The Political Economy of Incarceration in the U.S. South, 1910–1925: Evidence from a Shock to Tenancy and Sharecropping

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Abstract

A large theoretical literature in sociology connects increases in incarceration to contractions in the demand for labor. But previous research on how the labor market affects incarceration is often functionalist and seldom causal. We estimate the effect of a shock to the southern agricultural labor market during a time when planters exerted a clear influence over whether defendants were incarcerated. From 1915 to 1920, a beetle called the boll weevil spread across the state of Georgia, causing cotton yields and the share of farms worked by sharecroppers and tenant farmers to fall. Using archival records of incarceration in Georgia, we find that the boll weevil infestation increased the black prison admission rate for property crimes by more than a third. The infestation’s effects on whites and on prison admissions for homicide were much smaller and not statistically significant. These results highlight the importance of studying incarceration in relation to agricultural as well as industrial labor markets and in relation to sharecropping and tenant farming as well as slavery.

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At least since Marx, social theorists have proposed that the number of people in prison tends to rise when the demand for labor falls. Marx ([1867] 1990, p. 896) and Engels ([1845] 2005, p. 143) stressed that people expelled from the labor force must find some way to live and that property crime provided one alternative. Frankfurt School theorists Rusche and Kirchheimer ([1939] 2003) took the argument further by claiming that not just crime but punishment as well moved in tandem with the labor market.¹ Scholars inspired by Rusche and Kirchheimer ([1939] 2003) have argued that declining labor demand can increase the incarceration rate even without affecting crime (Chiricos and Delone 1992, p. 421–426; D’Alessio and Stolzenberg 1995, p. 350–352). This argument suggests that employers can influence the rate at which workers, on whom they depend, are imprisoned.

But efforts to understand the relationship between incarceration and the labor market face two challenges—one theoretical and the other empirical. To be theoretically compelling, it is not enough to describe the economic interests of employers; instead, studies of the political economy of punishment need to document precisely how employers influence the criminal justice system (Wright, Levine, and Sober 1992, p. 107–127; Goodman, Page, and Phelps 2017, p. 6). “If it is to be argued that economic imperatives are conveyed into the penal realm,” writes David Garland (1990, p. 109), “then the mechanisms of this indirect influence must be clearly specified and demonstrated.” To be empirically convincing, meanwhile, studies of how the labor market affects crime and incarceration have to avoid the methodological problem that the causal relationship runs in both directions: the labor market both affects and is affected by crime and incarceration (Pfaff 2008, p. 607; Western and Beckett 1999). Typically, this entails finding an exogenous event that transformed the labor market—an event that could not itself have been affected by changes in incarceration.

¹Rusche and Kirchheimer ([1939] 2003) focus primarily on the form rather than the scale of punishment, but subsequent research inspired by the book has focused mainly on the latter. For an important exception, see Melossi and Pavarini (2018).
In this paper, we address both challenges. We study a time and a place—the U.S. South in the early twentieth century—when local planters exerted a clear and well-documented influence over whether defendants were incarcerated. And we examine an event—the boll weevil infestation—that had a drastic effect on sharecropping and tenant farming, the primary forms of work available to black southerners. Our analysis combines historical evidence establishing the mechanisms through which employers affected incarceration with causal evidence consistent with these mechanisms.

Boll weevils are small beetles that feed primarily on cotton. They entered the United States through Texas in 1892 and gradually migrated eastward across the South, reaching Georgia in 1915. As they passed through the South’s Black Belt, they dramatically reduced both cotton yields (Lange, Olmstead, and Rhode 2009) and the share of farms that were worked by sharecroppers and tenant farmers (Bloome, Feigenbaum, and Muller 2017; Ager, Brueckner, and Herz 2017).

The resulting decline in sharecropping and tenant farming had an especially acute effect on black southerners. Slavery left freedpeople with little wealth (Du Bois 1901a; Higgs 1982; Miller 2011). It also gave rise to an ideology that led many whites to view African Americans as a distinct group with interests opposed to their own, and to justify that view with claims that African Americans were “unfit for independence” (Wright 1986, p. 101; Fields 1990, p. 108; Du Bois 1935; Patterson 1982, p. 34; Edwards 1998). On these grounds, whites often violently resisted the sale of land to black southerners (Ransom and Sutch 2001, p. 86–87; Duncan 1986, p. 57). With few resources and with barriers to purchasing the land they could afford, most rural black southerners had little choice but to enter sharecropping or tenant farming—labor arrangements that resulted from the clash between owners and workers over how to organize agricultural work after slavery (Jaynes 1986, p. 188; Wright 1986, p. 94, Lichtenstein 1998, p. 134–135; Tolnay 1999, p. 9; Ruef 2014).

The boll weevil’s effect on the demand for agricultural workers could have increased
incarceration in two ways: by increasing crime or by increasing the likelihood that people convicted of crimes would be imprisoned. For instance, displaced tenants and sharecroppers, with few options for survival, might have turned to property crime as an alternative means of subsistence. If so, the increase in property crime in infested counties could have led to an increase in incarceration.

But the infestation could also have increased incarceration irrespective of changes in crime. Before the boll weevil’s arrival, planters often secured workers by paying their fines or bail. Workers who otherwise would have been imprisoned instead labored in a brutal system of *peonage*, which bound them to the employers who paid their fines (Raper 1936; Daniel 1972; Novak 1978; Blackmon 2008). Some planters served as character witnesses, interfered with prosecutions, or dealt with property crimes informally to keep tenants and sharecroppers on their land (Alston and Ferrie 1999, p. 28–29; Davis, Gardner, and Gardner [1941] 2009; Smith 1982, p. 195; Du Bois 1904, p. 44–48; Raper and Reid 1941, p. 25; Raper 1936, p. 293–294). When the boll weevil infestation reduced planters’ need for agricultural workers, they no longer had an interest in preventing actual or potential laborers from being incarcerated. Thus the infestation might have increased incarceration even if it had no effect on crime.

The arrival of the boll weevil should have had a larger effect on black prison admissions than white prison admissions not only because a disproportionate share of black southerners worked as tenants and sharecroppers. In addition, whites ideologically opposed to African Americans’ economic independence restricted their work options outside of agriculture (Landale and Tolnay 1991, p. 36). Black southerners’ lower average levels of wealth also made it harder for them to pay fines to avoid peonage and incarceration. Historical research suggests that peonage affected African Americans more than whites (Daniel 1972, p. 108) and that crimes committed by African Americans were more likely than crimes committed by whites to be punished by incarceration, particularly when the demand for agricultural workers was low (Du
In the following analysis, we combine sixteen years of archival records on incarceration in the state of Georgia with data on the timing of the boll weevil infestation drawn from a map published by the United States Department of Agriculture. These data enable us to study how the arrival of the boll weevil affected imprisonment within Georgia counties. We find that the infestation increased the black prison admission rate for property crimes by more than a third. The boll weevil’s effect on the white property-crime admission rate, in contrast, was weaker and not statistically significant. Its effect on the rate at which both African Americans and whites were admitted to prison for homicide was statistically insignificant and close to zero.

Next, we use the timing of the boll weevil infestation as an instrumental variable for cotton production. We find that the size of a county’s cotton yield was inversely related to its black property-crime admission rate: as cotton production fell following the infestation, black prison admissions increased. Moreover, the boll weevil’s effect on the black prison admission rate for property crimes was largest in the counties that depended most on cotton cultivation and negligible in counties that grew little cotton.

These results have three implications of general relevance to sociologists. First, the historical evidence we review enables us to specify precisely how employers affected the rate of imprisonment. Scholarship in the political economy of punishment has been criticized for failing to identify the mechanisms through which class interests influence the form and scale of punishment. Our analysis shows how planters were able to hold workers in peonage by paying their fines and bail, thereby lowering the incarceration rate. Despite its clear consequences for the economic fortunes of African Americans and poor whites, this system of forced labor has mostly eluded sociological analysis.

Second, our results add causal evidence to the literature on the political economy of punishment. Previous research in sociology has not used exogenous changes in the demand for labor to study its effect on incarceration. The research in economics that
has used designs like ours, meanwhile, focuses on crime rather than incarceration and on economic shocks that affected a relatively small proportion of workers.

Finally, our analysis suggests that incarceration in the United States should be studied in relation to agricultural as well as industrial labor markets and in relation to sharecropping and tenant farming as well as slavery. Tenancy and sharecropping, which loomed large in the lives of poor, particularly black, southerners from the end of Reconstruction through the mid-twentieth century, deserve more attention from scholars of inequality both past and present. As we discuss below, their collapse, due to the large-scale mechanization of cotton production from 1950 to 1970, may point to an underappreciated cause of the rise in incarceration in the late twentieth century. Studying the boll weevil’s effects on incarceration may give us a better understanding of the consequences of later labor-market shocks like mechanization and deindustrialization.

The Political Economy of Punishment

Our work falls in a tradition of scholarship on the political economy of punishment. This tradition has produced a rich body of sociological and criminological research on how the form and scale of punishment varies with the demand for and supply of labor (Rusche [1933] 1978; Rusche and Kirchheimer [1939] 2003; Jankovic 1977; Greenberg 1977; Braithwaite 1980; Chiricos 1987; Myers and Sabol 1987; Chiricos and Delone 1992; D’Alessio and Stolzenberg 1995; Darity and Myers 2000; D’Alessio and Stolzenberg 2002; Melossi 2003; Sutton 2004; De Giorgi 2013). It has also been criticized on both theoretical and empirical grounds.

Critics of theoretical work on the political economy of punishment have noted its tendency to suggest that punishment’s form or scale can be explained by its beneficial consequences for ruling classes (Garland 1990). Their objection to this argument stems from a more general recognition of the problems with functionalist explanation in the
social sciences. In functionalist explanation, “one cites the beneficial consequences (for someone or something) of a behavioral pattern in order to explain that pattern, while neither showing that the pattern was created with the intention of providing those benefits nor pointing to a feedback loop whereby the consequences might sustain their causes” (Elster 2009, p. 155). Instead of assuming that the incarceration rate in the period we study simply reflected its beneficial consequences for employers, in the following sections we describe the mechanisms through which employers affected incarceration.

Reviews of empirical work on the relationship between unemployment, crime, and incarceration note that its findings are mixed and typically cannot be considered causal (Sampson 2000; Chiricos 1987; Chiricos and Delone 1992; Freeman 2000; Pfaff 2008). One major impediment to estimating the effect of unemployment on crime and incarceration is that crime and incarceration clearly affect unemployment (Pfaff 2008, p. 595; Western and Beckett 1999). This has led scholars in economics to search for sources of variation in unemployment that are not affected by crime or incarceration (Pfaff 2008, p. 607). But economic studies using exogenous changes to unemployment rates have focused on crime rather than incarceration. These studies find that declines in state-level employment rates in the United States at the end of the twentieth century either increased the rate of property crime but not violent crime (Raphael and Winter-Ebmer 2001; Lin 2007) or increased property crime and violent crime alike (Gould, Weinberg, and Mustard 2002). The economic shocks used in this research affected a relatively small proportion of all workers within a state. In contrast, in many of the counties we study, a large share of the labor force worked as tenants and sharecroppers. This means that the proportion of workers affected by the economic shock we study was comparatively larger. In addition, we show that the boll weevil’s effect on incarceration was negligible in those counties that grew little cotton.

\[2\] For an extended discussion of functionalist explanation, including when it might be permitted, see Cohen (1978), Elster (1980), Cohen (1980), and Elster (2007).
Previous research on unemployment, crime, and incarceration has focused on urban and industrial labor markets. Scholars have traced both the rise in crime in the 1960s and 1970s and the origins of mass incarceration to the decline in manufacturing in the Northeast, Midwest, and West (Wilson 1987; Western 2006; Gilmore 2007; Wacquant 2009). These arguments are supported by evidence that class inequality in incarceration increased more than racial inequality in incarceration during the prison boom (Pettit and Western 2004; Wacquant 2010; Forman 2012; Muller 2012), that growing unemployment increased young black men’s likelihood of being imprisoned, and that declining earnings increased the risk of imprisonment for both young black and young white men (Western, Kleykamp, and Rosenfeld 2006).

But the large-scale mechanization of cotton production in the South in the second half of the twentieth century may have been equally consequential (Gottschalk 2015, p. 85). Between 1950 and 1970, the percentage of U.S. cotton harvested by machine increased from five percent to nearly 100 percent (Wright 1986, p. 243). In 1940, 31.7% of young black men in the United States were employed in agriculture; by 1960, that figure had fallen to 6.5% (Fitch and Ruggles 2000, p. 75, 79; see also Mare and Winship 1979 and Cogan 1982). Katz, Stern, and Fader (2005, p. 86) argue that the collapse of agricultural employment “was a more important source of joblessness among black men than the decline in manufacturing opportunities.” In this paper, we study an exogenous change to the southern agricultural labor market that can be considered a rehearsal for the larger changes induced by the mechanization of cotton production from 1950 to 1970: the boll weevil infestation of 1892–1922.

The Boll Weevil and the Agricultural Labor Market

In 1910, African Americans in the state of Georgia worked predominantly as sharecroppers and tenant farmers. More than 45 percent of black Georgians, compared to 26 percent of whites, lived on farms they did not own (Ruggles et al. 2019). Eighty-seven
percent of farms worked by black Georgians were run by tenants and sharecroppers rather than owners or managers (U.S. Department of Commerce and Labor 1913, p. 344). The comparable figure for white Georgians was 50 percent. Black tenants and sharecroppers grew an especially large share of the cotton crop. In 1910, they worked 45 percent of Georgia’s acres devoted to cotton, compared to 32 percent of its acres devoted to corn (U.S. Department of Commerce 1918b, p. 623–624). White tenants and sharecroppers, in contrast, grew 25 percent of both corn and cotton acres in Georgia.

Historical scholarship has documented that when the boll weevil entered a county, planters “reduced their cotton acreage and chose to give up cotton altogether in favor of livestock or food crops. That in turn reduced the demand for black labor, and many field hands, sharecroppers, and tenants found themselves forced off the plantations” (Litwack 1998, p. 177). Subsequent research in economics and sociology has supported these conclusions. Lange et al. (2009) find that cotton yields declined by 50 percent within five years of the weevil’s arrival. Bloome et al. (2017) show that the infestation reduced the share of farms worked by black and white tenants. Ager et al. (2017) report that the weevil caused both tenancy and farm wages to decline.

Previous studies have examined the boll weevil’s effects on education, migration, health, and marriage. Baker (2015) finds that the infestation, by reducing the demand for child labor, increased black children’s rate of school enrollment in Georgia. Baker, Blanchette, and Eriksson (2018) extend this analysis by showing that young children living in infested counties spent more years in school. Fligstein (1981) reports that counties infested by the weevil had higher rates of black outmigration from 1900 to 1920 and higher rates of white outmigration from 1900 to 1930. Clay, Schmick, and Troesken (2019) document that the boll weevil prompted farmers to switch from growing cotton to food crops that were rich in niacin, causing rates of death from pellagra to fall.
Finally, Bloome et al. (2017) find that the infestation decreased the prevalence of marriage among young black southerners. African Americans in the rural South had few employment prospects outside of sharecropping and tenant farming—systems of work that used the patriarchal family to coordinate production (Bloome and Muller 2015; Hill 2006; Mann 1989; Lichtenstein 1998; Tolnay 1999; Jaynes 1986; Wright 1986). Planters’ preference for contracting with married men put pressure on African Americans to marry at young ages so that they could acquire agricultural work. Although the infestation reduced rates of tenancy and sharecropping among both black and white southerners, it caused a larger decline in African Americans’ early marriage rates because relatively more black southerners worked as tenants and sharecroppers.

From Tenancy and Sharecropping to Incarceration

By reducing the extent of sharecropping and tenant farming, the boll weevil infestation caused a temporary decline in the demand for black labor. Theorists writing as early as Marx ([1867] 1990, p. 896) and Engels ([1845] 2005, p. 143) have proposed that people who lose their jobs may turn to crimes of survival to make up for their lost incomes (see also Rusche [1933] 1978, p. 4; Rusche and Kirchheimer [1939] 2003, p. 12, 14, 95–96; Thompson 1963, p. 61; Kelley 1990, p. 161; Chiricos and Delone 1992; Davis 2003; De Giorgi 2013). If so, to the extent that crime and incarceration are correlated, the boll weevil should have increased the rate at which black southerners were incarcerated for property crimes.3

But the infestation should have affected not only the rate at which black southerners committed property crimes: it also should have affected the extent to which crimes

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3In a study with a similar design to ours, but with a different outcome, Bignon, Caroli, and Galbiati (2017) show that the spread of phylloxera, an aphid that destroyed French vineyards in the nineteenth century, increased the rate at which people were accused of property crimes in affected départements.
were punished by incarceration (Rusche and Kirchheimer [1939] 2003, p. 67, 140). Incarceration entails the removal of a person from the formal labor market. From the perspective of workers who view other workers—or other groups of workers—as competitors, such incarceration may appear desirable (Pope 2010, p. 1548). But employers want to exploit—not exclude—workers (Wright 2009). Unless employers can acquire the labor of prisoners, they have an interest in preventing actual or potential workers from being incarcerated (Wright 2019, p. 51).

Because of their need for agricultural workers, local planters often used their influence over judges, sheriffs, and other officials to offer sharecroppers and tenants “protection from the law” (Alston and Ferrie 1999, p. 28–29; Davis et al. [1941] 2009, p. 403, 521; Muller 2018). Some planters punished property crimes themselves—often using violence—without appealing to the formal criminal justice system (Davis et al. [1941] 2009, p. 46, 404, 512; Smith 1982, p. 195). Others served as character witnesses or intervened in prosecutions to prevent accused workers from being sent away to prisons and chain gangs (Du Bois 1904, p. 44–48; Raper and Reid 1941, p. 25; Raper 1936, p. 293–294; Lichtenstein 1993). In a survey W. E. B. Du Bois (1904, p. 47) distributed to African Americans in Georgia, one respondent attributed low rates of black incarceration for petty crime to “the demand of labor in this county and the means employed by the large land owners to secure it.”

Planters also paid tenants’, sharecroppers’, and potential agricultural laborers’ fines or bail, then forced them to work off the debt (Blackmon 2008; Daniel 1972; Novak 1978). This system of peonage was distinct from Georgia’s state convict lease system, which was abolished in 1908 (Blackmon 2008, p. 351–352). Whereas the

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4Research on lynching suggests that declines in the demand for labor may have increased the extent to which white agricultural workers viewed black agricultural workers as competitors (Tolnay and Beck 1995, p. 122–123). If so, white workers may have been more likely to accuse black workers of crimes after the boll weevil infestation. However, unlike in the case of lynching, planters’ ability to intervene in prosecutions and pay fines could override the effect of such accusations by preventing black workers from being incarcerated. Thus, the mechanisms we discuss could preempt this proposed explanation of the boll weevil’s effect on incarceration.
convict lease system “involved a contract between a public authority (usually the board of commissioners of the penitentiary) and a contractor who took whole blocks of workers,” peonage involved a “a private contract” between a convict and an employer “to work out an indebtedness caused by the employer’s payment of the felon’s fine and costs” (Novak 1978, p. 24). Defendants who avoided being imprisoned for failure to pay were bound instead to a private employer, often in harrowing conditions. Courts sometimes offered defendants the option of a prison sentence or a fine “to protect the landlords against the loss of their tenants’ labor, rather than to be lenient with the defendants” (Raper 1936, p. 293). Although there are no systematic estimates of the scale of peonage in the South, historical evidence suggests that the practice was widespread (Blackmon 2008). For instance, when federal agents explained the law prohibiting peonage to Jasper County planter John S. Williams, who was being investigated for violating it, Williams “expressed amazement and declared that ‘I and most all of the farmers in this county must be guilty of peonage’” (Daniel 1972, p. 110).

When the boll weevil interfered with cotton production, local planters no longer needed to keep actual or potential agricultural laborers—now a surplus population—out of prison. Raper (1936, p. 293), who studied two counties in Georgia’s Black Belt, reported that peonage persisted there until the boll weevil infestation:

At times when laborers have been in greatest demand in Green and Macon counties, certain landlords have made it a practice to pay fines and get out on bail, when possible, any defendants who seemed to be desirable workmen. This practice has been virtually abandoned in Greene since 1923, in Macon since 1925. Prior to the weevil depression, in a county adjoining Greene an understanding existed between certain court officials and two or three big planters whereby Negroes lodged in the county jail were bonded out to them; other laborers were obtained by them through the payment of court fines.

\footnote{Historical evidence suggests that many people trapped in peonage had committed no crime (Daniel 1972; Blackmon 2008). Our results are relevant to those defendants who would have been imprisoned if not for planters’ efforts to acquire their labor.}
The boll weevil infestation reduced the likelihood that planters would attempt to secure the labor of workers who otherwise would have been imprisoned. Thus, it should have increased the black prison admission rate even if it had no effect on crime.

There were other reasons why declines in tenancy and sharecropping should have had a larger effect on the incarceration of black Georgians than white Georgians. Even if the boll weevil infestation increased black and white Georgians’ involvement in crime equally, crime among black Georgians was more likely to be punished by incarceration, especially when labor demand was low (Du Bois 1901b, 1904; Ayers 1984; Muller 2018). Moreover, although “no thorough investigation of peonage ever revealed even an approximate estimate of black peons,” historical scholarship suggests that African Americans “bore the major burden of Southern peonage” (Daniel 1972, p. 108; Huq 2001). Finally, owing to the economic and ideological consequences of slavery, African Americans had fewer resources to pay fines and fewer work options outside of agriculture.

Because we cannot observe property crime directly, we cannot distinguish between the boll weevil’s effects on crime and its effects on planters’ efforts to acquire the labor of defendants. Our estimates almost certainly reflect a combination of these two ways the infestation could have increased incarceration. However, two additional analyses can inform our judgment about whether the increase in prison admissions primarily reflected an increase in crime.

First, the crime of homicide was not punishable by a fine (Hopkins 1911, p. 14–15). Unless judges departed from this rule, if we observe that the boll weevil increased prison admissions for homicide, this would suggest that a nontrivial portion of its effect was attributable to an increase in crime. If instead we do not observe that the infestation increased prison admissions for homicide, this could mean either that the increase in admissions was partially driven by the decline in peonage (because only crimes punishable by a fine were affected) or that homicide, unlike property crime,
was unaffected by changes in the labor market. As discussed above, there is mixed evidence about whether only property crime—and not violent crime—is affected by declines in the demand for labor (Raphael and Winter-Ebmer 2001; Lin 2007; Gould et al. 2002).

Second, the boll weevil’s effect on peonage should have been concentrated in counties that relied heavily on cotton production before the boll weevil arrived. In contrast, its effect on crime may not have been limited to those counties because workers displaced from counties that grew a large share of cotton could have moved to nearby urban counties where there was little cotton cultivation and more opportunity for property crime. Observing that the infestation’s effect was smaller in counties that grew little cotton would be more consistent with the argument that its effect on incarceration was driven by a decline in peonage than the argument that it was driven by an increase in crime.

Although it is important to distinguish between the boll weevil’s effect on crime and its effect on planters’ use of peonage, the difference between the two mechanisms is one of degree rather than kind. Both highlight the role of force in the labor market: one type of worker was compelled to labor in exchange for the payment of their bail or fines; other types were compelled to labor by the threat of starvation (Gourevitch 2015, p. 81; Zatz 2016, p. 951). Both refusing peonage and preferring “stealing to starvation” (Engels [1845] 2005, p. 143) could result in imprisonment. By both reducing planters’ interest in peonage and by reducing workers’ options for survival, the infestation increased the likelihood that affected workers would be imprisoned.

**Data and Methods**

To study the effect of the boll weevil infestation on prison admissions for property crime, we gather data from several historical sources. Data on imprisonment come from the *Central Register of Convicts, 1817–1976*, housed at the Georgia Archives in
Morrow, Georgia. These data consist of a series of handwritten ledgers listing every person imprisoned for a felony in the state, along with their offense, their county of conviction, their racial classification, and the date they were received. Data on prisoners’ counties of conviction are especially important because they enable us to study the effect of changes in the labor market in the counties where prisoners were convicted rather than the counties where they were incarcerated. Most data on incarceration, including census data, count prisoners where they are confined rather than where they were convicted (Lotke and Wagner 2004). We focus on the years 1910–1925 so that we can study imprisonment several years before the weevil infested the first county in Georgia and several years after it infested the last county.

We use ten volumes of the *Central Register of Convicts.* These volumes often cover overlapping time periods. To ensure that a single admission is not counted more than once in separate volumes, we identify duplicate records by matching each record on prisoners’ name, offense, county of conviction, and admission date. We split prisoners’ names into first, middle, and last, then discard middle names and any prefixes or suffixes. We sort crime descriptions into 40 distinct crimes and correct misspelled county names. We then use approximate string matching to match admission records by first name, last name, crime, and county. We consider admission dates to match if they are within 30 days of one another. Matching records in this way enables us to identify and discard 682 duplicate admission records.

In the remaining sample, 13 prisoners have a racial classification other than black.

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7 We manually examined the quality of our matches using different thresholds to classify a Jaro-Winkler distance score as a match. A threshold of 0.44 provided the best balance between false positives and false negatives, but any threshold between 0.3 and 0.5 produced results that differed by only a small number of matches. For a formal definition of the Jaro-Winkler distance score, see van der Loo (2014).
or white. Because our analyses focus on black and white admissions, we drop these prisoners. We also exclude 83 prisoners (0.6%) with missing racial classification data, 16 prisoners (0.1%) with missing offense data, and 64 prisoners (0.4%) with missing county of conviction data. This leaves 13,776 unique records of prison admissions.

We divide crimes into three categories: property crimes, homicide, and other crimes. Property crimes (54% of the sample) include all forms of burglary, larceny, robbery, and other forms of theft, such as forgery and embezzlement. Homicides (36% of the sample) include murder, attempted murder, assault to murder, and manslaughter. Other crimes include all offenses that do not fit into the first two categories. The most common were rape, shooting, arson, and bigamy. Other crimes make up only about 10% of the sample.

Data on the timing of the boll weevil infestation come from a map published by the U.S. Department of Agriculture (Hunter and Coad 1923, p. 3). The map charts the boll weevil’s path as it migrated northward and eastward across the South, using lines to indicate its farthest extent in a given year. This enables us to assign a year of infestation to each county. With information on the year each county was infested, we can compare the prison admission rate in the years before and after the infestation.

We adopt the same coding scheme as Baker (2015), who uses annual data to study the boll weevil’s effect on children’s school enrollment in Georgia. In nine counties, the boll weevil first arrived in 1916 but retreated in 1917 due to harsh weather conditions without causing significant damage. We follow Baker in assigning these counties the year the boll weevil reentered rather than the year it first arrived (see p. 2 of the online Appendix A of Baker 2015). The boll weevil migrated across Georgia from 1915 to 1920. Figure 1 depicts the year each county was infested, using 1920 county borders from Manson et al. (2018).

[Figure 1 about here.]

The boll weevil migrated late in the growing season and thus primarily affected the
following season’s harvest. Consequently, like Baker (2015), we study the boll weevil’s effect starting in the year after its arrival. The boll weevil indicator we create equals 1 in the year after the infestation and every year thereafter. To check for the presence of pre-treatment trends, we also estimate event-study models that add all leads and lags for five years before and after the treatment.\(^8\)

Because the boll weevil was attracted primarily to rural counties, which typically had lower incarceration rates than urban counties (Muller 2018), we adjust all of our estimates for the population density of each county.\(^9\) Data on the area and population of Georgia counties in the 1910, 1920, and 1930 censuses are available in Haines and ICPSR (2010). We divide the total population of each county by its land area and linearly interpolate population density in the intercensal years.

Between 1910 and 1925, 15 new counties were created in Georgia. To ensure that we study units that are consistent over time, we create “super-counties” that include the new counties and the counties out of which they were carved.\(^{10}\) This reduces our sample from 161 counties to a combination of 131 counties and super-counties. For simplicity, in what follows we refer to both counties and super-counties as counties. We assign the 13,776 unique prison admissions from the *Central Register of Convicts* to county–years. After excluding seven county–years with zero black residents, our primary sample includes \(N = 2,089\) county–year observations.

Our primary outcome \(y_{it}\) measures the number of annual prison admissions in each Georgia county, where \(i\) indexes counties and \(t\) indexes years. This is a count variable, and it is overdispersed with a large number of zeros, so our main analyses

\(^8\)In separate sensitivity analyses, we treat counties as if they had been infested one to four years before they actually were infested. As expected, we find no evidence of a treatment effect in these pre-treatment years (Heckman and Hotz 1989).

\(^9\)Our results are unchanged if we control instead for the proportion of the county population living in an urban area.

\(^{10}\)Specifically, we created eight super-counties out of the following 38 counties: (1) Bleckley and Pulaski; (2) Bulloch, Candler, Emanuel, Evans, Montgomery, Tattnall, Treutlen, and Wheeler; (3) Appling, Atkinson, Bacon, Berrien, Brantley, Charlton, Clinch, Coffee, Cook, Lanier, Lowndes, Pierce, Ware, and Wayne; (4) Barrow, Gwinnett, Jackson, and Walton; (5) Lamar, Monroe, and Pike; (6) Liberty and Long; (7) Decatur and Seminole; and (8) Houston, Macon, and Peach.
use negative-binomial regression to model the conditional mean ($\mu_{it}$) of the outcome $y_{it}$, taking the form

\[
y_{it} \sim \text{Negative binomial}(\mu_{it}, \theta)
\]

\[
\mu_{it} = N_{it} \times \exp(\beta_1 BW_{i,t+1} + \beta_2 PD_{it} + \gamma_i + \delta_t),
\]

where $BW_{i,t+1}$ represents the lagged presence of the boll weevil in a county and $PD_{it}$ represents population density.\(^{11}\) $\theta$ is an overdispersion parameter. $\gamma_i$ and $\delta_t$ are county and year fixed effects. $N_{it}$, the county population, acts as an “exposure” term that accounts for the fact that larger counties will typically have higher counts of prison admissions. Because we examine the effect of the infestation on black and white Georgians separately, when $y_{it}$ is the black prison admission rate, $N_{it}$ is the black population, and when when $y_{it}$ is the white prison admission rate, $N_{it}$ is the white population. Dividing both sides of Equation (2) by $N_{it}$ shows that this is equivalent to modeling the prison admission rate ($\mu_{it}/N_{it}$) for each group in a given county–year.

Our key parameter of interest is $\beta_1$, the regression coefficient on the arrival of the boll weevil. Because there was little farmers could do to prevent the boll weevil from overtaking their land, $\beta_1$ should represent the causal effect of the infestation on the prison admission rate (Lange et al. 2009, p. 689). Because the conditional mean, $\mu_{it}$, is exponentiated in Equation (2), we can interpret $\beta_1$ and the other regression coefficients in the same way as we would in a linear model with a log outcome. County fixed effects control for all stable characteristics of counties. $\beta_1$ thus captures the within-county effects of the boll weevil: each county, in the years before the boll weevil arrived, acts as its own control case to compare with the years after the boll weevil arrived. Including county and year fixed effects makes the interpretation of $\beta_1$ equivalent to

\(^{11}\)Below we introduce data on cotton production in each county. We do not control for cotton production in this model because it is a post-treatment mediator of the effect of the boll weevil on prison admissions.
a differences-in-differences estimate of the causal effect of the boll weevil infestation. Once a county is infested by the boll weevil, it remains in a treated state for all future time periods, which means that the treatment effect is the within-county average admission rate in the treated years minus the average rate in the pre-treatment years.

In studies where people choose whether to receive a treatment, individual fixed effects can fail to control for key confounders, because the circumstances that caused a person to select into a treatment at a particular time often affect their outcomes as well. This is not true of the boll weevil infestation, because counties had no way to avoid it. This fact greatly reduces the likelihood that there are time-varying confounders not captured by county fixed effects. Year fixed effects control for time-varying confounders that affected all counties at the same time, such as the United States’ entry into World War I or changes in state laws.

Previous research has shown that both black and white outmigration rates were higher in counties hit by the boll weevil in the 1910–1920 decade (Fligstein 1981). We cannot study migration directly because it can only be measured over decades using census data. Because our study uses annual variation in the boll weevil infestation and in prison admissions, any cross-sectional differences in migration across counties within a decade will be absorbed by the fixed effects. But if annual changes in migration affect our results, they will bias the effect towards zero, against finding a result: tenants and sharecroppers who moved away in response to the boll weevil infestation should have reduced the infestation’s effect on the prison admission rate by shrinking the excess supply of labor. Our results thus represent a conservative estimate of the effect of the infestation.

In some generalized linear models such as logistic regression, fixed-effects estimates can be inconsistent because of the incidental-parameters problem: the number of fixed effects that must be estimated grows as the sample size increases, so their estimates do not converge to the true parameter values. Fortunately, this is not true.
of Poisson or negative-binomial regression models (Allison and Waterman 2002, p. 249). However, the standard confidence intervals in fixed-effects negative-binomial regressions can be too small. To correct this, we use the nonparametric bootstrap to compute our confidence intervals, clustering on counties. Allison and Waterman (2002) offer a corrected version of standard errors for fixed-effects negative-binomial regressions, and in practice their correction produces smaller confidence intervals than the bootstrap. Our results are substantively identical if we use their corrected standard errors, but because our bootstrapped confidence intervals are wider, they provide a more stringent test of our claims. For the instrumental-variables estimates discussed below, the sampling distributions of our estimated coefficients are skewed, so for all models we use Efron’s (1987) bias-corrected and accelerated (BC$_a$) bootstrap confidence intervals, which produce intervals with correct coverage for skewed and other non-normal sampling distributions.

Next, we use the timing of the boll weevil infestation as an instrumental variable for changes in the agricultural labor market. Unlike Bloome et al. (2017), we cannot study the effect of tenancy and sharecropping directly because agricultural census data on tenancy and sharecropping are available only in ten-year intervals. However, we can estimate the effect of cotton production on incarceration. Like Lange et al. (2009) and Baker (2015), who show that the infestation markedly reduced cotton production, we use data on the number of bales of cotton ginned, available in annual U.S. Department of Commerce (1911, 1916, 1917, 1918a, 1919, 1920, 1921, 1923, 1924, 1927) Reports. Using state-level time-series data on incarceration in Georgia from 1868 to 1936, Myers (1991) shows that the incarceration rate of both black and white men increased when the price of cotton fell.

Because we use negative-binomial regression to model our outcome, standard two-stage least-squares approaches are not appropriate for estimating instrumental-variables models. Instead, we use a control-function approach (Cameron and Trivedi
The first stage is a linear regression of the treatment—the log of the number of cotton bales ginned—on the instrument—the arrival of the boll weevil—controlling for population density and county and year fixed effects. We then use the residuals from this first-stage regression as controls in the second-stage regression, which takes a form identical to Equations (1)–(2), with the cotton-production treatment taking the place of the boll weevil treatment. The first-stage residuals represent the variation in cotton production that is not explained by the arrival of the boll weevil and controls—in other words, the remaining endogeneity in cotton production. Including these residuals in the second stage controls for this endogeneity. The estimated residuals are referred to as the control function.

Because our estimation procedure has two stages, the standard errors reported for the second-stage negative-binomial regression do not account for the estimation uncertainty in the first-stage regression. To properly estimate the uncertainty from both stages, we use the BC$_\alpha$ bootstrap to produce appropriate confidence intervals, as described above.\footnote{Because the nonparametric bootstrap resamples counties from the observed data, a handful of bootstrap samples exhibit no correlation between the instrument and the treatment, which produces extreme values in the second-stage regressions because of the weak-instrument problem. This creates a heavy-tailed sampling distribution, which is why we report BC$_\alpha$ bootstrap confidence intervals, which are robust to non-normality. As shown in column (2) of Table 1, in the observed data, the arrival of the boll weevil is a strong instrument for cotton production; it is only in a small number of bootstrapped samples where this issue appears.}

The boll weevil infestation should have had a limited effect in counties where there was little cotton cultivation. To check this, in some regressions we interact the boll weevil indicator with each county’s share of improved acres devoted to growing cotton in 1909. We choose 1909, the year before our other time series begin, because we want to ensure that our measure of cotton cultivation is unaffected by the boll weevil or by later prison admission rates. Data on cotton cultivation come from the 1910 Census of Agriculture (U.S. Department of Commerce and Labor 1913), the last agricultural census before the infestation began in Georgia. Haines and ICPSR (2010)
have digitized these data and made them available for public use. In this model, we are interested in the marginal effect of the boll weevil on prison admissions at different levels of cotton cultivation (Brambor, Clark, and Golder 2006). We expect the effect of the infestation on imprisonment to be larger in counties that relied more heavily on cotton cultivation. We test the linearity of the interaction using the binned estimator of Hainmueller, Mummolo, and Xu (2019).

Results

The boll weevil infestation sharply increased the rate at which African Americans were admitted to prison for property crimes. We report our estimate of the infestation’s effect in Figure 2. The leftmost point estimate (0.31) implies that the boll weevil increased the black prison admission rate for property crime by 36 percent $(100 \times \exp(\beta_1) - 1)$.

![Figure 2 about here.](#)

The boll weevil’s effect on the black admission rate for homicide, in contrast, was nearly zero ($-0.02$) and its confidence interval is compatible with a range of positive and negative values. This could mean that the decline in sharecropping and tenant farming increased property crime but not violent crime or that the boll weevil reduced the practice of peonage and thus only increased prison admissions for those crimes that could be punished by a fine. The weak effect of the boll weevil infestation on prison admissions for homicide is thus consistent with the idea that some portion of its effect on imprisonment for property crime was due to changes in planters’ efforts to acquire defendants’ labor.

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13Data on cotton production are missing in 182 county–years. In addition, cotton production is zero in 14 county–years. Because our models focus on the natural logarithm of cotton production, we drop these observations, although all results are robust to alternative log transformations. The resulting sample size for models including data on cotton production is $N = 1893$. 

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Figure 2 also shows that the infestation’s effect on the white prison admission rate for property crime was much smaller and less precisely estimated than its effect on the black admission rate for property crime, although the difference between the estimates for white and black property crime admissions is not significant. The imprecision of the estimates for whites is attributable to the fact that, although there were many white tenants and sharecroppers, there were many fewer white than black prisoners. Like its effect on the black prison admission rate for homicide, the infestation’s effect on the white prison admission rate for homicide was nearly zero and not statistically significant.

Using decennial data covering most of the U.S. South, Bloome et al. (2017) show that the boll weevil reduced both the share of farms worked by black tenants and sharecroppers and the share of farms worked by white tenants and sharecroppers. However, because relatively fewer white than black southerners were employed as tenants and sharecroppers, the infestation had a smaller effect on their rate of marriage at young ages. The same appears to be true of incarceration. In addition, African Americans were more likely than whites to be punished by incarceration, particularly when labor demand was low, and more likely to become entangled in systems of peonage (Du Bois 1901b; Du Bois 1904; Ayers 1984; Muller 2018; Daniel 1972, p. 108). Their resources for paying fines and employment prospects outside of agriculture were also more limited than those of whites.

In column 1 of Table 1 we show that the number of cotton bales ginned—our measure of cotton production—was inversely related to the black prison admission rate for property crimes. As the size of the cotton harvest fell, the black admission rate rose. A 10% decrease in cotton production increased the rate at which African Americans were admitted to prison for property crimes by 1.4%.

\[^{14}\text{Because cotton production is in log form, and because the conditional mean of a negative-binomial regression is exponentiated, the coefficient (−0.14) is an elasticity as in a log-log regression: } -10\% \times -0.14 = 1.4\%.\]
In columns 2 and 3, we report the effect of cotton production instrumented by the boll weevil. Both the coefficient and the first-stage F-statistic in column 2 show that the infestation drastically reduced cotton yields. The instrumental variable estimate shown in column 3 remains positive and statistically significant and is much larger than the baseline negative-binomial estimate shown in column 1. This could be because the number of cotton bales ginned is an imperfect measure of changes in the agricultural labor market. It is also possible that counties with high crime or incarceration rates produced less cotton (Bignon et al. 2017).

A key assumption of differences-in-differences models is the parallel-trends assumption: in the absence of the boll weevil infestation, changes in prison admissions in infested counties would have been the same as changes in prison admissions in not-yet-infested counties. For each county, we have at least five years of pre-treatment data, so we can check the plausibility of this assumption by examining whether counties show any pre-treatment time trends. To do this, we fit a single event-study model that adds dummy variables capturing leads and lags for four years before the infestation and four years after as well as two binned dummy variables that capture observations five or more years before and five or more years after the infestation. The indicator for the year of infestation is left out as the reference year. We plot estimates from this model in Figure 3. Whereas the estimates shown in Figure 2 represent the within-county average admission rate in all the treated years minus the average rate in all the pre-treatment years, the estimates in Figure 3 are dynamic treatment effects representing the average admission rate in the five years before the infestation minus the five years after. Following common practice, in the event-study model we drop county-years that are more than five years before or after treatment so that the periods are balanced. The results are substantively (and nearly numerically) identical if we use the full sample. The same is true for all of our main results: If we restrict the sample of counties in this way, the treatment effect is slightly larger. We report the smaller, more conservative estimates.
within-county change in the admission rate for each particular year relative to the year of infestation. We find no evidence of pre-treatment differences across counties. The coefficients for the pre-treatment (lead) indicators are negative, close to zero, and not statistically significant. This strengthens our confidence that the causal effect of the boll weevil infestation is not confounded by unmeasured differences between counties in the timing of the boll weevil’s arrival.16

As discussed above, the infestation’s effect should have been larger in counties that relied more heavily on cotton cultivation before the infestation began. In Figure 4, we plot the marginal effect of the boll weevil infestation on the black prison admission rate for property crime as a function of counties’ share of improved acres devoted to cotton cultivation in 1909. We observe that the infestation had a larger effect in counties that grew a relatively large share of cotton in 1909, whereas its effect in counties that grew little cotton was close to zero. If the main effect of the infestation had been to increase crime, we might have expected it to vary less with counties’ dependence on cotton because displaced workers could have moved to nearby urban counties where there was little cotton cultivation and more opportunity for property crime. Figure 4 also shows the conditional marginal effects for each tercile of cotton production—low, medium, and high. This provides a test of whether the interaction effect is linear, as our model assumes (Hainmueller et al. 2019). All three conditional marginal effects lie close to the line representing the linear marginal-effect estimate, indicating that the linearity assumption is reasonable. If anything, our linear interaction model underestimates the effects of the boll weevil in counties in the medium and high terciles of cotton production.

16 We use the event study solely to check for pre-treatment time trends. Our sample of counties is too small to power a fully dynamic model of year-by-year treatment effects, which is why we focus on the average treatment effect over the post-treatment period (i.e., the differences-in-differences estimate) rather than patterns in the noisy year-to-year estimates.
Conclusion

In the U.S. South in the early twentieth century, planters depended on the labor of tenants and sharecroppers to produce cotton. When the boll weevil interfered with cotton cultivation, their demand for these workers markedly declined. Tenants and sharecroppers rendered economically redundant may have resorted to theft to survive. Planters who had previously interfered with prosecutions or paid workers’ fines or bail to secure their labor no longer needed to do so.

The boll weevil infestation was most consequential for black southerners not only because they were more likely than white southerners to work as tenants and sharecroppers. In addition, the economic and ideological effects of slavery left them with few resources for paying fines and few work options outside of agriculture. They were also more likely than whites to be punished by incarceration after the infestation and held in a system of peonage before it.

We find that the boll weevil infestation increased the rate at which black Georgians were admitted to prison for property crimes by more than a third. The infestation’s effect on whites’ prison admission rate for property crimes was smaller and less precisely estimated. Its effect on both African Americans’ and whites’ rate of admission for homicide was near zero and not statistically significant.

Previous research has shown that the boll weevil destroyed a large portion of the cotton crop (Lange et al. 2009; Baker 2015). We find that this decline in cotton yields was inversely related to the black prison admission rate for property crimes. When the number of cotton bales ginned in a county fell, the black admission rate increased. Moreover, the infestation had the largest effect on black prison admissions in the counties that grew the most cotton and a negligible effect in the counties that grew the least. Although we cannot distinguish the boll weevil’s effect on crime from its effect on peonage, we find no evidence inconsistent with the latter effect.
The literature on the political economy of punishment is vast, but few studies have been able to identify and measure large-scale changes in the labor market and relate them to local changes in incarceration. With an exogenous shock to one of the primary forms of employment in the U.S. South in the early twentieth century, we are able to estimate the causal effect of changes in the demand for workers on the rate of imprisonment. Moreover, our historical analysis enables us to specify precisely how employers, through a system of forced labor that has received little attention from sociologists, influenced the prison admission rate. Because there are no systematic records of the practice of peonage in the South, studying how imprisonment changed when the demand for agricultural workers declined may be one of the only ways to gauge its extent. Even if changes in peonage accounted for only a small portion of the increase in imprisonment that we document, this would provide further evidence both that the practice was extensive and that it was a substitute for incarceration (Muller 2018, p. 372).

Our results demonstrate the relevance of transformations in the economy to changes in incarceration in the U.S. South in the early twentieth century. How well they generalize to other regions and periods is another matter. The credibility of future research on the political economy of punishment will depend on how persuasively it can document how particular classes or class interests affect the inner workings of the criminal justice system. In the time and place we studied, the connection between class interests and incarceration was unusually direct. In more recent years, it may be subtler (Greenberg 1977, p. 650). For instance, Ash, Chen, and Naidu (2019) find that attending a Law and Economics training program funded by business and conservative foundations led federal judges to sentence defendants to prison more often and for longer terms. The work of Raphael and Winter-Ebmer (2001), Lin (2007), and Gould et al. (2002) suggests that some of the effect of unemployment on imprisonment in the last three decades of the twentieth century may be due to its effect on crime. The
relationship between incarceration, crime, and the labor market, moreover, should be weaker in times when economic elites have less influence over the criminal justice system (Muller 2012) and in places with stronger unions and welfare states (Platt 1982; Sutton 2004, p. 171; Lacey 2008, p. 50; Fishback, Johnson, and Kantor 2010). Where unemployment does not entail economic ruin, declines in labor demand need not lead to increases in incarceration.

Studying the political economy of incarceration in the early-twentieth-century U.S. South highlights the centrality of sharecropping and tenant farming to the lives of African Americans and poor whites. At the beginning of the twentieth century, nearly half of black men and more than thirty percent of white men aged 22–27 worked in agriculture (Fitch and Ruggles 2000, p. 80). More than seventy percent of farms worked by African Americans and nearly thirty percent of farms worked by whites were operated by tenants or sharecroppers (Carter, Gartner, Haines, Olmstead, Sutch, and Wright 2006, p. 4-71). Although the absolute number of farms worked by both black and white tenants and sharecroppers peaked in the 1920s and 1930s, it remained high through midcentury. Given the dominance of these institutions in the lives of African Americans and poor whites for much of the twentieth century, they merit more attention from sociologists.

The boll weevil infestation prefigured a much larger collapse in tenancy and sharecropping induced by the large-scale mechanization of cotton cultivation from 1950 to 1970 (Wright 1986, p. 241–249). Although mechanization had begun earlier in some parts of the South, “with the successful breakthrough in mechanical cotton harvesting, the character of the labor market radically changed in the 1950s from ‘shortage’ to ‘surplus’” (Wright 1986, p. 243). Katz et al. (2005, p. 82) note that the resulting decline in black men’s labor force participation “coincided with a stunning rise in their rates of incarceration” (see also Myers and Sabol 1987 and Harding and
Winship 2016). Consistent with this observation, the uptick in incarceration in the late twentieth century began earlier in cotton-producing states than elsewhere in the United States, as shown in Figure 5. Future research should study the relationship between agricultural mechanization and mass incarceration in closer detail.
References


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Figure 1: The boll weevil infestation in Georgia, 1915–1920. The map depicts Georgia counties, using 1920 borders from Manson et al. (2018). Darker shades indicate later infestation years. Data on the timing of the infestation come from Hunter and Coad (1923, p. 3).
Figure 2: The effect of the boll weevil infestation on prison admissions in Georgia. Dots represent point estimates from negative-binomial regressions, controlling for population density and county and year fixed effects. Bars represent 95% BC$_a$ bootstrap confidence intervals, clustered by county. The estimates depict the within-county average admission rate in all the treated years minus the average rate in all the pre-treatment years. The boll weevil infestation increased the black prison admission rate for property crime by more than a third. Its effect on the white prison admission rate for property crime was smaller and less precisely estimated because comparatively few whites were imprisoned. The infestation’s effect on both the black and the white prison admission rate for homicide was nearly zero and not statistically significant.
Figure 3: The effect of the boll weevil infestation on black property-crime admissions one-to-four years before and one-to-four years after the year of infestation. These estimates represent the average within-county change in the admission rate for each particular year relative to the year of infestation. They provide a check for the presence of pre-treatment trends. All estimates come from an event-study model that includes all lags and leads simultaneously. The lags and leads are balanced so that all counties have the same number of observations in the pre- and post-treatment years. Two binned dummy variables capture observations five or more years before and five or more years after the treatment.
Figure 4: The marginal effect of the boll weevil infestation on black property-crime admissions in Georgia. The thick line plots the linear marginal effect of the boll weevil at different levels of cotton cultivation in 1909. The gray band depicts the 95% confidence interval around the marginal effect. Along the x-axis, the rug plot shows the distribution of counties’ share of improved acres devoted to cotton cultivation in 1909. The three points labeled “low,” “medium,” and “high” show point estimates for conditional marginal effects evaluated at the median of the three terciles of the distribution of cotton production. Lines around each dot represent 95% confidence intervals for each conditional marginal effect. The fact that all three conditional marginal effects lie close to the line representing the linear marginal-effect estimate indicates that the linearity assumption is reasonable.
### Table 1: Negative-binomial and control-function IV negative-binomial regression of black prison admissions for property crimes, Georgia counties, 1910–1925. Both (1) and (3) model the relationship between cotton production and prison admissions. The negative coefficients imply that declines in cotton production increased black prison admissions. Model (2) is the first-stage regression of cotton yields on the boll weevil infestation. We use the timing of the boll weevil infestation as an instrumental variable in model (3). Values in square brackets below each point estimate are 95% BC$_a$ bootstrap confidence intervals, clustered by county.

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* ***p < 0.001, **p < 0.01, *p < 0.05*