U.S. Convict Labor System and Racial Discrimination[*]

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Abstract

After the demise of the slavery and rise of crime after the end of the Civil War, convict labor system evolved in the United States in order to finance state penitentiary institutions. It provided monetary incentives to the police to arrest more people. Black and other minorities became an easy target for a police that used a variety of minor crime laws to increase the supply of coerced labor. Using the geographical variation of convict labor camps in the United States in 1886-1940 I show that counties exposed to a more severe exploitation of convict labor experienced had higher incarceration rates in 1920 and 1930, especially among minorities. After the abolishment of the old convict labor system in 1941, the racial discrimination in policing remained: the same variation of convict labor camps predicts excessive arrests of Black and Hispanic for non-violent crimes (drugs and vagrancy). To show that the results are causal I use the exogenous shock of first massive expansion of the U.S. convict labor system in 1870 that had happened when the National Prison Association was founded in Cincinnati, Ohio. I use distance to Cincinnati as an instrument for the value of goods produced by convict labor. It correlates with the likelihood of attending the Congress by the wardens of prisons, and cost of getting information about the profitability of convict labor. I perform a series of sensitivity checks and placebo tests to ensure that results are indeed causal.

Key words: Convict Labor, Coercive Institutions, Racial Discrimination, Incarceration Rates

JEL Codes: F1, F16, N26

PRELIMINARY AND INCOMPLETE

1   Introduction

One of the greatest example of the racial discrimination in the contemporary U.S. is the racial composition of the inmates in the U.S. penitentiary, as the ratio of Black-to-White and Hispanic-to-White prisoners is 5.6 and 1.8 to 1 correspondingly. These racial disproportions cannot be explain by the socioeconomic controls, and are often regarded as continuances of various forms of racial discrimination. However, this puzzle in the race-based discrimination in arrests may be a legacy of the old U.S. convict labor system.

Convict labor in the XIX-XX century United States affected incarceration rates directly and indirectly. The former took place as some systems of convict labor legally provided monetary incentives to police and judicial system (Wilson (1933), Blackmon (2009) and Litwack (2010)), or because some prisons bribed judges and policy to increase supply of prisoners (Gildemeister (1978)). The later affected incarceration through lower opportunity costs of crime due to distortion of wages of low-skilled workers who competed with prison-made goods (Poyker (2018b)). In this paper I show that countries more exposed to convict labor had higher incarceration rates. In addition, convict labor had differential effects on the incarceration of minorities. Jim Crow laws and overall racial discrimination made it easier to arrest African-Americans in the South, while hostility toward migrants made an easy target foreign-born Whites in the Northern States. Moreover, even after abolishing of the convict labor racial discrimination in policing may persist, thus creating contemporary disparities in arrest rates.

In this paper I explore effect of convict labor on incarceration rates, and the long-term persistence of the interracial hatred by using the new data-set of the U.S. convict labor camps in the end of XIX - begging of the century. I start my analysis by showing that the introduction of the institution of convict labor in the United States increased incarceration rates, especially among the Black and foreign-born White males. First, I measure the exposure of each county to convict labor as the value of convict-made goods in all U.S. prisons weighted by the distance from those prisons to the county centroid. Second, I construct cross-section of the county-level incarceration rates. As U.S. censi contain data on county of confinement of prisoners, but not the county of arrest I use first available data from Eriksson (2015) to construct the incarceration rates in 1920 and 1930, based on prisoners' county of origin.

Using ordinary-least-squares specification with state fixed effects I also test if convict labor affected incarceration rates: groups of people that benefit from convict labor might be incentivized

to increase incarceration rates.[1] To estimate the causal effect of convict labor on incarceration, I use data from Eriksson (2015) to construct the incarceration rates in 1920 and 1930, based on prisoners' county of origin, and I show that higher exposure to convict labor led to increased incarceration rates. I also show that counties that were more exposed to convict labor and more likely to over-incarcerate Black and foreign-born White males. While I control for a wide set of socioeconomic and demographic variables, it is challenging to identify causal effects of convict labor on incarceration rates due to the embedded endogeneity problem. First, 19th century prisons were located in highly populated areas where crime rates were higher. Second, both racial discrimination, and endogenous choice of industry and the amount of goods produced by prisons can be correlated with local institutions.

To address these concerns, I employ an instrumental variable estimation. In particularly, I use first massive rapid expansion of the U.S. convict labor brought about when the National Prison Association (hereafter NPA) held its first congress, in Cincinnati, in 1870.[2] Thus, I use within-state distance to Cincinnati as an instrument for the value of goods produced by convict labor. This distance correlates with the likelihood that wardens would attend the conference and with the cost of getting information about convict labor profitability. Distance to Cincinnati does not, however, correlate with any important variable in 1870.

Thus I impose two main identifying assumptions. First, that distance to Cincinnati is an information treatment, and that the closer wardens and other prison executives lived to Cincinnati the less it cost them to arrive and get new ideas about employing prisoners for industrial purposes. During the first NPA congress its "Declaration of Principles" was accepted. This declaration promoted the establishment of agricultural or industrial departments within prisons to relax states' financial burden and give prisoners useful skills as a part of their rehabilitation (Wines (1871)). Thus we expect to see a higher value of goods produced by convict labor and a greater number of employed prisoners in 1886 the closer the prison was to Cincinnati. Second, I assume, that distance to Cincinnati does not affect incarceration rates not through the convict labor.

To address plausibility of the identifying assumptions I perform a number of sensitivity tests. First, I use placebo distances to all U.S. counties as an instrument, to show, that distance to Cincinnati yields the strongest first-stage. Second, I show that results are entirely driven by "com-

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[1]Alternatively, the opportunity cost of crime decreased in those locations due to competition with convict labor.

[2]The conference was the creation of one visionary man, Reverent Enoch Wines, who was the secretary of the New York Prison Association at that time. Being a deeply religious person, he believed prisoners could be rehabilitated through education, Bible study, and hard labor. He convinced the governor of Ohio to help organize the conference in Cincinnati, and then he became the association's first president. (See more details in McKelvey (1936).)

pliers" — 24 states that were represented at the NPA meeting. Third, I show, that distance to Cincinnati affects convict labor only through the NPA's participants. Finally, I provide extensive exidence that distance to Cincinnati does not correlate with any important variable in the 1870s U.S. Manufacturing census[3].

Despite the fact that convict labor was abolished by the 1940s and policemen lost their direct (or indirect) incentives to arrest Black and foreign-born population, racial discrimination persisted through the police traditions. A generation after, with the start of the war on drugs, the tradition of stopping Black/Hispanic people on streets end up in charging them with possession of drugs. Even if consumption of drugs is similar cross racial groups in the U.S. higher checks of the minorities lead to higher convictions rates, and Black/Hispanic prison population grew even without monetary incentives to the police.

To test this hypothesis, I use the same IV strategy, and estimate the reduced form effect of convict labor on contemporary arrest rates of adults and juveniles for marijuana offenses in 2000 by race. Usage of marijuana related arrests provides the cleanest measure of racial discrimination, since consumption of marijuana is similar for both black and white population groups, while incarceration data contain only information about current location of penitentiary where inmates are located but not the county of their arrests.

I show that the results are robust to various model specifications and ways I construct the explanatory variable. I demonstrate that results are not entirely driven by differences between counties with and without prisons: I find that results hold within the sample of counties with prisons. Finally, I show that my results are not driven by a sub-sample of states.

My contribution to the literature lies in the following aspects. First, it contributes to the economic paper that studies the coercive institutions (Fogel and Engerman (1974); Wright (1978); Acemoğlu and Wolitzky (2011); Naidu (2010); Naidu and Yuchtman (2013); Dippel, Greif and Trefler (2015)) and coerced labor in the United States in particular (Poyker (2018b,a)). Second, this paper contributes to the field of U.S. economic history, and especially in racial discrimination (Alsan and Wanamaker (2016); Edwards, Bunting and Garcia (2013); Eriksson (2015); Tian (2017)). Third, the paper is related to the literature related to coerced labor and long-run economic consequences. Buggle and Nafziger (2018); Markevich and Zhuravskaya (2018) studies economic consequences of the institutions on serfdom in Russian Empire, while Kapelko, Markevich and Zhuravskaya

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[3]While it correlates with the value of agricultural output and share of Black population, I control for these variables in all my specifications.

(2015) investigate the consequences of Soviet GULAG. Dell (2010) examined the long-run adverse impacts of the forced mining labor system in 16-19 century Peru and Bolivia on contemporary health outcomes. Although, a growing literature continues to study the importance of institutions the case of US convict labor system is unique as it allows to show the persistent effect of labor coercion on economic outcomes and distinguish the channel of its effect.

The paper is organized as follows. The historical background of convict labor in the United States is introduced in Section 2. Section 3 describes the data. Section 4 presents my identification strategy and estimation results. Section 5 address alternative explanations, and presents robustness and sensitivity checks. Section 6 lays out my estimates of long-run effects of convict labor on contemporary racial discrimination in policing. Section 7 concludes.

2 Convict Labor: Historical Background and Implications

U.S. convict labor system emerged after the Civil War. Sharp increase in crime and incarceration rates demanded expansion of the states' correctional facilities.[4] States with their depleted budgets were reluctant to increase their expanses on penitentiaries and started to impose convict labor legislation. These laws allowed prison wardens to employ prisoners and use resulting profits to maintain themselves and contribute to their states' revenues.

2.1 Convict Labor in the Northern States

By 1870, only eight prisons across the U.S. (all in New York) operated with a modest net profit (Department of Labor (1900)). However, by 1886, all (but two) U.S. states have accepted some sort of convict labor legislation. It created a differential change in the amount of prison-made goods: from near zero dollar amount, mostly stone production, to at least 0.5% of GDP in 1886.

The catalyst for this rapid expansion was the creation of the National Prison Association (hereafter NPA) in 1870. The secretary of the New York Prison Association, Reverent Enoch Wines, with a help of a few other believers in rehabilitation of prisoners through education and labor, convinced then the governor of Ohio (and future U.S. president) Rutherford Hayes to organize a conference in Cincinnati: the first congress of the NPA.[5] Wines was able to gather and convince 140 delegates from 24 states to sign a "Declaration of Principles," which emphasized the importance

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[4]The literature on U.S. convict labor system summarized by Poyker (2018b). More detailed descriptions of the system can be found in McKelvey (1936); Gildemeister (1978), and Lichtenstein (1996).

[5]The organization exists nowadays as the National Correctional Association: it is the primary U.S. supranational prison-overseeing association devoted to rehabilitation of prisoners through labor and education.

of labor for rehabilitation, whereby prisoners would be taught skills that would help them to find a job upon release. Probably more important, they presented papers describing the successful, self-sufficient, and profitable existence of the New York prisons and prisons using convict labor in various industries around the globe (e.g., the Irish system) (Wines (1871)).[6] NPA's establishment will be integral part of the identification stratery used in the empirical part of the paper and will be discussed in grater details later on.

The main feature of the convict labor in the Northern States was establishment of the factory on the prison premises and employment of prisoners within prison walls. In most cases inmates were employed by a private contractor who organized the production and trained the prisoners, while the state was housing and guarding the prisoners.[7] In some cases prion warden was in charge of employment of prisoners, and state furnished prison's workhouse or factory. These prisons were employed in predominantly low-skill intensive industries and were producing cheap goods. A the unit-labor cost of prison labor was much smaller than that of free laborers, parties involved (private contractors and prison wardens) benefited substantially from convict labor Department of Labor (1901).[8]

Convict labor systems accepted in the North did not directly incentivized policy to arrest more people. Nevertheless, as wardens were personally benefiting from convict labor they often used bribes to increase supply of the convict workforce.[9] They could bribe police to arrest and "invent" a crime for some particular people that interested wardens: "... *negro in the [omitted] penitentiary ... was a wizard at cutting. Soon after he was released they planted something on him and got him sent back because they couldn't spare him.*"[10] Wardens also bribed judges to hand down longer sentences.

The situation is similar to the contemporary "Kids for Cash" scandal (New York Times (2009)) and in line with the mechanism of how nowadays private prisons affect sentencing decisions (Dippel and Poyker (2018)). For example, John T. McDonough, former New York Secretary of State and

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[6]It is unclear if the well-being of prisoners guided delegates of that congress the same way as Reverent Wines or that they cared about the profitability of their prisons, but after 1870 industrial and agricultural complexes started to appear in almost all correctional facilities and jails. Prison-made goods became so widespread and caused so many complaints from firms that were competing with prisons that Senate and House of Representative directed the Commissioner of Labor to collect data concerning convict labor in 1886 and analyze if convict labor affects firms using free labor in the same industries (Department of Labor (1887)).

[7]The were no free entry into employing prisoners, and only politically-connected firms were able to establish production there (Gildemeister (1978)).

[8]Prisoners were essentially worked for free and were punished for not working. More about working conditions of prisoners can be found here Department of Labor (1887).

[9]Wardens' salary did not directly depend on the profitability of the prison. Thus they often misreported the true output of their prisons and acquiring those profits themselves instead of paying it to the state.

[10]Department of Labor (1925), p. 124.

chief of New York's BLS to the Industrial Commission (Department of Labor (1901) p. 296.) said in his testimony:

> "In the penitentiaries in the old times, when we did not have enough men to do the work, our police were instructed to put men in there. ... Judge Nott, lately, the [Albany] county judge, testified ... that he was offered \$100 for every long-term prisoner that he would send to penitentiary [Clinton prison]".

McDonough also said that police were monitoring newly discharged prisoners. As they were entitled to some money upon release, they usually did not go far until they began spending it. If they went on a bender or to a brothel and "*pushed the door*" they might be arrested for burglary and returned to the prison.[11]

2.2 Convict Labor in the Southern States

While convict labor in the North was driven largely by industrialization and rapid population\crime growth, reasons for its emergence in the South were different: there the main factors were the lack of prisons and the abolishment of slavery.

Systems of convict labor varies across states but two systems of convict labor worth mentioning separately, due to their geographic prevalence, unique properties, and interrelation with southern political institutions and slavery. These systems are convict leasing, and public works and ways (better known as chain gangs). One of them – convict leasing – assumed monetary incentives to the police and judicial system.[12] Convicts were leased on the first-bid actions, and while the lion share of the money went to state, some portion of that price was paid to sheriff and judge who were directly involved in that case. These created incentives for police to arrested less socially protected Black people and charged them with vagrancy or minor crimes, in order to auction out them later. Moreover in the South, various Jim Crow laws made it even easier to find an excuse for arrest. Sometimes, police would "*round up idle blacks in times of labor scarcity*" (Cohen (1976)). However sometimes, sheriffs were directly asked to arrest more people before the cotton harvest season (Blackmon (2009); Oshinsky (1997)).

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[11]This happened not only in states with massive private interest in the convict labor industries. In Alleghany County of Pennsylvania, magistrates at the requests of the workhouse superintendent gave stiffer sentences to good coopers. For example, one black worker from Pittsburgh was arrested on a drunk charge who got six-month sentence instead of usual 2 to 30 days because "*he was the fastest barrel maker in the state*" (*National Labor Tribute* (January 14, 1882)).

[12]More about systems of convict labor, and its emergence in the United States in Sharkey and Patterson (1933).

Convict leasing is system of penal labor frequently regarded as a continuation of the slavery in the southern sates[13]. It was introduced during the Reconstruction period (1865–1877) when the government of the U.S. were trying to revive economy of the former Confederate states and was intended to replace the labor force once their slaves had been freed. Prisons had right to "lease" convicts to the firms or farms/plantation to work for free (in comparison with non-southern states that payed (miserable) wage to convicts).

Most of the prisoners involved in the convict leasing were black males (Litwack (2010)), thus creating a racial incarceration gap that persists until today. The practice peaked around 1880 and was used to supply labor to farming, railroads, mining, and timber industry. The state of Virginia never imposed convict leasing system, Tennessee was the first state to officially abandon it in 1893 while Alabama was the last one (in 1928). However, whenever state prohibited convict leasing they were substituting the existing system with the Public Works and Ways system. Prisoners continues to work on infrastructural projects under direct states' supervision. Thus convict leasing persisted in various forms until it was abolished for good by Franklin Roosevelt in 1941.[14]

The reason why convict leasing lasted for so long was mainly economic: according to Mancini (1996) on average profit from each convict was four times higher then cost of prison administration. In addition to black people, white immigrants also were frequently leased to work for some factories, however in the south, due to discrimination white people mostly worked on less difficult works and were employed inside prisons by contract system.

2.3 Demise of the *Old* Convict Labor System

By the late 1930s, the modern American prison system had existed for more than one hundred years. During that time, many penal institutions themselves had remained unchanged. Convicts lived in a barren environment that was reduced to the absolute bare essentials, with less adornment, private property, and services than might be found in the worst city slum. One aspect that had changed rather significantly, however, was the prison labor system. In 1929 Congress passed the Hawes-Cooper Act, which enabled any state to prohibit within its borders the sale of any goods made in the prisons of another state. By the time the act became effective in 1934, most states had enacted laws restricting the sale and movement of prison products. In 1935 the Ashurst-Sumners Act strengthened the law to prohibit the transportation of prison products to any state in violation

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[13]Convict leasing existed in some northern states as well but was less widespread and posses less similarity with slavery (Lichtenstein (1996)).

[14]See Section A.1 for additional information about convict leasing.

of the laws of that state, and prohibited to have any contracts with private contractors.[15] In 1940 Congress enacted legislation to bar, with a few exceptions, the interstate transportation of prison-made goods. These developments contributed to decreased reliance on prison labor to pay for prison costs. More and more inmates became idle and were not assigned to jobs.

As a result, by 1940, all convict labor was concentrated in the public systems, either producing goods for consumption by its state or employing prisoners in chain gangs. The latter was abolished in 1941 by President Roosevelt's Circular 3591. State-use of convict labor remained the only form of convict labor afterward, and the problem of competition with convict labor was quieted until 1979, when Congress revived the private system of convict labor by establishing the Prison Industry Enhancement Certification Program.

3 Data

In this Section I describe data sources and the way I constructed main variables.

3.1 Data on Convict Labor

To measure exposure of each county to I digitalized an archival dataset of prisons and convict-labor camps in 1886, 1895, 1905, 1915, 1923, 1932 and 1940 collected by the U.S. Department of Labor.

As my outcome variables are cross-sectional, my main main explanatory variable is also cross-sectional. I construct three measure of counties exposure to convict labor:

The first is similar to one used in Poyker (2018b), where I weigh the effects of each prison by the distance between it and a given county and by counties industrial composition:

$$ CL^1_{c,t} \;\; = \;\; \sum_{i \in I} \left(\lambda_{i,c} \times \sum_{p \in P_t} \frac{\ln \left(\text{Value of goods produced}_{i,p,t} \right)}{\text{Distance}_{c,p}} \right), \tag{1} $$

where P_t is the set of all prisons at year t, $\text{Distance}_{c,p}$ is a distance between prison p and county's c centroid (in km), and $\lambda_{i,c}$ is a value share of industry i in county c in 1870.

Second measure only weighs output of each U.S. prison by the distance from it to the county's centroid:

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[15]Although it allowed to sign contracts not exceeding $10,000 annually.

$$CL_{c,t}^2 = \left(\sum_{p \in P_t} \frac{\ln \left(\text{Value of goods produced}_{p,t} \right)}{\text{Distance}_{c,p}} \right). \tag{2}$$

The second measure may be more applicable as we do not want to measure effect of convict labor on the local labor market. Even if county is not affected by the competition with prison-made goods because its industrial composition is different incarceration may be still affected as local police will may be incentivized to increase number of employed convicts in a nearby prison. Hereafter I refer to the first two measures of convict labor as "continuous" as they treat all counties.

The third measure is constructed as the value of goods produced in a county, and thus assume only those counties as treated if they had a prison (hereafter I refer to this measure of convict labor as "discrete"):

$$CL_{c,t}^3 = \ln \left(\sum_{p \in P_{c,t}} \left(\text{Value of goods produces}_{i,p,t} \right) \right), \tag{3}$$

The underling assumption here is that wardens are more capable to incentivize police and judges nearby, and at the same time, the demand for convict labor is higher around the prison. I prefer this measure and use it as a baseline hereafter because it may be easier for prison wardens to incentivize local police than police in a counties farther away.

3.2 Data on Historical Incarceration Rates

The quality of incarceration data makes it difficult to identify the effect of convict labor on incarceration immediately after convict labor was allowed in 1870s-1880s. In particular censi contain information about the location of group quarters, thus we can observe where inmates are currently confined but not where they were arrested.

First available data that contains the county of pre-arest residence of inmates from Eriksson (2015) is for 1920. I use the following formula to construct incarceration rates for 1920:

$$\text{Incarceration Rate}_{c,1920} = \frac{\#\text{Inmates}_{c,1920}}{\text{Population}_{c,1920}} \times 100,000. \tag{4}$$

Similarly, I construct incarceration rates by race, gender, and foreign-born status. E.g., Black Incarceration Rate$_{c,1920}$ = $\frac{\#\text{Black Inmates}_{c,1920}}{\text{Black Population}_{c,1920}} \times 100,000$.

3.3 Data on Contemporaneous Arrests Rates

Data for contemporaneous arrests come from Uniform Crime Reporting Data: Arrests by Age, Sex, and Race (2000) available at ICPSR.[16] I calculate the arrest rate for drug usage and vagrancy as the number of arrests for drug and vagrancy is again divided by the total population in the given county in the year of 2000 multiplied by 100,000 to obtain the arrest rate per 100,000. Similarly, I compute arrests by races and gender. In addition, I compute placebo outcome – arrests for violent crimes that should be less dependent on racial practicing of the police.

3.4 Other Data

All county-level data for controls are taken from U.S. censi (Haines (2004); Ruggles et al. (2015)). I work with county level data for the years 1870 and 1880. The data was obtained from Historical, Demographic, Economic, and Social Data: The United States, 1790-2000, ICPSR 2896 (Haines (2004)). Additionally, I use data on county topography and demographics from the paper "Data Set for Births, Deaths, and New Deal Relief During the Great Depression" by Fishback, Haines and Kantor (2007) generously made available on Price Fishback's website.

I drop counties in Hawaii or Alaska and underpopulated counties with population less than 1,000 in any decade in the 20th century. The quality of some of the key variables is not ideal. Substantial measurement error is likely to be present at the beginning of our sample period.

I use the following variables as controls: total population of each county; urban population in each county divided by the total population of each county (calculated as population residing in places of 2,500 or more persons); shares of population of black and foreign-born (defined as the share of Black (foreign-born) over total population); share of employment in agriculture (defined from individual level data as the number of individuals who reported working on agriculture over the total number of individuals with reported industry); total county level manufacturing wages in thousands of dollars of 1880; value of farm products in thousands of dollars of 1880 (total value of farm products for each county in thousands of dollars). Lynching data is taken from the Historical American Lynching Data Collection Project.

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[16]While data is available starting from 1990s, I choose 2000 as a baseline specification for my summary statistics to be more comparable with those of Bunting, Garcia and Edwards (2013). However all results hold if I use other years.

4 The Effect of Convict Labor on Incarceration Rates

In the previous section, I described how convict labor incentiviced police arrest more people, and provided historical records that convict labor by itself caused an increase in crime rates and incarceration across the United States between 1870 and 1940. Thus convict labor could affect incarceration rates by providing incentives to police, judges and wardens. Moreover, manufacturing wages and employment suffered on the local labor markets around prisons (Poyker (2018b)) thus making opportunity cost of crime smaller. This indirect channel could also contribute to the raise in incarceration rates.

Convict labor could have affected incarceration through both direct and indirect effects. First, the decrease in wages could have decreased the opportunity cost of crime (à la Becker (1968)) for the poor, increasing crime rates. Second, prisons could have directly affected incarceration, through two main channels. First, predominantly in Southern states that adopted convict leasing, the police and the judicial system were directly incentivized to arrest more people. In particular, inmates were leased out via an auction, the highest bidder paid the bid to the state, while everyone involved (sheriff, judge, public officials, and even witnesses) were getting a share (Cohen (1976); Blackmon (2009); Oshinsky (1997)). Second, while other forms of convict labor provided no direct monetary incentives for police or judges, prison wardens themselves were colluding with judges, police, and contractors. Wardens also bribed judges to hand down longer sentences (Department of Labor (1900, 1901)).

Estimation of the effect of convict labor on incarceration is problematic due to lack of data. Even if the full count censuses of 1880 and 1910 were available for construction of county-level measures of convicts, there would be a measurement error, as they reflect the county where inmates served their term but not where they lived. The first reliable source of data comes from Eriksson (2015), who collected data on prisoners and their county of residence for 1920 and 1930. Thus I choose to use the cross-sectional specification:

$$\text{Incarceration Rate}_{c,1920} = \alpha + \beta CL_{c,1886} + \mathbb{X}'_c\Gamma + \mu_s + \varepsilon_c, \tag{5}$$

where Incarceration Rate$_{c,1920}$ is the number of inmates in *any* state prison who live in county c.[17] $CL_{c,1886}$ is weighted by distance log of value of goods produced by all prisons measured for

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[17]Almost all prisoners at that time were confined under state penitentiaries and thus were incarcerated in the states

county c at year $t = 1886$; $\mathbb{X}_{c,1880}$ is a matrix of county-level controls at year $t = 1880$; and μ_s are state fixed effects. I use a set of socioeconomic control for counties' economic conditions, and I use population, urban share, and share of Black and foreign-born population as proxies for crime rates. I cluster standard errors on the state level.

4.1   Identification

Because I cannot control for baseline crime rates well enough, endogeneity concerns remain. For example, if prison were located in locations with higher crime rates, I will *overestimate* the effect of convict labor.

To address this concern, I use instrumental variable analysis. I exploit the massive expansion of convict labor brought about when the National Prison Association (hereafter NPA) held its first congress, in Cincinnati, in 1870.[18] Thus, I use distance to Cincinnati as an instrument for the value of goods produced by convict labor.

The congress held a series of lectures about the experience of penitentiaries around the world, and how education and labor rehabilitate prisoners, by teaching them skills that will prevent them from ending up in prison in the future. In particular, the reports featured stories from New York prisons and prisons in Ireland that already had an extensive history of employing prisoners. After the congress, the NPA enshrined its "Declaration of Principles" (Wines (1871)). It declared that *"We [shall] have imparted to him [prisoner] the capacity for industrial labor and the desire to advance himself by worthy means."* In particular, it suggested that prisons should establish industrial and/or agricultural departments, as appropriate, and that *"these would be run as efficient business organizations, returning profits to the institution and providing training and craft skills to the inmates."*

The idea behind the instrument is that the closer wardens and other prison executives lived to Cincinnati the less it cost them to arrive and get new ideas about employing prisoners for industrial purposes. Thus the distance correlates with the likelihood that wardens would attend the conference and with the cost of getting information about convict labor profitability. We expect to see a higher value of goods produced by convict labor and a greater number of employed prisoners in 1886 the closer the prison was to Cincinnati.

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of their residence.

[18]The conference was the creation of one visionary man, Reverent Enoch Wines, who was the secretary of the New York Prison Association at that time. Being a deeply religious person, he believed prisoners could be rehabilitated through education, Bible study, and hard labor. He convinced the governor of Ohio to help organize the conference in Cincinnati, and then he became the association's first president. (See more details in McKelvey (1936).)

I introduce an example from New Jersey to demonstrate that visiting the NPA congress in Cincinnati indeed affected the decision to open industrial or agricultural departments within prisons' premises. Five representatives from New Jersey attended the congress. One of them, was Samuel Allinson, deputy of New Jersey's governor and a member of the board trustees of the state reform school in Yardville, in Mercer County. In 1869, Allinson was appointed to a commission at the Trenton State Prison, but he did not mention convict labor in his recommendations (New Jersey Historical Society (1884)). After attending the congress, he wrote two papers, about discharged prisoners (Allinson (1872)) and about scholastic and industrial education in reform schools (Allinson (1876)). In 1879, he was appointed to a similar board at the same prison, where he wrote a report suggesting expanding convict labor. We can't know for sure whether Allinson modified his beliefs about convict labor because of what he learned at the congress, but his obituary (New Jersey Historical Society (1884)) indicates that he became a pro-convict labor activist after 1870. This example shows that the instrument is indeed plausible, and that the ideas disseminated at the NPA's first meeting could have affected attitudes toward convict labor across the United States.

Overall, the first stage can be written as follows:

$$CL_{c,1886} = \tilde{\alpha} + \widetilde{\beta}\text{Distance to Cincinnati}_c + \mathbb{X}'_{c,1880}\widetilde{\Gamma} + \widetilde{\Pi}\Psi_{c,1870} + \tilde{\mu}_s + \epsilon_c, \tag{6}$$

where $CL_{c,1886}$ is weighted by distance log of value of goods produced by all prisons measured for county c at year $t = 1886$; $\mathbb{X}_{c,1880}$ is a matrix of county-level controls at year $t = 1880$; $\Psi_{c,1870}$ – matrix of pretreatment ($t = 1870$) controls; and μ_s are state fixed effects.

The second stage can be written as follows:

$$\text{Incarceration Rate}_{c,1920} = \alpha + \beta\widehat{CL_{c,1886}} + \mathbb{X}'_{c,1880}\Gamma + \Pi\Psi_{c,1870} + \mu_s + \varepsilon_c. \tag{7}$$

For distance to Cincinnati to be a good instrument we need it to be not correlated to other variables in 1870 that can potentially correlate with dependent and explanatory variables. For example, if it correlates to the urbanization share or local crime rates it can potentially violate exclusion restriction.[19] To test it, in Table 9 I run OLS regression of distance to Cincinnati on,

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[19]It is hardly true that distance to Cincinnati has a direct effect on incarceration rates in 1920, but indirect effect may be plausible.

incarceration rates, log of population, urban share, share of women, share of African-American, log of manufacturing and agricultural outcomes, literacy, etc.[20] Only log of agricultural output and share of Black seems to correlate with the instrument, and I control for these two variables in all specifications.[21]

To demonstrate that distance to Cincinnati is indeed an information treatment for those wardens that came to the conference in Table 1. In Columns I-V I regress the instrument on the number of delegates from each county. I show results with no controls in Column I, and then add state fixed effects (Column II), socioeconomic and demographic controls (Column III), and geographic controls (Column IV). The coefficient is very significant, suggesting that counties further away are less likely to send delegates. In Column V I restrict the sample to the 25 states that actually sent delegates, in case state that did not do it are different; nevertheless, the results hold. In Column VI I test other functional form (log distance) of the instrument, and I use log of counties market access (from Donaldson and Hornbeck (2016)) in Column VII. Both yield robust results. These results hold if I use a indicator variable if the county sent a delegate.

Table 1: National Prison Association Congress Delegates, Distance to Cincinnati, Ohio and Convict Labor

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Outcome:				Delegate at NPA					Value of Prison Output (1886)		(1895)
Distance to Cincinnati, OH	-0.0197***	-0.0549***	-0.0792***	-0.0959***	-0.159***					-0.466	0.533
(1000 km)	(0.00611)	(0.0197)	(0.0222)	(0.0226)	(0.0291)					(0.400)	(0.712)
ln of Distance to Cincinnati, OH						-0.0366***					
						(0.0121)					
ln of Market Access (1870) to Cincinnati, OH							-0.0643**				
							(0.0242)				
Delegate at NPA								3.987***	4.017***	4.000***	2.918***
								(0.726)	(0.747)	(0.749)	(0.833)
State FE		X	X	X	X	X	X	X	X	X	X
Socio-Economic Controls			X	X	X	X	X	X	X	X	X
Geographical Controls				X	X	X	X	X	X	X	X
Sample		Full				25 NPA-States		Full		25 NPA-States	
R squared	0.01	0.09	0.17	0.18	0.18	0.18	0.18	0.43	0.38	0.38	0.20
Observations	3,109	3,108	2,265	2,265	1,373	1,373	1,372	2,266	1,374	1,374	1,374

All columns contain constant. Robust clustered by state standard errors in parentheses. *** p p < 0.01, ** p p < 0.05, * p p < 0.1

Even if I have names and origin cities of each of the 140 participants, I do not use the dummy if a county sent a representative (or a number of delegates) to the conference since it can be endogenous to the personal views of the warden and his propensity to promote convict labor. However, I can use

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[20]As incarceration rates I used actual number of people in prisons, thus it rather shows that distance to Cincinnati does not correlate to prisons in 1870 and the capacities of these prisons.

[21]Also results do not change if I drop them. I tries other covariates from the 1870 manufacturing census, but non of them are significant, and I don't report them.

it to demonstrate the mechanism, how distance to Cincinnati affected convict labor. In Columns VIII and IX I regress number of delegates on the log value of prison-made goods produced in that county in 1886 on the full sample of states, and on the sub-sample of 25 states with delegates.[22] The point-estimate is virtually the same, and is highly significant. In Column X I add distance to Cincinnati in addition to the number of delegates. The coefficient for the number of delegates does not change, and the distance to Cincinnati becomes insignificant. This suggest, that whole effect comes through the delegates, but not the distance to Cincinnati per se. Finally, in Column XI I do the same specification bu use value of convict labor in 1895 instead of 1886. While results hold (delegates has positive effect on value of convict labor, and distance to Cincinnati is insignificant), the magnitude of the point-estimate for the deligates decreases. Its explanatory power decreases over time, as by 1895 convict labor becomes more widespread, and delegates and distance to Cincinnati are worse predictors of convict labor further away from 1886.

Finally, I present reduced form results with the number of NPA Congress participants in Table A14.

4.2 Results

In this section I first, estimate the effect of convict labor on incarceration rates in 1920 and 1930, and second, study if the effect was disproportional for the minorities.

4.2.1 Effect of Convict Labor on Incarceration

I start my analysis by demonstrating in Table 2 strong correlation of the incarceration rates in 1920 and instance of convict labor measured as log of value of goods produced in a county. In Column I I show strong negative correlation of convict labor in 1886 and incarceration rates in 1920. The standard deviation of the log of value of prison-made goods in a county with prison is 2.2, thus one standard deviation increase in the value of prison-made goods in 1886 is associated with 73 additional people convicted in that county in 1920 or 50 percent of its standard deviation. Similar results can be observed in Columns II-V where I run ordinary-least-squares regression of convict labor in 1895, 1905, 1915, and 1923 on the incarceration rates. While the coefficient varies — one standard deviation in convict labor is associated with increase in incarceration rates from 36.4% to 47.8% of its standard deviation.

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[22]In fact instead of log I use inverse hyperbolic sine transformation $(\log(y_i + (y_i^2 + 1)^{1/2}))$. It is approximately equal to $\log(2y_i)$ or $\log(2) + \log(y_i)$, and so it can be interpreted in exactly the same way as a standard logarithmic variable but without doing $\log(1 + y_i)$ (Burbidge, Magee and Robb (1988)).

Table 2: Convict Labor and Incarceration in 1920

	I	II	III	IV	V
	Dependent variable: Incarceration (1920)				
Convict labor (1886)	33.21***				
	(7.253)				
Convict labor (1895)		48.05***			
		(11.16)			
Convict labor (1905)			25.05***		
			(6.039)		
Convict labor (1915)				39.72***	
				(12.06)	
Convict labor (1923)					41.89***
					(9.082)
R-squared	0.27	0.30	0.23	0.20	0.26
Observations	2,185	2,185	1,946	1,503	1,800

All columns contain constant and state fixed effects. The following variables are used as controls: ln of total population (1880), urban share (1880), share of Black (1870, and 1880), share of women (1880), share of foreign-born (1880). Robust clustered by state standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Similar correlation is observed if I use continuous measures of convict labor (1 and 2). In Table 10 of Appendix I present similar results for incarceration rates in 1930.

Correlations are remarkably stable over time and to be sure that the effect is indeed causal and not driven by unobserved characteristics of counties with convict labor (in particular crime rates) I employ instrument variable analysis. I present results of the IV estimation in Table 3. First, I use continuous measure of counties exposure to convict labor weighted by county's industrial composition and distance to prison. For the interpretation purposed I standardize all variables by subtracting their mean and dividing by their standard deviation. One standard deviation in exposure to convict labor in 1886 increases incarceration by 84 people in 1920 (Column I). The IV coefficient in Column II decreases by 18 percent but remains significant: comparing two counties, one on 25th percentile exposure to convict labor and one on 75th percentile, the more exposed on experienced 53 percent of its standard deviation increase in incarceration rates. The OLS coefficient for the specification with convict labor exposure weighted only by distance in Column III is almost twice as small as the one in Column I. But the IV coefficient (Column IV) has similar magnitude to one in Column II. Finally, in Columns V and VI I show that results also hold for the discrete measure of exposure to convict labor.

Table 3: Effect of Convict Labor om Incarceration Rates in 1920

	I	II	III	IV	V	VI
	Dependent variable: Incarceration (1920)					
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Convict labor (continuous)	84.32***	69.27**				
(weighted by industry & distance)	(23.09)	(29.07)				
Convict labor (continuous)			47.00*	61.58**		
(weighted by distance)			(25.16)	(24.76)		
Convict labor (discrete)					33.21***	53.96**
(nonweighted)					(7.253)	(23.63)
R-squared	0.18	0.18	0.11	0.11	0.27	0.20
Kleibergen-Paap F stat		12.31		17.20		6.93
Partial R-squared		0.031		0.112		0.004
Instrument's coefficient		-0.00102***		-0.00108***		-0.00142***
		(0.000289)		(0.000271)		(0.000517)
Observations	2,228	2,228	2,228	2,228	2,228	2,228

All columns contain constant and state fixed effects. The following variables are used as controls: ln of total population (1880), urban share (1880), share of Black (1870, and 1880), share of women (1880), share of foreign-born (1880). Robust clustered by state standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

I also report results for the similar specification but with incarceration in 1930 as a dependent variable in Table 11 of Appendix. All results hold.

4.2.2 Over-Incarceration of Minorities

To show that convict labor disproportionately affected minorities I slightly augment the specification:

$$\text{Black inc. rate}_{c,1920} = \alpha + \beta CL_{c,1886} + \Gamma \mathbb{X}_{c,1880} + \mu_s + \varepsilon_c, \tag{8}$$

where Black inc. rate$_{c,1920}$ is incarceration rate of Black in county c in state s at year $t = 1920$; $CL_{c,1886}$ is a weighted by distance log of value of goods produced by all prisons measured for county c in state s at year $t = 1886$; $\mathbb{X}_{c1880}$ is a matrix of county-level controls dated by pre-convict labor date of 1880, and μ_s are state fixed effects. The standard errors are clustered at the state level.

Usage of continuous variable of interest $CL_{c,1886}$ is imperative, since police in counties with prisons were more likely to be incentivized to arrest more people than those where there were no labor camp. However, I assume that policemen located in the county that is closer to prison will be more incentivised to arrest more people than in a county that is further away, since the costs of transportation of prisoners are increasing.

The revenue and expenses of prison were directly linked to state's budget, thus state fixed effects can eliminate the concern that the poorer counties could have higher crime rates among the poorest population, and at the same time more extensive usage of convict labor that would decrease costs of up-keeping existing prisons and improve its financial situation. However, as a state could install a plant in those prisons strategically in order to stimulate future tax revenues in depressed counties will magnify the coefficient of interest, thus, I control for county tax revenues, as a proxy for the fiscal health of the county.

In addition, as prisons appeared in places with higher population and urban share, I use the corresponding controls.

Fixed effects are especially important, as convict labor laws were state-specific, and because states were prohibiting usage of private forms of convict labor and switching to the state use and public works and ways system at different years. Thus, there is a heterogeneity in the number of how many years convict labor affected racial discrimination.

Nevertheless, unobserved heterogeneity concern remains, as some important issues cannot be addressed and cause a bias that magnifies the coefficient of interest. First, counties with more developed coercive institutions can be more involved in the convict labor and at the same time to have higher level of racial discrimination, thus affecting incarceration rates on non-whites. Second, if location of prison decreases social capital of the surrounding counties (e.g., because prisoners remain nearby prisons after release) it may affect local crime rates and cause higher incarceration rates in the future. These two sources of unobserved heterogeneity will cause upward bias that in the OLS estimates.

While issues described above tend to magnify the coefficient of interest, there is an important source of the bias that can bias it toward zero: the measurement error. As labor camps were afraid that their activity would be subject to state or federal legal restrictions due to unfair competition with firms using free labor, prisons' administration could under-report the value of goods produced. However, it will work against me showing the effect on incarceration rates. Finally, reverse causality is unlikely to cause bias, as I use Black incarceration rate 34 years after the year of the main variable of interest. These facts make the overall direction of bias unclear.

Table 4 introduced OLS ans 2SLS regression for specification described above. Column I contain OLS specification: while the relation between convict labor and Black incarceration rate is positive, it is insignificant. The reduced form is presented in Column II, suggesting that Black incarceration rate in 1920 was larger in counties situated closer to Cincinnati. Column III contains the first

Table 4: Convict Labor and Black Incarceration Rates (1920)

Dependent variable:	I	II	III	IV
	Black incarceration rates (1920)			
	OLS	Reduced form	First stage	Second stage
St.dev. explanatory variable	19	713	713	19
Log of value of goods	17.29			51.43*
produced (1886)	(15.4)			(29.3)
Distance to Cincinnati, km		-1.17*	-0.023***	
		(0.69)	(0.005)	
Partial R^2			0.1	
F stat of excluded instrument			22.96	
Prob > F			0.00	
Anderson-Rubin p-value			0.08	
Observations	2,112	2,112	2,112	2,112
adjR^2	0.03	0.03	0.87	0.03

All columns contain constant, state fixed effects, geographic controls (latitude and longitude, dummies for coastal counties), 1880 and 1870 socio-economic controls (ln of total population, urban share, share of Black, share of women, share of foreign-born). Robust clustered by state standard errors in parentheses. 41 cluster. *** p<0.01, ** p<0.05, * p<0.1

stage of the 2SLS specification. The relation between the distance and convict labor output is very strong. The F statistics of excluded instrument is equal to 23 and partial $R^2 = 0.1$, suggesting that the instrument is unlikely weak. Finally, the second stage is reported in Column IV. The coefficient of interest is positive and significant, thus corroborating the hypothesis that convict labor favored incarceration of Black through racial discrimination.

It should be noted that the IV coefficient is three times bigger than the OLS one. This can be attributed to the fact, that the attenuation bias due to measurement error was bigger than possible upward bias caused by unobserved heterogeneity. Alternatively it could be the result of the weak instrument. However as we can see, the first stage result suggest that it is not the case. Finally, inflated IV coefficient can be result of the violation of the exclusion restrictions. While exclusion restrictions cannot be tested directly, a sensitivity check intended to alleviate this concern will be provided later in the robustness check section.

Table 5 show OLS and 2SLS results for incarceration of other population groups. As can be seen, incarceration was affected among all groups, even among the white, suggesting that it was not only because of the racial discrimination or due to distortion of human capital around prisons or economic incentives to increase labor force in prisons. The effect of convict labor is the biggest for non-white and non-black population group, that includes Hispanic and Asian (mostly in the west).

Table 5: Convict Labor and Incarceration Rates by Races (1920)

Dependent variable:	I	II	III	IV	V	VI	VII	VIII
				Incarceration rates (1920)				
	Non-white	Non-white & non-black	White foreign-born	White	Non-white	Non-white & non-black	White foreign-born	White
	OLS	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS
St.dev. explanatory variable	19	19	19	19	19	19	19	19
Log value of goods produced (1886)	18.563	449.120	12.905	3.307	64.00**	1061**	34.15***	10.09***
	(15.516)	(329.356)	(8.125)	(2.090)	(29.57)	(456.7)	(13.00)	(3.477)
Partial R^2					0.12	0.06	0.12	0.12
F stat of excluded instrument					23.12	23.32	23.28	23.32
Prob > F					0.00	0.00	0.00	0.00
Anderson-Rubin p-value					0.02	0.03	0.01	0.00
Observations	2,134	1,233	2,159	2,175	2,134	2,175	2,159	2,175
adjR^2	0.017	0.035	0.019	0.044	0.01	0.02	0.02	0.04

All columns contain constant, state fixed effects, geographic controls (latitude and longitude, dummies for coastal counties), 1880 and 1870 socio-economic controls (ln of total population, urban share, share of women, share of Black, share of foreign-born). Robust clustered by state standard errors in parentheses. 41 cluster. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5 Robustness and Sensitivity Checks

In this section, I briefly address the most important robustness and sensitivity checks for the long-run analysis. I start with showing additional pieces of evidence in favor that the distance to Cincinnati is a legitimate instrument for the expanse of convict labor in its first years and not violating exclusion restrictions.

Placebo

While the validity of distance to Cincinnati as an instrument for convict labor in 1886 is covered in great details in Section 4.1, it is important to show that the instrument is not spurious, by employing a series of placebo tests. Exclusion restriction can be violated if the distance to Cincinnati is correlated to trade or migration patterns that took place after 1870 and before the realization of intergenerational outcomes. In this case, even if the instrument is not associated to important socioeconomic variables in 1870, it still accumulates other effects that had happened during the century. One way to address this point is to show, that distance to Cincinnati, not just by accident a good correlate of convict labor, I present first stage F-statistics of the first-stage regressions with all possible distances to county centroid. This simple placebo test shows that geographic proximity to Cincinnati, yield the largest F-statistics among of all placebo tests substituting proximity to all other counties (See Figure A1). Thus the effects I measure is specific to geographic proximity to Cincinnati and not to a post-1886 condition affecting the United States overall.

Figure 1: First Stages for Placebo Tests with Proximity to all Other Counties
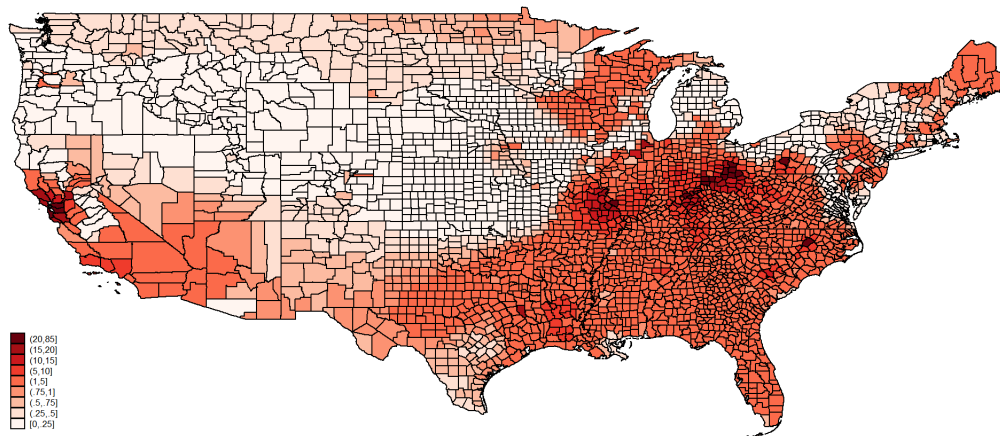

Figure 1 plots F statistics resulted from the first stage regressions with distance to each U.S. county instead of distance to Cincinnati, Ohio. Darker tones reflect higher first stage F-statistics. Source: Distances calculated using NEARSTATA module in STATA (Jeanty (2012)).

SUTVA

In the case of NPA congress, IV assumptions can be regarded as SUTVA, as wardens living close to Cincinnati who came at the conference were "compliers" and we would expect the instrument to affect only through them (Angrist, Imbens and Rubin (1996)). Thus I used he fact, which only 25 states sent their delegates, and in Panel A of Table A16, I show that the instrument affects outcomes only in a sub-sample of the twenty-five states that sent delegates to the NPA Congress. Indeed, the size of IV coefficients is statistically insignificant from those on the full sample. At the same time, the same specification on a sub-sample of the states without delegates in Panel B yield week first stage F-statistics below one suggesting a relationship between the instrument and convict labor.

Sub-sample Analysis

In Table A15 I examine if results are driven by some sub-sample of states. First, in Columns, I report the baseline specification from Table A**??**. In Column II I omit North-Eastern states. All coefficients but relative absolute mobility remain significant (p-value= 0.16). The size of the coefficient does not change much, and I attribute this marginal insignificance to low sample size and marginally week first stage. For Columns II-VII the first stage F-statistics ranges between 5 and 8, that still passes week instrument test on 95% level. Then in Column III, I exclude southern non-Confederate states. All coefficients are significant and remain stable. However, if in Column IV I exclude Confederate states, the effect of convict labor on incarceration vanishes. Then, in Column V I drop Midwestern states. The resulting coefficients differ from those with full sample only in size of standard errors. Finally, in Column VI I drop both Great Plains and Far West states. A few sent their delegates to the NPA Congress anyway, and I do not expect much changes upon exclusion of these states: and indeed, results are as expected are very similar, although incarceration effect is smaller in magnitude than in the full sample.

Relaxing Exogeneity Assumptions on the Instrument

Finally, in vein of Conley, Hansen and Rossi (2012) I relax the exogeneity assumptions of the instrument and examine the bounds we are able to place on the true effect of convict labor on the arrests of Black. The idea behind the method is simple: if in addition to exogenous and endogenous variables I add instrument (distance to Cincinnati) its coefficient (γ) required to be equal to zero according to standard IV estimation. However, by relaxing the constraint we can find the bounds for

the IV estimate of convict labor (β). If one expects instruments to have direct or indirect negative effect on the arrests of black ($\gamma < 0$) I will underestimate the true effect of the convict labor on racial discrimination. This gives the minimum prior for γ. More challenging is to determine the maximum prior of γ. Thus I assume, that the maximum direct effect of instrument will be not bigger than the size of the biggest effect of one of the control covariates. The covariate with the biggest significant covariate (standardized) is the urban population in 1880. Applying Conley, Hansen and Rossi (2012), I find that the bounds on the strength of β are still below zero (at 95% confidence level): $[7; 98]$ for black incarceration in 1920 and $[22; 180]$ for arrests of Black in 2000. Therefore, even allowing for imperfect exogeneity, the positive effect of convict labor on the racial discrimination is confirmed.

6 Long-Run Effects of Convict Labor: Contemporary Discrimination in Arrests

In this Section I show the persistent effect of convict labor on the over-incarceration of Black and other minorities. Unfortunately, contemporary incarceration data does not allow us to create good county level dataset, due to the fact that we can only observe the county of incarceration, but not the county of arrest. In addition, as around 13% of the prison population is contained under the federal prison system, those inmates serve their term even outside their states. To alleviate this concern I use the arrest data instead of incarceration.

In Table 6 I provide results of the arrests of Black for drug-related offenses and vagrancy laws. Column I contains OLS regression. While positive it is not significant. I report the reduced form in Column II. Column III contains the first stage of the 2SLS regression of value of goods produce by convicts on the Black arrest rate for drugs and vagrancy. The F statistics of excluded instrument is equal to 20.6, and despite the fact, that I add fixed effects, and the identification comes from the within-state variation of distance to Cincinnati, partial $R^2 = 0.09$. Column IV shows the result of the second stage, showing results consistent with those received in Table4.

Similarly, I report results for other population groups in Table 7. Arrest rates among Hispanic are even bigger than for the Black population, however, other groups have the opposite or no effect on arrest rates.

Table 6: Convict Labor and Black Arrest Rates (2000)

Dependent variable:	I	II	III	IV
	Black arrest rate for drugs and vagrancy (2000)			
	OLS	Reduced form	First stage	Second stage
St.dev. explanatory variable	19	713	713	19
Log of value of goods	30.595			121.4**
produced (1886)	(48.592)			(61.2)
Distance to Cincinnati, km		-1.54*	-0.021***	
		(0.81)	(0.004)	
Partial R^2			0.09	
F stat of excluded instrument			20.60	
Prob > F			0.00	
Anderson-Rubin p-value			0.05	
Observations	1,813	1,763	2,172	1,813
adjR^2	0.082	0.089	0.874	0.08

All columns contain constant, state fixed effects, geographic controls (latitude and longitude, dummies for coastal counties), 1880 and 1870 socio-economic controls (ln of total population, urban share, share of Black, share of women, share of foreign-born). Robust clustered by state standard errors in parentheses. 41 cluster. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Overall these results suggest that convict labor in 1886 has a persistent effect on racial discrimination that can be approximated through over-incarceration of Black population and other minorities.

It is important to note, that results provided in Tables 6 and 7 are based on the assumption that minorities are more likely to be stopped by police and thus checked for drugs, while at the same time have the same consumption of drugs as white population (Edwards, Bunting and Garcia (2013)). This seems corroborate my story, since racial discrimination will cause police to pay more attention on minorities. At the same time arrest for the serious crimes should be solely explained by socioeconomic and demographic characteristics. Thus employing arrests for 20 other offense category provide no consistent significant effect of convict labor on arrests of any type of population group.

Table 7: Convict Labor and Arrest Rates by Race (2000)

Dependent variable:	I	II	III	IV	V	VI	VII	VIII
				Arrest rates for drugs and vagrancy (2000)				
	Hispanic	Indian	Asian	White	Hispanic	Indian	Asian	White
	OLS	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS
St.dev. explanatory variable	19	19	19	19	19	19	19	19
Log of value of goods	6.764	-12.123	0.621	-2.332	155.6*	-140.9**	-10.07	4.425
produced (1886)	(12.386)	(19.635)	(15.048)	(3.842)	(88.54)	(70.49)	(50.88)	(21.86)
Partial R^2					0.09	0.09	0.09	0.09
F stat of excluded instrument					20.39	20.39	20.34	20.39
Prob > F					0.00	0.00	0.00	0.00
Anderson-Rubin p-value					0.01	0.02	0.00	0.01
Observations	1,758	1,758	1,753	1,758	1,758	1,758	1,753	1,758
adjR^2	0.136	0.137	0.027	0.298	0.06	0.09	0.03	0.30

All columns contain constant, state fixed effects, geographic controls (latitude and longitude, dummies for coastal counties), 1880 and 1870 socio-economic controls (ln of total population, urban share, share of Black, share of women, share of foreign-born). Robust clustered by state standard errors in parentheses. 41 cluster. *** p<0.01, ** p<0.05, * p<0.1

7   Conclusion

Institutional history has a profound influence on economic development and world inequality as many countries today still live in the shadow of colonial institutions established more than at least a century ago. One of the most damaging of such institutions is forced labor. When elites are able to coerce part of the population to perform unpaid labor, it can cement growth-killing power arrangements, reduce innovation, cripple "creative destruction" and eventually lead to lackluster economic growth. This study is part of the agenda of studying medium and long-term consequences of the forced labor institutions (Poyker (2018b,a)). While many other papers look at the institutions of developing nations, I explore institutions of forced labor in one of the most developed nations of the world: United States of America. Certainly, it might seem paradoxical to look at the adverse effects of forced labor in a country that rightfully belongs to the club of the richest nations, but one should be aware of an unequal distribution of the benefits of economic development in the U.S. (Oliver and Shapiro (2006); Frank (2009); Chetty et al. (2014a,b)).

In this paper, I showed that coercive institutions that had appeared in the United States after the civil war had an effect on the racial discrimination that resulted in over-incarceration of the minorities. Prison labor created incentives to arrest unprotected minorities in order to increase coerced labor supply, and even after its abolishment continued to persist through racial discrimination. I found that regions that were exposed to a more severe exploitation of convict labor experienced higher incarceration rates among minorities at 1920 are still worse off in terms of arrest rates for minor crimes.

The intuition behind the mechanism of racial discrimination is simple, as sheriffs and local police were incentivized monetary in arresting more people, they were trying to arrest as much as possible, especially among the least protected and easily visible distinguishable groups of states' population (e.g., Afro-Americans). As convict leasing system existed for long period of time (e.g., 82 years in Alabama), police get used to arrest members of those unfortunate groups and may continue to arrest them more often even after abolishing of the convict leasing system and thus monetary incentives. Since, police was slowly renewing itself overtime, more experienced policemen may share their traditions with those who was enrolled into service after the abolishing, thus transmitting the tradition for generations ahead[23]

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[23]Similar tradition concerns related to corruption triggered the Georgian government to hire all policemen after the Revolution of Roses in 2007 and recruit entirely new police. Ukrainian government did the same in 2014, while their police reform was incomplete due to small supply of possible police candidates.

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A Appendix

A.1 Additional Background Information Regarding Convict Leasing

Convict leasing is system of penal labor frequently regarded as a continuation of the slavery in the southern sates[24]. It was introduced during the Reconstruction period (1865–1877) when the government of the US were trying to revive economy of the former Confederate states and was intended to replace the labor force once their slaves had been freed. Prisons had right to "lease" convicts to the firms or farms\plantation to work for free (in comparison with non-southern states that payed (miserable) wage to convicts).

Most of the prisoners involved in the convict leasing were black males (Litwack (2010)), thus creating a racial incarceration gap that persists until today. The practice peaked around 1880 and was used to supply labor to farming, railroads, mining, and timber industry. The state of Virginia never imposed convict leasing system, Tennessee was the first state to officially abandon it in 1893 while Alabama was the last one (in 1928). However, convict leasing persisted in various forms until it was abolished for good by Franklin Roosevelt in 1941 (Circular 3591).

The reason why convict leasing lasted for so long was mainly economic: according to Mancini (1996) on average profit from each convict was four times higher then cost of prison administration. In addition to black people, white immigrants also were frequently leased to work for some factories, however in the south, due to discrimination white people mostly worked on less difficult works and were employed inside prisons by contract system.

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[24]Convict leasing existed in some northern states as well but was less widespread and posses less similarity with slavery (Lichtenstein (1996)).

All convict leasing laws were determined on the state level and had federal government had little to do with it. Most of the states allowed several types of the convict labor system, with the contract system to be the most popular. Despite being dispraised by the federal government and public opinion almost everywhere the convict leasing system was imposed in 26 US states at different point of the history[25]. The practice peaked around 1880 and was used to supply labor to farming, railroads, mining, and timber industry. Alabama was the fist state to impose convict leasing system in 1846 and North Carolina was the last state to abolish it in 1933. However, convict leasing persisted in various forms until it was abolished for good by Franklin Roosevelt in 1941.

Such popularity popularity was partly imposed by the fact that it was not only the cheapest way to keep prisoners but even highly profitable way that does not require any effort from the State. Thus, according to Mancini (1996) on average profit from each convict was four times higher then cost of prison administration. Second, convict lease provide opportunity to fill the most dangerous and hard jobs with the work force: e.g., mining, or turpentine production, as prisoners had no choice and had to work in any case. According to the studies of convict leasing (McKay (1942); Taylor (1942); Green (1949); Shelden (1979); McCarthy (1985); Walker (1988); Ledbetter (1993); Lichtenstein (1993); Mancini (1996)) it was always used only for providing workers for mines, factories and plantations that needed unskilled labor. Third, in some, predominantly southern states, there was a shortage of labor that had happened due to the abolishment of slavery after the Civil War, that resulted most of the southern states to adopt convict leasing system. Finally, for the slave states, fear of freed African-Americans that got access to arms after the war caused white population to ask to incarcerate more black people, and as prison system in most of states were not developed and had small capacities, it was easier to lease prisoners out than to build new prisons.

While convict leasing is a broad name of the convict labor system, it differ from state to state. Thus, for example, in Colorado and Virginia leased convicts were only allowed to work in mines\quarries and railroad construction correspondingly. In New Mexico, all wardens should have been employed in the states penitentiary system even if they work for a lessee in her private barracks, while in Maryland all prisoner related costs were on prison. Some states allowed to lease only certain type of prisoners: those with misdemeanors in Missouri and only females for work in homes in Massachusetts (I am not sure why somebody wants to have a criminal to cook your food). Finally, Idaho's convict leasing system resembled contemporary private prisons in a way that state

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[25]Even in southern states, as can be seen in the "Gone with the Wind" by Margaret Mitchell (1936), where Scarlett's plan to lease convicts to work in the mills was heavily criticized.

Table 8: Evolution of Convict Labor: Share of Employed Convicts

System	1886	1895	1905	1914	1923	1932	1940
Convict leasing	20	14	6	3	0	0	0
Contract	30	24	23	16	7	3	0
Piece-price	6	10	5	4	4	6	0
State-account	20 {	24 {	14	20	16	10	5
State-use			12	14	22	22	26
Public works and ways			5	7	12	12	13
Not Employed	24	28	35	36	39	47	56

State-account, state-use and public works and ways systems were reported together as public-account system before 1905. Source: U.S. Department of Labor.

leased the whole prison and lessee could employ prisoners wherever she likes.

The question, why some states adopted convict leasing and some did not goes beyond the scope of this paper. Nevertheless, it was a combination of budgetary health, demand for cheap unskilled labor force, bargaining power of small firms that cannot afford a "small prison" and have to rely on free labor and public opinion toward the convict leasing.

B Additional Figures and Tables

Table 9: Correlates of the Distance to Cincinnati

VARIABLES	I		II		III	
	Independent variable: Log distance to Cincinnati					
Incarceration rates, black males	-0.038	(-1.055)	-0.054	(-1.564)	-0.042	(-1.313)
Incarceration rates, males	-0.015	(-0.728)	-0.006	(-0.273)	0.023	(-0.658)
Incarceration rates, all	-0.007	(-0.248)	0.005	(-0.176)	0.034	(-0.857)
Number of slaves (1860)	-0.044	(-0.520)	0.013	(-0.383)	0.03	(-0.901)
Share black population	0.179	(-1.236)	0.279*	(-1.697)	0.272*	(-1.962)
Share foreign-born population	0.166	(-1.185)	0.18	(-1.558)	0.123	(-1.538)
Share children in school	-0.113	(-1.199)	0.044	(-0.756)	0.051	(-1.236)
Total population	-0.341**	(-2.049)	-0.126	(-1.388)	-0.089	(-1.045)
Urban share	-0.181**	(-2.554)	0.003	(-0.064)	-0.008	(-0.186)
Mean-to-median farm size	-0.05	(-0.535)	-0.092	(-0.979)	-0.106	(-1.396)
Gini (land)	0.135*	(-1.7)	0.067	(-1.013)	0.051	(-0.942)
Manufacturing output	-0.213	(-1.434)	-0.083	(-0.473)	-0.101	(-0.547)
Agricultural output	-0.289*	(-1.846)	-0.116	(-1.579)	-0.134*	(-1.845)
Labor in manufacturing	-0.267**	(-2.495)	-0.075	(-1.415)	-0.019	(-0.489)
Value of gold and silver mines output	-0.001	(-0.045)	-0.084	(-1.239)	-0.087	(-1.264)
Value of coal mines output	-0.056	(-0.503)	-0.07	(-0.571)	-0.062	(-0.501)
Value of iron mines output	0.172	(-0.944)	0.103	(-0.954)	0.112	(-1.045)
Capital-labor ratio	-0.048	(-0.643)	-0.047	(-0.854)	-0.041	(-0.839)
Socioeconomic controls	$\times$		$\checkmark$		$\checkmark$	
Geographic controls	$\times$		$\times$		$\checkmark$	

Columns I, II and III contain beta coefficient and t-statistics for the regression of log distance to Cincinnati on variables related to incarceration, slavery, demographic, inequality and industrial and agricultural outcomes. For example, row 2 of Column I says, that beta coefficient of the regression of the log of distance to Cincinnati on the incarceration rates of males in 1870 without any controls is -0.015, and t-statistics is equal to -0.728. Similarly, in Column II I add a set of control variables and add longitude and latitude controls in Column III. As we can see, distance to Cincinnati is correlated with the share of black population and agricultural output, thus I will control for these variables in the IV section. All columns contain constant and state fixed effects. Robust clustered by state standard errors in parentheses. *** p $p < 0.01$, ** p $p < 0.05$, * p $p < 0.1$

Table 10: Convict Labor and Incarceration in 1930

	I	II	III	IV	V	VI
	Dependent variable: Incarceration (1930)					
Convict labor (1886)	54.13***					
	(15.38)					
Convict labor (1895)		84.25***				
		(25.28)				
Convict labor (1905)			43.26***			
			(10.37)			
Convict labor (1915)				83.07***		
				(21.13)		
Convict labor (1923)					94.78***	
					(19.49)	
Convict labor (1932)						35.71***
						(7.474)
R-squared	0.27	0.32	0.25	0.28	0.36	0.26
Observations	2,228	2,228	2,228	2,228	2,228	2,228

All columns contain constant and state fixed effects. The following variables are used as controls: ln of total population (1880), urban share (1880), share of Black (1870, and 1880), share of women (1880), share of foreign-born (1880). Robust clustered by state standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11: Effect of Convict Labor om Incarceration Rates in 1930

	I	II	III	IV	V	VI
	Dependant Variable: Incarceration Rate (1930)					
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Convict labor (continuous)	129.8***	86.37*				
(weighted by industry & distance)	(31.39)	(48.22)				
Convict labor (continuous)			20.17	75.40*		
(weighted by distance)			(29.94)	(44.62)		
Convict labor (discrete)					55.71***	67.28
(nonweighted)					(15.93)	(42.42)
R-squared	0.18	0.18	0.13	0.13	0.26	0.25
Kleibergen-Paap F stat		12.31		17.20		6.93
Partial R-squared		0.031		0.112		0.004
Instrument's coefficient		-0.00102***		-0.00108***		-0.00142***
		(0.000289)		(0.000271)		(0.000517)
Observations	2,228	2,228	2,228	2,228	2,228	2,228

All columns contain constant and state fixed effects. The following variables are used as controls: ln of total population (1880), urban share (1880), share of Black (1870, and 1880), share of women (1880), share of foreign-born (1880). Robust clustered by state standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 12: Convict Labor and Black Incarceration Rates (1930)

Dependent variable:	I	II	III	IV
		Black incarceration rates (1930)		
	OLS	Reduced form	First stage	Second stage
St.dev. explanatory variable	19	713	713	19
Log of value of goods	23.4			88.43**
produced (1886)	(22.4)			(38.3)
Distance to Cincinnati, km		-2.005*	-0.023***	
		(1.11)	(0.005)	
Partial R^2			0.12	
F stat of excluded instrument			23.32	
Prob > F			0.00	
Anderson-Rubin p-value			0.05	
Observations	2,175	2,175	2,175	2,175
adjR^2	0.032	0.033	0.882	0.03

All columns contain constant, state fixed effects, geographic controls (latitude and longitude, dummies for coastal counties), 1880 and 1870 socio-economic controls (ln of total population, urban share, share of Black, share of women, share of foreign-born). Robust clustered by state standard errors in parentheses. 41 cluster. *** p<0.01, ** p<0.05, * p<0.1

Table 13: Convict Labor and Incarceration Rates by Races (1930)

Dependent variable:	I	II	III	IV	V	VI	VII	VIII
				Incarceration rates (1930)				
	Non-white	Non-white & non-black	White foreign-born	White	Non-white	Non-white & non-black	White foreign-born	White
	OLS	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS
St.dev. explanatory variable	19	19	19	19	19	19	19	19
Log of value of goods	23.110	77.077	26.986	5.359	112.7*	397.4	27.78	15.12**
produced (1886)	(21.226)	(67.661)	(18.684)	(3.679)	(61.52)	(306.7)	(17.64)	(6.249)
Partial R^2					0.12	0.06	0.12	0.12
F stat of excluded instrument					23.32	7.75	23.32	23.32
Prob > F					0.00	0.01	0.00	0.00
Anderson-Rubin p-value					0.02	0.03	0.01	0.00
Observations	2,175	2,175	2,175	2,175	2,175	2,175	2,175	2,175
adjR^2	0.020	0.032	0.034	0.045	0.01	0.01	0.03	0.04

All columns contain constant, state fixed effects, geographic controls (latitude and longitude, dummies for coastal counties), 1880 and 1870 socio-economic controls (ln of total population, urban share, share of Black, share of women, share of foreign-born). Robust clustered by state standard errors in parentheses. 41 cluster. *** p<0.01, ** p<0.05, * p<0.1

Table 14: National Prison Association Congress Delegates: Reduced Form

Outcome:	I	II	III	IV
	Incarceration Rate (1920)	Incarceration Rate (1930)	Incarceration Rate (1920)	Incarceration Rate (1930)
Distance to Cincinnati, OH (1000 km)	-80.34*** (25.85)	-103.7* (53.19)		
Delegate at NPA			232.7*** (78.18)	288.9* (161.6)
R squared	0.01	0.09	0.18	0.18
Observations	3,109	3,108	1,373	1,373

All columns contain constant. Robust clustered by state standard errors in parentheses. *** p $p < 0.01$, ** p $p < 0.05$, * p $p < 0.1$

Table 15: Convict labor and incarceration: Sub-sample analysis

	I	II	III	IV	V	VI	VII	VIII
	Dependent Variable: Incarceration Rate (1920)							
	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Convict Labor (Continuous) (nonweighted)	47.91* (25.95)	74.19*** (27.83)	63.60** (30.82)	89.44* (49.58)	36.06*** (12.07)	8.749 (30.01)	54.40** (23.16)	39.04 (34.88)
Kleibergen-Paap F-stat	-	16.0	5.4	4.2	8.6	5.5	7.428	4.9
Sample	Full Sample	Full Sample	w/o North-East	w/o Mid-West	w/o Great Plains & Far West	w/o South	w/o South non-CSA	w/o ex-CSA
Observations	2,185	2,185	1,946	1,503	1,800	1,306	2,017	1,339

All columns contain constant. Robust clustered by state standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 16: Testing for SUTVA

Outcome:	I	II	III	IV	V	VI	VII	VIII
	Incarceration Rate (1920)		Incarceration Rate (1930)		Incarceration Rate (1920)		Incarceration Rate (1930)	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Convict labor	44.65***	74.47*	73.91***	123.1*	15.35**	109.1	27.17*	176.6
	(10.21)	(40.99)	(24.39)	(76.80)	(7.002)	(116.6)	(14.10)	(204.5)
R-squared	0.35	0.24	0.31	0.24	0.17	-1.95	0.23	-1.24
Partial R-squared		0.003		0.003		0.001		0.001
Kleibergen-Paap F stat		6.082		6.082		0.780		0.780
Prob > F		0.022		0.022		0.389		0.389
Anderson-Rubin p-value		0.049		0.0504		0.0169		0.0991
Sample	25 states with deligates at NPA				States without deligates at NPA			
Instrument's coefficient		-0.00132**		-0.00132**		-0.00139**		-0.00139**
		(0.000536)		(0.000536)		(0.000571)		(0.000571)
Observations	1,362	1,362	1,362	1,362	833	833	833	833

All columns contain constant. Robust clustered by state standard errors in parentheses. *** p < 0.01, ** p p < 0.05, * p p < 0.1