbank, and Draper (1916)

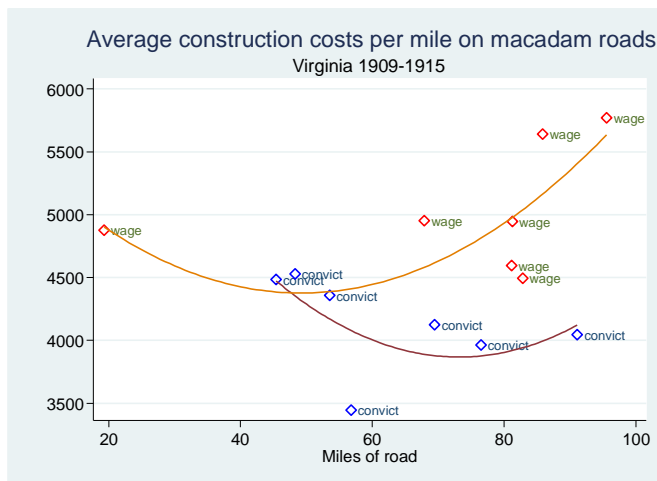Figure B2: Average construction costs per mile on macadam roads in Virginia, 1909-1915

Figure B3: Average construction costs per mile on gravel roads in Virginia, 1909-1915
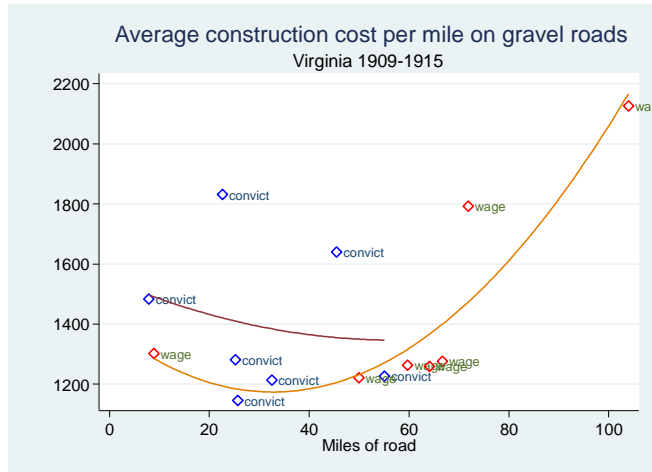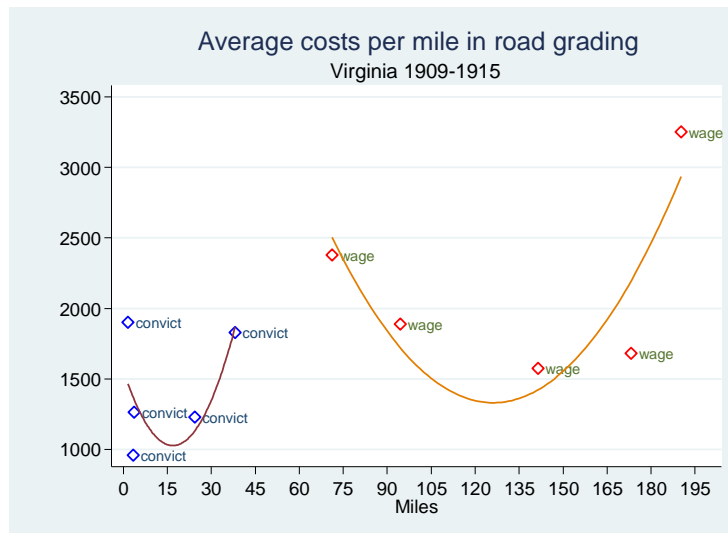

Figure B4: Average construction costs per mile on road grading in Virginia, 1909-1915

Appendix C: Descriptions of South Carolina's county jails and chain gang camps.

In order to provide a fair depiction rather than select on particularly bad cases, this appendix provides extended quotes from the state Board of Charities and Corrections (1919) report on the first three counties ordered alphabetically.

Aiken County Jail: "About 25 prisoners. … The 1919 session of the General Assembly made an appropriation for some improvement in the plant of the Aiken jail, but nothing had been done when our visit was made. There are two outstanding needs in the permanent plant, the first being a better plumbing system. The bathtub in the jail should be removed – it has not been used for some time – and showers installed instead…. New flush toilets should be installed…. [Second], we recommend that the Commissioners have the entire jail repainted inside, especially the steel work … This steel has rusted badly, and the cages are rapidly going to pieces" (p.53).

Aiken County Chain Gang: "We recommend that the foreman have all blankets in use washed regularly each month; that each new prisoner be given clean blankets for his bed; and that each man be given separate water in which to bathe. … Finally, be careful about the disposal of sewerage…. The slop tub does not breed flies, but attracts them to the camp from elsewhere, and therefore it should be kept covered tightly" (p.100).

Anderson County Jail: "When we inspected the Anderson jail in September 1918, the beds were in bad condition, but since then improved double deck steel beds have been put in … Another improvement noted is the greater care taken to keep the prison sanitary, blankets now being washed more often than formerly, and a sweeping compound used to keep down the dust. … We recommend that every new prisoner committed to the jail be given clean blankets for his bed by the jailer…. Finally we recommend that the jailer allow no form of initiation [a euphemism for beatings, taking of new prisoners' clothes and shoes, and sexual assault] of new prisoners by the old. The Judges are the proper persons to sentence criminals to punishment, and no others should be allowed to do it" (p.54).

Anderson County Chain Gang: "We found conditions improved in both camps over last year…. [yet we] recommend that Captain McConnell … have the blankets in use washed at least monthly; make every effort to place the sewerage pit where it cannot

fill with water, and throw about three inches of dirt on top of the waste daily, to prevent flies reaching it … give each newly committed convict clean blankets … do not allow the chain men to bathe two to the tub of water … and … do not allow the men to initiate each other" (p. 101).

Bamberg County Jail: "The building is dangerous from fire … the beds, except for whites, have not been furnished with mattresses or cotton pads, blankets being the only bedding. No facilities have been provided for the safe-keeping of insane inmates. There are no flush toilets and no bathtubs in the building. The windows are not screened against flies and mosquitoes. The medical service is far below standard …." (p.55).

Bamberg County Chain Gang: "We are sorry to report that there has been little change in conditions in the Bamberg camp since our inspection of 1918. The county has not yet provided a stove for cooking, an open fire being used, a piece of iron culvert forming a rude and ineffective shelter in rainy weather. … no county should expose the prisoners to the danger of improperly prepared food, or no food at all in bad weather … In the foreman's management the outstanding fault is the lack of care in the disposal of sewerage and other waste products of the camp. The pit into which the sewerage buckets are dumped was eighteen steps, or yards, from the tent in which the convicts slept… As naturally follows the camp was swarming with flies" (p.102).

Appendix D: Data

Appendix E: Random assignment of magistrates

An important issue in the outcome-test literature is whether decision makers are randomly assigned. Arnold, Dobbie and Yang (2018), for example, discuss whether bail-setting judges are randomly assigned because random assignment will preclude biased judges from adjudicating cases in which they are more or less likely to act on their biases. Tables E1 through E3 suggest that magistrates did not specialize in cases. The busiest magistrates, those who heard cases in Greenville city and the West Greenville mill district heard cases involving all types of crimes, by both races of defendants, and all days of the week.

Table E1: Chain gang commitments by magistrate

Chain gang	Magistrate Ballenger	Batson	Cooley	Daniel	GJones	Poole	Total
No	446	208	479	249	114	152	1,648
Yes	35	56	110	55	43	67	366
Total	481	264	589	304	157	219	2,014

Table E2: race of defendant by magistrate

Race	Magistrate Ballenger	Batson	Cooley	Daniel	GJones	Poole	Total
White	256	143	391	151	123	158	1,222
Black	225	121	198	153	34	61	792
Total	481	264	589	304	157	219	2,014

Table E3: Defendant alleged crimes by magistrate

Crime	Magistrate Ballenger	Batson	Cooley	Daniel	G Jones	Poole	Total
a&b	76	95	186	44	25	26	452
Public disorder	115	73	211	96	41	62	598
concealed weapon	24	6	14	15	2	5	66
gambling	152	11	22	89	4	41	319
larceny	96	59	96	33	58	32	374
vagrancy	18	20	60	27	27	53	205
Total	481	264	589	304	157	219	2014

Table E4: Day of the week appearing in court by magistrate							
	Magistrate						
Hearing day	Ballenger	Batson	Cooley	Daniel	GJones	Poole	Total
Sunday	140	24	90	93	9	70	426
Monday	69	48	111	35	19	32	314
Tuesday	52	38	97	27	35	26	275
Wednesday	38	46	68	30	26	18	226
Thursday	43	34	75	34	24	22	232
Friday	30	31	56	14	23	11	165
Saturday	109	43	92	71	21	40	376
Total	481	264	589	304	157	219	2014

Appendix F: Fine versus days on the gang alternative offered black and white defendants

Days on the gang versus fines tradeoff
Greenville magistrate courts 1917-1927