Turnover or Cash? Sharecropping in the US South.*

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Abstract

Between 1880 and 1940, US post offices alleviated the isolation of the Southern countryside by posting information about jobs in the growing industrial sector. Hence, post offices enhanced the outside options of employees in a time employers in the farming sector used sharecropping - a contract where employers paid employees with a share of the harvested crop - to avoid labor turnover costs. This paper finds that a new post office in a county decreased sharecropping, which is evidence that sharecropping mostly resulted from the lack of outside options for employees. This is an innovative result in the share contract literature, usually more concerned about sector-level reasons such as labor turnover than about outside options. Furthermore, new light is shed on the current use of sharecropping and other share contracts such as franchising. Since sharecropping and franchising are a form of entrepreneurship, this paper suggests a reason for the negative relation between GDP per capita and entrepreneurship.
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1 Introduction

Understanding what it takes for an employer and an employee to agree on a labor relationship is a fundamental but intricate problem in economics. This paper sheds light on this issue by using a historical episode where the reasons for employers and employees to enter a specific contract in a specific sector are well documented. Equally important, there is an observable source of exogenous variation of crucial parameters. In the farms of the US South between 1880 and 1940, many employers used sharecropping - a share contract where employers paid employees with a share of the harvested crop - to avoid labor turnover costs, whereas many employees signed those contracts for lack of outside options. The introduction of post offices eased communication between rural and industrial areas, increasing both labor turnover and outside options in the farming sector. The core result is that the overall effect of post offices on the prevalence of sharecropping contracts in a county was negative, which is consistent with the idea that this share contract was extensively adopted mostly because employees lacked outside options.

Share contracts are one of the core issues in the economics literature. First, they are ubiquitous (Allen and Lueck, 1993; Dana and Spier, 2001; Burke, 2015): taxi and Uber drivers work in piece-rate contracts (Hall and Krueger, 2016); CEO's have their remuneration attached to several performance indicators; franchising contracts are paramount in the modern economy (Dana and Spier, 2001), counting as much as 10% of Canada's GDP, and employing 11 million US workers (Pruett and Winter, 2011). Second, share contracts are the solution for a wide range of problems (Ackerberg and Botticini, 2002) such as risk sharing between principals and agents (Cheung, 1969; Townsend and Mueller, 1998), screening of employees' ability (Hallagan, 1978; Ackerberg and Botticini, 2002), labor turnover costs (Lazear, 1996) or transaction costs along a supply chain (Allen and Lueck 1992, 1993; Dana and Spier, 2001).

Between 1880 and 1940, sharecropping played a central role in the economy of the US South. Farms run with sharecropping contracts increased dramatically, from 24% in 1880 to 37% in 1940 of the total number of farms, peaking at 48% in 1930. Economists and economic historians have largely attributed this phenomenon to labor turnover costs. For instance, the

demand for labor was extremely inelastic in crucial periods of the season. For the employer, sharecropping outperformed the use of wage labor by not only postponing most of the cash payment to the end of the season, but also making that payment dependent on a steady labor supply by the employee during the whole season. In other words, sharecropping minimized the employer's labor turnover costs.

Employees accepted the postponement of their income and the increased exposure to risk in sharecropping contracts because employers gave several perks during the season,[1] and because employers did not micromanage sharecroppers. However, those contracts had an asymmetric impact. Employees with smaller families found it more difficult to run a farm alone, and did not benefit so much from the provision of educational services. Therefore, many employees were left indifferent between sharecropping and available outside options. The US South economy fared poorly during this period: "at the turn of the twentieth century, real income per worker in the South was less than half that in the rest of the United States" (Collins and Wanamaker, 2015). Furthermore, employees in Southern farms often lived in ignorance of the changes occurring in the rest of the economy, a situation worsened by several laws targeted at labor recruitment and job searching.

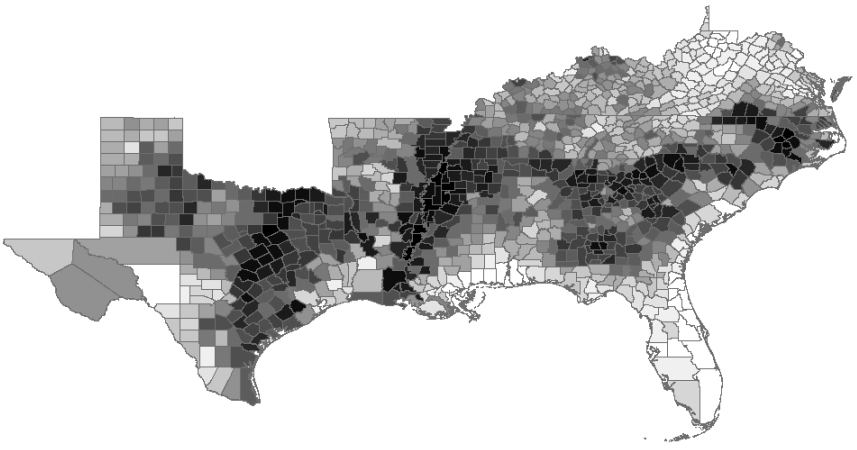

Figure 1: Number of sharecropping farms over the total number of farms, 1880-1940 average. Source: NHGIS (2011).

Thus, it was unclear whether the surge in sharecropping contracts between 1880 and 1940 was mostly due to labor turnover costs or the outside option. A way to solve this

[1]Examples: food rations, access to consumption credit, schooling, health care, and public safety.

problem consists of increasing simultaneously both variables: if labor turnover costs were the dominant reason, sharecropping contracts used in a county would increase; if the outside option was the most relevant reason, sharecropping contracts in a county would decrease. The model in section 3 concludes that a simultaneous increase in labor turnover costs and in the outside option decreases the proportion of sharecropping-run farms relative to all active farms in a county (herein, proportion of sharecropping) as long as labor turnover costs are low enough. Empirically speaking, this paper uses the fact that the opening of post offices increased both labor turnover and outside options. US Post Offices were an established institution that distributed letters and newspapers all over the country: during the farming season, laborers were more likely to switch jobs after receiving news from elsewhere, increasing the labor turnover affecting employers who used wage contracts; at the beginning of the season, employees would be aware of more job opportunities, decreasing the number of employees taking sharecropping contracts. Note that the literature denies that post offices coincided with local economic development or with the capacity of the federal government to undermine local labor market institutions. In order to definitely rule out these alternative channels, several control variables are included in all regressions and extra robustness checks are run. Therefore, the introduction of post offices was an exogenous source of variation.

A county-level, decennial data panel provides both non-parametric and parametric evidence that the impact of an extra post office on the proportion of sharecropping was negative. Figures 1 and 2 illustrate a statistically-significant, negative correlation between the proportion of sharecropping and post office density. This effect survives controlling for population density and distance to the nearest railroad, the two determinants of the number of post offices in a county. This empirical exercise includes two exogenous treatments to make sure that the variable *Post Office* acts in the aforementioned channels. The treatment *Rain* follows the idea that turnover costs are higher where the rain is very erratic in crucial periods of the farming calendar, whereas the treatment *Coal* equates the presence of a coal deposit to a higher outside option. As predicted by the model in section 3, new post offices decrease less the proportion of sharecropping in counties in the treatment *Rain*, while they decrease more the proportion of sharecropping in counties in the treatment *Coal*. Overall, depending on the treatments affecting each county, it is found that a one-standard-deviation increase

in post office density corresponded to an average decline in the proportion of sharecropping between 2.8% and 5.6%. Overall, note that these results do not deny that labor turnover costs played a key role in the proportion of sharecropping (Alston, 1981): they simply give evidence of a dominant role of outside options. Indeed, the findings in this paper are consistent with previous findings of employees' having their choices distorted by the Southern elites (Roback, 1984; Naidu, 2010; Hornbeck and Naidu, 2014).

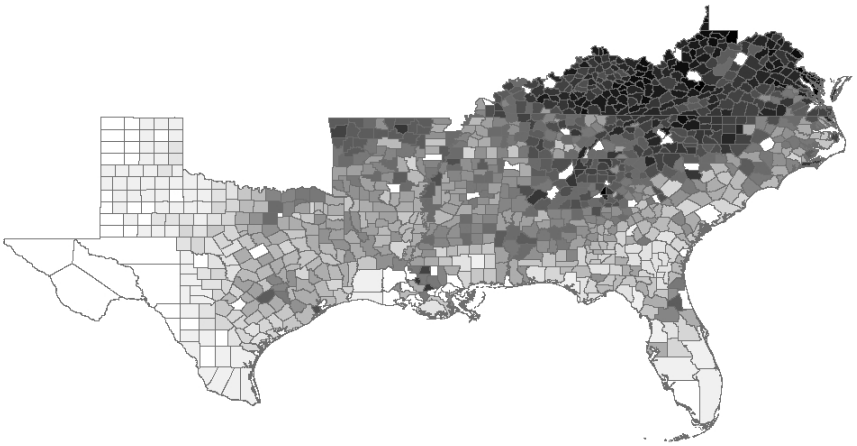

Figure 2: Post office density, 1880-1940 average. Source: Postal History.

All in all, this paper finds evidence that the role of the employees' outside options deserves further attention in future research about share contracts. A back-of-the-envelope calculation suggests a significant resource distortion since a one-standard-deviation increase in post office density in the past would have increased the GDP per capita in 2014 somewhere between 0.5% and 1.1% at the county level. Moreover, outside options may be behind the persistent use of sharecropping contracts in developing economies or the rise of franchising contracts: the lack of economic diversity in income generation takes employees with low managerial skills to accept these sorts of contracts. Finally, share contracts like franchising provide a path towards entrepreneurship (Pruett and Winter, 2011). Thus, the same explanation might shed some light on the following puzzle: there is a negative relation between GDP per capita and entrepreneurial activity.

The paper proceeds as follows: section 2 presents the historical background; section 3 frames the discussion in a theoretical model; section 4 sets up an empirical strategy, and discusses the results; section 5 summarizes the main conclusions of this paper and suggests

a future research agenda.

2 Historical Background

This section makes three points. First, sharecropping in the US South was driven by labor turnover affecting employers and by the employees' outside option. Second, this historical episode is a great laboratory to test the dominance of a sector-level factor against the outside options. Third, news about job opportunities affected both factors, and post offices spread such news.

The farming sector experienced an iterative process when dealing with the fluid labor market created by the American Civil War (1861-65) and the abolition of slavery (1865). Employers attempted but failed to collude when tackling labor turnover. Many employees desired the autonomy common to family farms. Sharecropping solved both problems: employees had to wait for the end of the season for the bulk of the revenues, giving them a reason to stay the whole season; employers could compensate that wait with the provision of consumption and other non-pecuniary perks, such as management autonomy. However, some employees benefited from sharecropping more than others. In case an outside option emerged, some employees would consider to work as wage farm laborers in the spot labor market, or to leave the farming sector.

This historical period provides a very clean setting. Labor contracts, including sharecropping, were standardized by the 1870s. Farming was a labor-intensive, technically unsophisticated sector. Therefore, this is a world of mostly binary choices of choosing direct management or a tenancy contract for employers, and of working or not in the farming sector for employees.

Another especially important point relates to the isolation in which agents lived in that period: "Life in the south in the late nineteenth and early twentieth centuries, particularly for the black sharecroppers, was striking in its isolation and its lack of connection to the modern world" (Gordon 2016, p. 266). Outside of the Southern villages, industrialization was in full swing (Gordon 2016, p. 14). Therefore, certainly any news would affect job choices of those still stuck in the rural South. The postal service was ready to provide information

because it was fully functional even before the war. It brought letters and newspapers to every corner of the US economy. Post Offices were harbingers of economic development: people knew that they ought to have a post office to improve their living standard. Further, the public service mission of the Post Office Department implied a service that preceded local development. Post offices improved communication of news in an industrializing economy, certainly increasing labor turnover and the outside option simultaneously.

2.1 Employers and Employees

Sharecropping contracts were a key feature of the US South[2] economy after the American Civil War and the abolition of slavery.[3] The use of sharecropping exploded in the 1870s: those two shocks left employers and employees vulnerable to a fluid labor market in agriculture.[4] On the one hand, employers struggled to stabilize their labor force, that is, they wanted to avoid labor turnover during the season. On the other hand, employees desired a decent living in a backward region of an industrializing US economy.

The abolition process itself leaves those problems at naked eye. The federal government enforced the abolition of slavery throughout the Reconstruction Era (1863-77). This historical period had three distinct stages: Wartime (1863-65); Presidential (1865-66); Radical (1866-77). The "Wartime" period consisted of the conquest of the Southern states, liberating slaves in each of them. The "Presidential" period began with the rise of President Johnson in 1865, and promoted a quick reintegration of the Southern states into the US without interfering in their internal affairs. Southern states seized the chance to control the labor supplied by former slaves, the freedmen, through a series of laws known as Black Codes.[5] However, Radical Republicans took over the US Congress in 1866, and began an interventionist agenda to guarantee the creation of a free labor economy in the South. This

[2]The South was composed by the states of Alabama, Arkansas, Florida, Georgia, Mississippi, Louisiana, North Carolina, South Carolina, Tennessee, Texas, and Virginia.

[3]Literature used for this section: Donald and Randall (1961), Foner (1988), Keller (1977), McPherson (2013), and Roback (1984).

[4]Sharecropping contracts had already existed before 1861, but not nearly at the same scale (Shlomowitz, 1984; Wright 2006, p. 5).

[5]There were already laws of this nature before the war but by "the mid-nineteenth century criminal prosecutions for enticing a servant had become virtually nonexistent, and civil cases were rare" (Roback 1984, p. 1166).

policy included military occupation, suspension of the Black Codes, and promotion of wage employment among freedmen through the Freedmen's Bureau. Lack of popularity, a financial crisis, and a stalemate in the presidential election of 1876 precipitated the end of the Radical Reconstruction period.[6]

Employers sought a substitute for slavery in their farms (Ransom and Sutch, 1977). Labor turnover was the most pressing problem created by abolition: crops had strict calendars, and were vulnerable to climatic shocks (Wright, 1986; Hanes, 1996).[7] Since this was common knowledge, employers also faced the threat of labor contract renegotiation (Hanes, 1996; Roback, 1984; Shlomowitz 1979, 1984). More importantly, these problems affected cotton, the most important Southern cash crop (Shlomowitz, 1979; Wright, 1986).[8] Cotton had two labor peaks during the crop year, planting and harvesting (Roback, 1984; Wright 2006, p. 86); cotton also required twice as much labor as any other crop (Alston, 1981). Not surprisingly, employers tended to poach labor from each other during the critical cotton-picking season (Higgs 1977, p. 45). To be sure, collusion in labor contracting failed during the Reconstruction Era (Higgs, 1977): employers were too many and too heterogeneous and employees could easily move to exploit deviations (Higgs, 1977; Ransom and Sutch, 1977; Shlomowitz, 1984; Wright, 1986; Collins and Wanamaker, 2015). Indeed, "there was [...] a labor market in the South between 1870 and 1930, and it operated to reduce wage differentials and some form of wage discrimination" (Wright 1986, p. 120 and "intercounty mobility rates were high" (Wright, 1986, p. 65).

After extensive experimentation, employers opted for sharecropping (Ransom and Sutch, 1977; Shlomowitz, 1984).[9] Employers began by postponing the payment of wages to the end

[6] "The states and the years of military withdrawal are Alabama (1874), Arkansas (1874), Florida (1876), Georgia (1874), Louisiana (1876), Mississippi (1874), North Carolina (1874), South Carolina (1876), Tennessee (1874), Texas (1874), and Virginia (1874)" (Naidu 2010, p. 428).

[7] Example of climatic shock: sudden precipitation that might have destroyed a whole cotton harvest in a few days.

[8] The other two major cash crops, cane sugar and tobacco, were also vulnerable. Cane Sugar had at least one labor peak and "sugarcane, once harvested, cannot be stored because of sucrose decomposition" (Britannica, 2015). Therefore, "the time between cutting and processing" had to be minimized (Britannica, 2015). Tobacco had at least three labor peaks: seeds preparation; transplanting, and harvesting. "The prime requisite for successful tobacco culture is a supply of well-developed healthy seedlings that is available at the proper time for transplanting" (Britannica, 2015). Before harvesting tobacco "may be left in the field from a few hours to two days to wilt" (Britannica, 2015).

[9] Shlomowitz (1979, p. 560) witnesses a "wide variety of payment schemes" during these early postbellum years (1865-1880): Standing Wages; Share of the Crop or Sharecropping; Sharing of Time; Standing Rent;

of the season to stabilize the workforce (Shlomowitz, 1979; Alston, 1981; Roback, 1984). But employees had to finance their consumption during the season, and desired autonomy in the management of family farms (Du Bois, 1935; Ransom and Sutch, 1977; Wright 1978, 2006; Shlomowitz, 1979; Roback, 1984). At the same time, employers struggled to pay enough cash during the season to compensate the lack of autonomy in wage labor (Shlomowitz, 1979), and they had high management costs to enforce effort among employees (Higgs 1977, p. 45; Alston, 1981). Sharecropping offered a satisfactory solution. It was a share contract where labor earned a share of the final output at the end of the season. "Since the worker had a stake in the crop on that particular farm, he was not likely to abandon his job" (Roback 1984, p. 1173). The employer usually sold the crop and deducted whatever advances in consumption goods he gave in the beginning and during the season to the employee. Furthermore, employees gave many non-pecuniary perks such as food rations, access to credit,[10] medical care or education (Ransom and Sutch, 1977; Alston and Ferrie, 1993; Naidu, 2010), and the chance to cultivate food crops on the side (Wright, 1978).[11]

Overall, sharecropping "offered the potential of a higher income than could be obtained working for the fixed standard wage" (Ransom and Sutch 1977, p. 95). Hence, employees who had families and some inputs, like a mule, would seize the chance to work as sharecroppers (Du Bois, 1935; Ransom and Sutch, 1977; Wright 1978, 2006). Wage labor was tightly supervised, and the extreme mobility demanded to wage laborers mostly attracted young men (Ransom and Sutch 1977, p. 95; Wright 1986, p. 103).

Nevertheless, note that "wage workers received money and rations at regular intervals during the course of the crop year. Tenants and owners, on the other hand, needed to spend both for personal consumption and for farm operations throughout the year, but not until they had produced and sold a crop would they receive any income" (Higgs 1977, p. 55). That is, an employee accepted a postponement of liquidity when he became a sharecropper, because he earned most of his cash income at the end of the season. The underlying transfer

Wages in Kind; Other various explicit incentive schemes.

[10] Often employers would not directly provide current consumption: merchants and local shopkeepers financed it in exchange of a portion of the final production (Wright, 1986; Du Bois, 2007). This paid off for employees in an environment where the credit market was especially expensive (Wright, 1986).

[11] Employers also provided protection from violence, an especially valuable good for black employees (Alston and Ferrie, 1993). Note that many of these non-pecuniary benefits of sharecropping also compensated employees to the exposition to risk (Alston, 1981).

of liquidity costs was so good for employers that they often preferred to write-off debt created by the advancements than losing the employee (Wright, 1986), or they would accept to just roll it over to the next season (Naidu, 2010; Ager, 2012). Furthermore, many of the non-pecuniary perks given by the employers only worked because cash wages were low in the first place (Wright, 1986), and local elites controlled the access to those goods (Alston and Ferrie, 1993).[12] Thus, consumption decisions were frequently distorted by employers. No wonder that after World War 2 the increase of cash wage made a black employee "to buy where he thought he was getting the best values for his money, and where he was treated with the most consideration" (Alston and Ferrie 1993, p. 866).

Above all, most employees did not have cash themselves to explore different alternatives. There was no land redistribution after the war, meaning that millions of freedmen and poor whites had no access to land (Higgs, 1977; Foner, 1988). Rural bankers did not provide short-term credit at all (Ransom and Sutch, 1977), and banks were forbidden to accept land as collateral (Wright, 1986). Thus, a "wealthy farmer might choose to operate as a tenant or sharecropper, but a poor man could not simply choose to become a cash tenant" (Wright 1978, p. 177) because fixed-rent tenancy required the employee to supply many more inputs than in sharecropping. Thus, most rural employees were stuck between being wage laborers or sharecroppers.

Those not acquainted with this historical period might find it odd to equate wage labor with forms of tenancy.[13] Yet Shlomowitz (1984) establishes a relation between wage levels and the capability of employers to pay a premium for the lack of autonomy compared to that offered by sharecropping or tenancy. Alston and Ferrie (1993, p. 863) go further and state that "sharecroppers are legally wage workers paid with a share of the crop."

Training was irrelevant in agriculture at that time.[14] Ransom and Sutch (1977, p. 125)

[12] Additionally, blacks were often humiliated and cheated (Alston and Ferrie, 1993; Higgs, 1977).

[13] In fact, Wright (1986, p. 70) states that "sharecroppers, renters and small farmers were not wage laborers; they were not involved, directly at least, in the market we have been describing." But he contradicts somewhat with himself when he states that the choice between "wage labor, sharecropping, and rental [...] depended on relative wage levels and rental rates" (Wright 1986, p. 90).

[14] Already in slavery times, human capital consisted of slaves health and reproductive capacity (Ruef, 2012), which were absent in the US South (Du Bois, 2007; Ruef, 2012). Moreover, most skill acquisition for slaves occurred in domestic service (Ruef, 2012) whereas by "1850, nearly 80 percent all slaves were engaged directly in agriculture" (Wright 2006, p. 84). Further, Rueff (2012) presents records of 57977 slaves sold in the market: about 95% had no skills.

classify farmers of the US South after the war as "inexperienced and illiterate." Collins and Wanamaker (2015) suggest that southern employees after the war were less skilled than in the rest of the US. Alston and Ferrie (1993, p. 857) regard the agriculture of the time as "pre-mechanized and non-science-based." Furthermore, the high number of employees changing employer between seasons supports the idea of low relation-specific investments (Wright, 1986).[15]

Lastly, the main parameters of the different labor contracts were standardized before 1880 (Ransom and Sutch, 1977). The division of the output depended on the quality of the land and on the amount of inputs supplied by each party.[16] Higgs (1977) and Ransom and Sutch (1977) report that often contract terms were subjected to small adjustments in other terms, such as food rations provided during the season by the employer.

In conclusion, sharecropping certainly helped employers to curb labor turnover, especially those for whom it was harder to manage wage labor. Similarly, sharecropping had an asymmetric impact across employees: many were ready to take the chance to be their own managers, and to access goods that were valuable for farm operations and for their family life. But for other farmers, the benefits of sharecropping were not enough to make it more than a labor contract with uncertain payment (Du Bois, 2007) or even a piece-rate wage labor regime (Wright, 1978). So, unsurprisingly, a witness saw that people had been "moving cityward, entering other occupations, migrating west or north-where more money is to be made" (Higgs 1977, p. 62). Letters and newspapers distributed by mail certainly informed these decisions.

[15] Among the blacks' labor force, trust and deference were the crucial characteristics to access sharecropping (Higgs, 1977; Ransom and Sutch, 1977; Wright, 1986).

[16] "For example, in 1876, the U.S. Department of Agriculture reported: 'Contracts vary widely in details, but are most generally based upon the following equivalents. Bare labor, one-fourth of cotton in rich land, one-third in poor soils; labor and rations, one-half as a general rule, four-tenths in some very productive lands; labor, rations, stock and supplies, two-thirds to three-fourths of the product'" Shlomowitz (1979, p. 565).

2.2 Post Offices as Communication Centers

Post Offices[17] were a well-established communication system well before the American Civil War.[18] "The Post Office Department [...] developed new services that have lasted into the 21st century and subsidized the development of every major form of transportation" (USPS 2007, p. 10). Even before 1861, populations already perceived the benefits brought by the introduction of a mail service:[19] the "new territories and states, as well as established communities, pressed the Post Office Department for more routes and faster delivery" (USPS 2007, p. 10). Furthermore, community debates about postal delivery always reflected their importance for business development. For instance, 'business logic' was behind the adoption of free rural delivery at the end of the 19th century: "Rural people needed the important information provided by newspapers [...] Young people might stay on the farm if correspondence and magazines eased their isolation" (USPS 2007, p. 22).

Evidence indicates that new post offices preceded economic development (Acemoglu, Moscona and Robinson, 2016). Indeed, the Post Office Department "ultimately made decisions in the 19th century that reflected public service as its highest aim. It funded post routes that supported national development and instituted services to benefit all residents of the country" (USPS 2007, p. 11). The opening of a new post office was a function of the number of new customers and distance to a transportation route (POD, 1980), which after 1864 equated to the nearest railroad.[20] Typically, the Post Department would require a report from the nearest postmaster of an existing post office. That report would also include suggestions for the postmaster position at the new post office, who had to be a local inhabitant.[21] Usually, postmasters were storekeepers who kept their normal jobs while on duty.

[17] The main reference of this subsection is USPS (2007).

[18] "The 19th century saw the growth of the United States. The Post Office Department, the communications system that helped bind the nation together" (USPS 2007, p. 10).

[19] Universal service to customers in all the US was established by the Act of March 3, 1863 (12 Stat. 704). The act also formalized the three types of goods delivered by mail: letters; newspapers; other heavier items, such as catalog-ordered consumption goods (like can syrup or soap bars). These items were delivered along mailing routes.

[20] The use of steamboats peaked in 1853.

[21] Naturally, the local community or the local congressmen had a saying in the matter. For the largest post offices, the postmasters were directly nominated by the US President, while the Postmaster General filled the remaining positions.

A final point relates to effects of an improved communication system. The industrialization of the US economy was at full swing after the American Civil War (Gordon, 2016). Thus, thinking that more news about employment outside agriculture necessarily increased labor turnover during the season and the employees' outside option is a realistic assumption. In fact, emigrant-agent legislation targeted newspapers that advertised jobs outside of the US South (Roback, 1984). Domestic service and rural factories often advertised new positions through newspaper ads and word of mouth (Hanes, 1996). Even Alston and Ferrie (1993, p. 858) recognize that "out-migration of labor or in-migration of capital[22] would have raised reservation wages."

In summary, post offices provided a crucial mean of communication for any local community in a time when job postings traveled mouth to mouth (Higgs, 1977; Alston, 1981; Wright, 1986; Du Bois, 2007). The public service mission of the Post Office Department implied a service that preceded local development. The opening of a new post office essentially depended on local population size and accessibility. All these characteristics suggest that a new post office dramatically changed the available information about job prospects of individuals and households in the US South:

> *Life in the south in the late nineteenth and early twentieth centuries, particularly for the black sharecroppers, was striking in its isolation and its lack of connection to the modern world. Many members of farm families never traveled outside the county in which they were born. Roads were poor to nonexistent, and the only means of travel available were by foot, horseback, or wagon. Striking was the absence of medium to large-sized cities that were typical in the northeast and Midwest. Most towns were merely crossroads* (Gordon 2016, p. 266).

3 Model

"In a sense, the adoption of sharecropping was the result of a compromise between the laborers' pursuit of independence and higher incomes and the landlords' desire to retain

[22]There was a Postal Savings System from 1910 on (USPS 2007, p. 29). However, it did not extend loans to local inhabitants. Hence, Post Offices did not substitute banks or any other credit institution.

control and minimize risk" (Ransom and Sutch, 1977 p. 94). This section formalizes how different economic conditions outside agriculture upset this compromise.

The analysis is conducted using a principal-agent model where the principal is the "employer" and the agent is the "employee." The employer wants to run a farm for one season using one of two options: direct management with wage labor hired on the spot labor market during the season, which implies that the employer faces labor turnover, or sharecropping, which eliminates labor turnover since it locks in the employee for the whole season. Because employers differ according to management costs when using wage labor, some employers can accommodate labor turnover costs better than others.

Wage labor gives to the employee a fixed income and no management costs. The employer cannot observe the employee's effort under a sharecropping contract, which brings information rents that can compensate management costs. Since employees differ in management costs when running a sharecropping farm, the higher management costs are, the more likely the employee opts for wage labor. Alternatively, the employee can choose an option outside the farming sector. This fact generates a participation constraint that the employer must take into account both in wage labor and in sharecropping contracts. The fixed income in wage labor equals the outside option because the employer chooses the effort level of the employee; sharecropping may bring more income to the employee depending on the size of the information rents net of management costs.

Before proceeding, note that a static setting is applied because it only discusses what happens during one season. This approach reflects that employer-employee pairs changed frequently from one season to another (Wright, 1986).

3.1 Setup

Employers (employees) are uniformly distributed along a continuum $\delta \in [0,1]$ ($\alpha \in [0,1]$), where δ (α) is the cost of managing a farm. The employer (employee) cannot observe the employee's (employer's) type, but he knows the distribution of types.[23]

[23]Note that both populations are risk averse. The literature supports this view. Ransom and Sutch (1977, p. 97) states that "the poor black was probably less averse to assuming risk than the comparatively wealthy landlord." At the same time, Alston (1981, p. 214) defends that "agricultural workers are relatively more absolute risk averse than landowners because they are less wealthy and have less access to credit markets".

Employees have three employment options: wage labor in agriculture, sharecropping, or an outside option such as a job in the industrial sector. Wage labor implies that the employer chooses the employee's effort level a and pays him a fixed wage w throughout the season. With sharecropping, the employee manages his own effort, and earns a share s of the production at the end of the season. Self-management brings a cost α and makes effort unobservable to the employer. The outside option pays $\bar{u}$.

y, the farm's output, is a random variable. $y = a + \beta\epsilon$, where $\epsilon \sim N(0, \sigma^2)$. a is the employee's effort level and β is a proxy for turnover costs. $\beta = 1$ if the farm is operated by a sharecropper, and $\beta > 1$ if run with wage labor. That is, the danger of turnover or renegotiation by wage laborers amplifies the effect of production's risk. In conclusion, an employee has the following payoff as a wage laborer:[24]

$$\Pi_{wage} = w - \frac{a^2}{2} \tag{3.1}$$

Where $\frac{a^2}{2}$ is the cost of exerting effort a. The employee has the following payoff as a sharecropper:

$$\Pi_{share} = sa - \frac{a^2}{2} - \alpha - s^2\frac{\sigma^2}{2} \tag{3.2}$$

Finally, the payoff of the outside option payoff for the employee:

$$\Pi_{outside} = \bar{u} \tag{3.3}$$

In an analogous fashion, each employer chooses to run his farm using wage labor or to let it be operated by sharecroppers. The advantage of using sharecropping contracts consists of minimizing the increase in risk created by labor turnover, β, and save the management cost, δ. However, wage labor lets employers to directly control the effort level exerted by their

This model assumes that all agents have the same risk preferences: the object is the role of risk, not of risk preferences, in the composition of farm contracts.

[24]The following payoffs are certainty equivalents. They make use of the fact that $E\left[-e^{\delta\epsilon}\right] = -e^{\delta^2\frac{\sigma^2}{2}}$ where $\epsilon \sim N(0, \sigma^2)$.

wage laborers. Thus, wage labor pays the employer:

$$\Pi^E_{wage} = a - w - \delta - \beta^2 \frac{\sigma^2}{2} \tag{3.4}$$

And for sharecropping:

$$\Pi^E_{share} = (1-s)\left(a - (1-s)\frac{\sigma^2}{2}\right) \tag{3.5}$$

The employer must satisfy a participation constraint when choosing either w or s: employees have a reservation value of $\bar{u}$. If neither wage labor nor sharecropping satisfy the participation constraint, the employee chooses to work outside the farm sector. Additionally, employers must satisfy an incentive-compatibility constraint for employees when using sharecropping contracts, which generates information rents to the employee.

3.2 Results and Discussion

The results proven in appendix A revolve around three thresholds. There is a level of management costs that leaves employers indifferent between inactivity and wage labor, and another that leaves them indifferent between wage labor and sharecropping. Likewise, employees are always indifferent between wage labor and the outside option, but there is a level of management costs below which sharecropping is attractive. The proportion of sharecropping, $\mathbf{p}$, depends on these 3 thresholds, which in turn vary with turnover costs β and the outside option $\bar{u}$.

With wage labor, employers impose the level of effort a to the employees. Employers just need to pay the employees enough to compensate the cost of effort and the outside option $\bar{u}$, leaving employees indifferent between wage labor and the outside option. Wage labor is only profitable when the employer's type δ is lower or equal to δ_w, where:

$$\delta \leq \delta_w \equiv \frac{1-\beta^2\sigma^2}{2} - \bar{u} \tag{3.6}$$

Therefore, if turnover costs and/or the outside option are high enough, employers with higher management costs are driven out of the market. Appendix A shows that $\delta_w < 1$, that

is, there are always inactive farms.

The second threshold comes from employees indifferent between sharecropping and the two other options. The employer sets the share s that maximizes the effort exerted by the employee given that the employer cannot observe employee's effort. The optimal $s = s_s$ always satisfies the incentive-compatibility constraint. Yet, the sharecropper, unlike the wage laborer, faces management costs. Hence, the optimal level of effort must not only pay effort exerted and the outside option, but it must also compensate for those management costs. There is a level of management costs, α_s, below which every employee earns information rents:

$$\alpha \leq \alpha_s \equiv \frac{1-\sigma^2}{2}\left(\frac{1+\sigma^2}{2+\sigma^2}\right)^2 - \bar{u} \tag{3.7}$$

The existence of an information rent is consistent with the necessity of a non-monetary premium for employers to convince employees to take sharecropping contracts (Alston and Ferrie, 1993). Consequently, management costs must go down to compensate for a higher outside option. Thus, a higher $\bar{u}$ lets fewer employees to sharecropping.[25]

The final threshold defines when employers choose sharecropping over wage labor:[26]

$$\delta \geq \delta_s \equiv \frac{1-\beta^2\sigma^2}{2} - \frac{1}{2\left(2+\sigma^2\right)} - \bar{u} \tag{3.8}$$

Figure 3 summarizes the type of contracts signed in equilibrium between employers and employees in the farming sector. There are $1-\delta_s$ employers and α_s employees willing to sign sharecropping contracts. In other words, there is a $(1-\delta_s)\alpha_s$ chance that an employer and an employee meet in the market and, hence, sign a sharecropping contract for the season. Therefore, in equilibrium there are $(1-\delta_s)\alpha_s$ sharecropping farms. However, for employers with very high management costs, $\delta > \delta_w$, only sharecropping is profitable. So, $(1-\delta_w)(1-\alpha_s)$ employers are inactive in equilibrium, i.e. only $1-(1-\delta_w)(1-\alpha_s) = \alpha_s + (1-\alpha_s)\delta_w$ farms are active. Combining the number of sharecropping farms and the

[25]There is another interesting change from condition (3.6) to condition (3.7). Since $\beta > 1$, threshold α_s would always be higher than threshold δ_w if employees would get all the output. The term $\left(\frac{1+\sigma^2}{2+\sigma^2}\right)^2$ is smaller than 1 because a sharecropper, unlike an employer using wage labor, does not get all the production. Note that this term increases with σ^2 since an employer needs to give a higher share of the output to the sharecropper to compensate the increase in the risk of output.

[26]Appendix A demonstrates that sharecropping always yields a positive pay off to the employers.

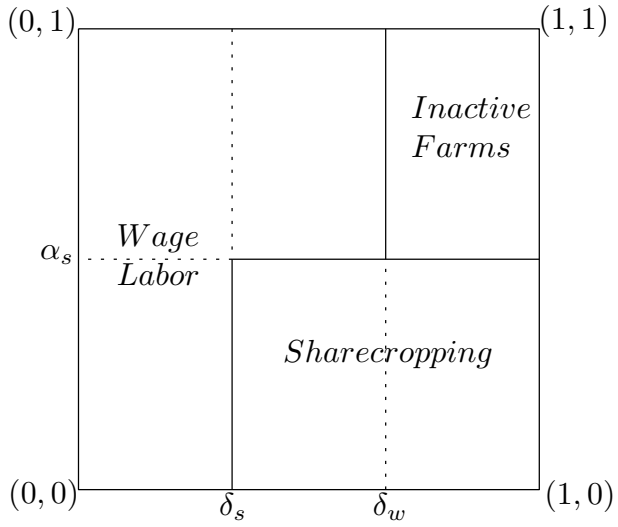

Figure 3: Thresholds and type of contracts signed in equilibrium.

number of active farms gives the proportion of sharecropping, $\mathbf{p}$, in equilibrium:

$$\mathbf{p} = \frac{(1-\delta_s)\alpha_s}{\alpha_s + (1-\alpha_s)\delta_w} \tag{3.9}$$

The sum of the derivatives of $\mathbf{p}$ to turnover costs and to the outside option is the following:

$$\frac{\partial \mathbf{p}}{\partial \bar{u}} + \frac{\partial \mathbf{p}}{\partial \beta} \tag{3.10}$$

This derivative is negative if turnover costs are low enough. Intuitively, higher turnover costs reduce the number of active employers under wage labor, δ_w, at the same time they increase the number of employers who prefer sharecropping to wage labor contracts, $1 - \delta_s$. This becomes clear when thinking of the case when no employer is profitable with wage labor, $\delta_w \leq 0$, because of very high turnover costs: $\mathbf{p} = 1$, that is, all active farms are sharecropping farms because that is the only profitable arrangement for the employers.

> **Proposition 1**: A simultaneous increase of turnover costs, β, and the outside option, $\bar{u}$, decreases the proportion of sharecropping, $\mathbf{p}$, if turnover costs are low enough. Otherwise, the proportion of sharecropping increases.

There is a corollary that follows from Proposition 1. The following interpretation assumes a negative effect on the proportion of sharecropping of a simultaneous raise in labor

turnover and in the outside option. First, the proportion of sharecropping decreases less with a simultaneous increase of turnover costs and of the outside option if turnover costs are higher. Basically, as turnover costs increase, sharecropping is increasingly more desirable for employers.

Second, if the outside option increases, the proportion of sharecropping decreases more with a simultaneous increase of turnover costs and of the outside option. Intuitively, sharecropping becomes increasingly less desirable for the employees as the outside option increases, making concerns about turnover costs relatively less important.

> **Corollary 1**: If there are not too many employees wanting sharecropping contracts, and the proportion of sharecropping does not react too much to turnover costs, the second derivatives of the proportion of sharecropping to turnover costs, β, and the outside option, $\bar{u}$, are such that a simultaneous increase of turnover costs and of the outside option:
>
> - decreases less the proportion of sharecropping if turnover costs increase.
> - decreases more the proportion of sharecropping if the outside option increases.

Proposition 2 tells that a simultaneous increase in turnover costs and the outside option decreases the number of active farms. Sharecropping farms are only affected by the will of employees through α_s: better outside options make sharecropping less attractive. Farms run with wage labor depend on both employers and employees. Turnover costs reduce the number of employers that can afford wage labor. The outside option may have an ambiguous effect: it reduces the number of active employers but at the same time it reduces employees in sharecropping. In other words, there are less employers offering wage labor contracts, but there are more employees willing to take them. However, for every employee dropping out of sharecropping, only a fraction δ_w goes to wage labor. Hence, this leakage of employees from sharecropping to wage labor never compensates the fall in sharecroppers in absolute terms.

> **Proposition 2**: A simultaneous increase of turnover costs, β, and the outside option, $\bar{u}$, decreases the number of active farms.

There is also a corollary following Proposition 2. This corollary has a more straightforward intuition: both turnover costs and the outside option decrease the total number of active farms. Moreover, they affect linearly the calculation of employers and employees, i.e. their effect is the same no matter how many employees and employers are out there. So, as the number of active farms decreases, the relative effect of either an increase of turnover costs or an increase of the outside option.

> **Corollary 2**: The second derivatives of the total number of active farms to turnover costs, β, and the outside option, $\bar{u}$, are such that a simultaneous increase of turnover costs and of the outside option:
>
> - decreases more the proportion of sharecropping if turnover costs increases.
> - decreases more the proportion of sharecropping if the outside option increases.

4 Empirics

This section empirically tests the model of section 3. An increase in the density of post offices in each county identifies the simultaneous increase in labor turnover and in the outside option discussed before. Intuitively, more post offices enhanced the chances of news about job opportunities. This section brings further qualitative and quantitative evidence backing subsection 2.2, which rules out a coincidence of post office density with local development and a countervailing presence of the federal government. Overall, the evidence discussed in this section gives support to the idea that employees' outside options, not employer's labor turnover costs, determined the prevalence of sharecropping contracts in the counties of the US South.

4.1 Identification

The job creation due to the fast industrialization of the US economy makes it possible to equate new information to good news about employment. Post offices facilitated the diffusion of information. News during the season certainly diverted wage laborers from agriculture to

other occupations such as mining, i.e. they increased turnover costs, β. Letters and newspapers affected the calculations of those employees who benefited less from sharecropping arrangements relative to jobs in cities like Chicago (Roback, 1984), that is, there was an increase of the outside option, $\bar{u}$. However, post offices opened in function of the immediate access to transportation and to population density. Hence, a correct statistical model must include controls for population density and existing transportation.

The first question about this identification mechanism is whether more post offices are just a sign of the local economic development. More post offices might also bring more jobs or other economic opportunities across the county. Yet post offices preceded economic development, as they were part of the public service mission of the Post Office Department at least since 1863. Even in the case of established counties, USPS (2007) presents evidence of the postal service giving subsidies to the development of railroads and other means of transportation through allowances for delivery to transportation companies.

Mail may have affected the relative prices of inputs that, in turn, influenced the costs of managing a farm. If that were the case, employees could find better places to use their family labor force or other inputs such as mules or tools. However, it is not clear why that effect would impact sharecropping farms more than farms with other types of tenure. Equally relevant, that same effect can be easily described by a change in the reservation utility of employees instead of an adjustment in the costs of managing a farm. Intuitively, employees could simply make more cash somewhere else with those inputs, while the yield of those inputs in a sharecropping farm remained unchanged.

Acemoglu et al. (2016) raises the concern that post office presence equated to a stronger presence of the federal state, whose policies could have interfered with local labor markets. That seems highly unlikely. King and Lieberman (2009) and Novak (2008) argue that the federal state before World War 2 was stronger than previously thought, but that does not imply that the federal state was indeed a powerful entity in every realm of the US economy. Even if it was a strong entity, Alston and Ferrie (1993) and Higgs (1977) present concrete evidence of how the federal state did not interfere in the southern labor market. Equally important, the persistence of separate labor markets between the US south and the rest of the US (Wright, 1986) is a sign of the limited role that any federal intervention might have

had.

Another point of contention arises with the mobility of people, especially before World War 1. This is essential to assume that employees could actually seize job opportunities elsewhere. First, there is plenty of evidence of inter-county mobility of wage laborers and of occasional labor in non-farming sectors for this period (Wright, 1986). Second, Alston (1981) and Higgs (1977) present contemporary testimonials of recruitment in urban areas for agricultural jobs, and of several black employees moving to the cities for better jobs in industry. Finally, several US markets were already integrated.[27]

Finally, there may be doubts about whether post offices and the proportion of sharecropping interact through the desired channels, labor turnover during the season and the outside option at the beginning of the season. The empirical discussion in subsection 4.3 clarifies those mechanisms using two exogenous treatments defined in table 1, *Rain* and *Coal*.[28] *Rain* is a proxy for turnover costs using the fact that the more erratic the rain is during the cotton harvesting season, the more costly it is to have uncertainties in labor supply. *Coal* stands for the stylized fact that the first industrial areas were located nearby coal mines (Cameron, 1993). Atack (2013) correlates railway access with the location of inanimately-powered, larger manufacturing establishments, which had higher productivity than smaller establishments. Therefore, more mines and/or industry associated to coal certainly meant higher reservation values for employees in the farming sector.

4.2 Dataset and Empirical Implications

Several panel-data regressions are run in a sample of 1119 counties across the southern states.[29] Note that the sample size was reduced to only include counties where there is data

[27]The cotton market is a good example. Any farmer could easily ship their cotton production from anywhere in the South (Higgs, 1977). Atack (2013) confirms that the price of cotton was the same nationwide before the 1880s.

[28]Exogenous because both are geographical variables, as shown in table 1: *Rain* is constructed from contemporary data on precipitation. *Coal* is based on existent coal deposits, not mines, so it is not influenced by human behavior.

[29]I use 1880 borders, as defined by the maps available in NHGIS (2011). The robustness check in table 14 demonstrates that dropping states with more county-border changes does not affect the conclusions of this paper.

for the number of post offices.[30] The US census data on land tenure spans from 1880 to 1940 with a decennial frequency. The only year after abolition left out of the dataset is 1870, when the South still tested post-slavery institutions (Ransom and Sutch 1977; Shlomowitz 1979, 1984; Roback, 1984). 1940 is taken as the last data point, before the mechanization of cotton production (Alston, 1981; Holley, 2000; Britannica, 2015) and the effects of the New Deal and of the World War 2 in the southern labor markets (Alston, 1981; Wright, 1986). Finally, this paper follows Naidu (2010) and considers the eleven Confederate states plus Kentucky and West Virginia: Kentucky had slavery and passed legislation restricting labor mobility after the war just like the Confederate states[31]; West Virginia was simply a strategic breakaway from Virginia at the beginning of the American Civil War.[32]

The dependent variable is the proportion of farms run with a sharecropping contract relative to the total number of farms in each county (*Sharecropping* herein). Studying the proportion in place of the absolute number of sharecropping farms distinguishes changes common to all farms from those only affecting sharecropping farms. For instance, a positive shock in the size of the local labor force makes labor equally cheaper for every farm.[33]

The identification variable, the number of post offices per county, is divided by the county area. Table 3 presents a statistically significant correlation of -0.24 across the whole sample. Equally interesting, table 2 and table 3 demonstrate that *Post Office* is not significantly correlated to *Coal* across the whole sample, weakly related to *Industry*, and negatively related with *Wage*. There is an interesting flip in the correlation sign across time, that is, *Coal* and *Wage* are negatively correlated with *Post Office* until 1900, becoming positively from 1910 on. These numbers give quantitative support to the claim that post offices preceded local development. Table 3 also shows that *Post Office* is significantly correlated with several variables, namely population density and available transportation that were discussed in subsection 2.2. Thus, meaningful regressions must control for all these variables.

[30] Table 1 demonstrates that variables differ in the number of observations. Since *Post Office* is the crucial component of the identification strategy, the sample was subordinated to the availability of that variable.
[31] See figure 8.
[32] Again, table 14 demonstrates that dropping these states leaves the gist of the results untouched.
[33] Note that *Sharecropping* is a continuous variable, while the total number of farms is a count variable. This fact would bring extra complications in case this paper opted to regress sharecropping farms using the total number of farms as a control variable (Cameron and Trivedi, 2005).

[*Insert table 3 here.*]

Figures 1, 4 and 5, and table 4 give evidence of the effect of the treatments in the farming sector, and support the claim that *Post Office* acted as a source of news and not a sign of coincidental local development. Comparing figure 1 with figure 4, clusters of *Sharecropping* coincide with areas of erratic rain, such as the Mississippi river basin. The positive, significant difference in *Sharecropping* between treated and nontreated counties in table 4 also establish a positive relation between more erratic rain and sharecropping contracts. Also note that the treatment *Rain* has a significant correlation of -0.30 with the number of cotton harvesting days. That correlation makes clear that treatment *Rain* represents turnover costs because the fewer days there are to harvest cotton, the more costly the lack of laborers is.[34] A mixed scenario emerges with the treatment *Coal*: despite a negative relation between *Sharecropping* and *Coal* in Texas and in the Appalachians visible in figure 5, table 4 shows that *Coal* increases both *Sharecropping* and *Farms*. However, this goes in the direction that, in the absence of communication, *Coal* might simply shift the historical levels of *Sharecropping* through an effect on local institutions, among others. Lastly, *Post Office* is negatively affected by *Rain*: if there is an association between higher risk and lower economic development, then perhaps there is a correlation between post offices and local development. But this last piece of evidence is contradicted by the non-significant relation between the*Post Office* and treatment *Coal*, a variable with positive and significant impact on *Wages* and a negative and significant impact on *Industry*.

Table 4 demonstrates that treatments *Rain* and *Coal* affect other variables not discussed by the model of section 3. *Wage* is negatively affected by *Rain* but positively affected by *Coal*, which brings evidence that erratic weather depresses the wage paid to laborers, whereas the potential existence of more nonfarm jobs increases wages. Oddly, *Industry* is strongly and positively correlated with *Rain* and weakly and negatively with *Coal*. Perhaps erratic rain makes farming less profitable, releasing inputs to the nonfarming sector, while *Coal* might be associated with industries placed in the countryside or of more specific sectors. This

[34] USDA (1997) provides the number of harvesting days in cotton cultivation for the year 1996 in each US state. Because modern agriculture is certainly more efficient and less labor-intensive than traditional farming, this number of days is closer to turnover costs driven by environmental, human-independent factors than using contemporary calendars.

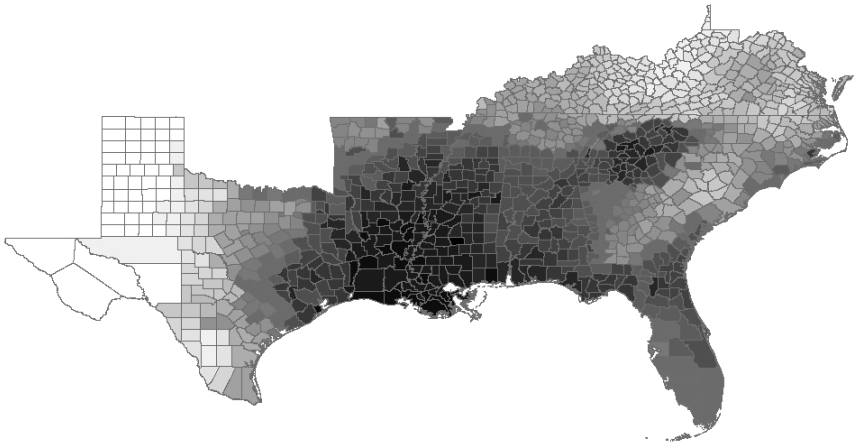

Figure 4: Standard Deviation of Precipitation during cotton harvesting, 1880-1840 average. Source: NOAA (2016) and Hong (2013).

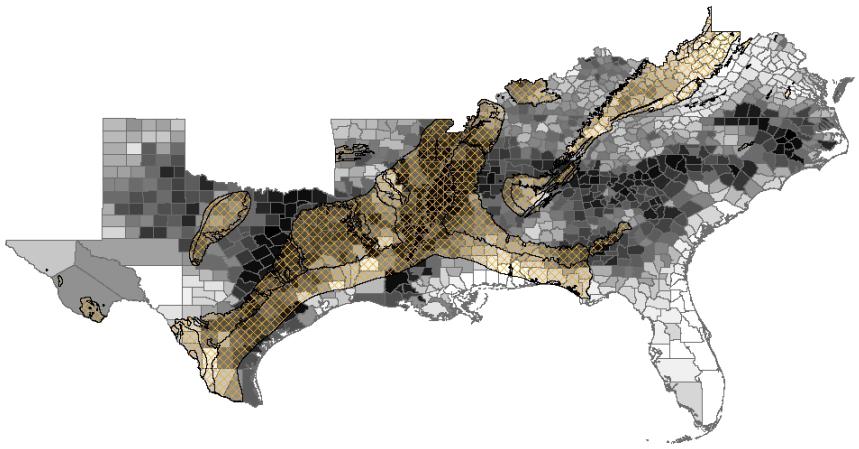

Figure 5: Sharecropping Farms and Coal Deposits. Source: USGS (1996).

last explanation is consistent with the findings that *Urban Pop. Dens.* is also correlated positively with *Rain* and negatively with *Coal*, and that *Avg. Farm Size* is not correlated with *Rain* but it is positively correlated with *Coal*.

[*Insert table 4 here.*]

A last piece of non-parametric evidence is brought by table 5. If the treatment *Coal* changes when the rain is not so erratic, i.e. $Rain = 0$, *Sharecropping* decreases. Otherwise, *Sharecropping* increases with *Coal* if $Rain = 1$. In case *Rain* changes, *Sharecropping* increases independently of the level of *Coal*. Both these regularities are consistent with the analysis in section 2: turnover costs were an important driver of sharecropping contracts; the proportion of sharecropping was affected by non-farming factors.

[*Insert table 5 here.*]

A parametric analysis connected to the model of section 3 is required to have definitive answers. Proposition 1 of subsection 3.2 contains the core implication of the model: the effect of a simultaneous increase of labor turnover and of the outside option in the proportion of sharecropping depends on the level of the turnover costs. As discussed in subsection 4.1, an increase in *Post Office* is equivalent to a simultaneous raise of both labor turnover and of the outside option. Hence, the following regression is estimated:

$$Sharecropping_{c,d} = \gamma_c + \gamma_d + \zeta_1 Post\ Office_{c,d} + \bar{\zeta} X_{c,d} + \epsilon_{c,d} \tag{4.1}$$

Where c, d stands for county c in decade d, γ_c is the county-fixed effects term, γ_d is the decade-fixed effects term, and $X_{c,d}$ includes all the control variables in table 1, and $\epsilon_{c,d}$ is the idiosyncratic error.

> **Prediction 1**: If turnover costs (the outside option) is the dominant reason behind *Sharecropping*, then *ceteris paribus Sharecropping* increases (decreases) with *Post Office*: $\zeta_1 > 0$ ($\zeta_1 < 0$).

Following Proposition 1, when the outside option is low, employees want sharecropping contracts more than employers. Since the latter use sharecropping contracts to avoid labor

turnover, turnover costs dominate *Sharecropping*. Hence, increased information brought about by *Post Office* increases *Sharecropping*. When the outside option is highly valuable, employers want sharecropping contracts more than employees. The latter are driven by the outside options: so when news come, *Sharecropping* decreases.

However, further evidence of the interaction between *Post Office* and labor turnover and the outside option helps to establish which is the dominant force, as discussed in Corollary 1. Hence, a difference-in-differences regression is ran using two treatments, *Rain* and *Coal*:

$$\begin{aligned} &Sharecropping_{c,d} = \gamma_c + \gamma_d + \zeta_1 Post\ Office_{c,d} \\ &+ \zeta_2 Post\ Office_{c,d} \times Rain_c + \zeta_3 Post\ Office_{c,d} \times Coal_c + \bar{\zeta} X_{c,d} + \epsilon_{c,d} \end{aligned} \tag{4.2}$$

Note that the level effects of *Rain* and *Coal* are included in the county fixed effects. In case the turnover costs are already large enough:

Prediction 2: In counties with high turnover costs, *ceteris paribus Sharecropping* decreases less with *Post Office*: $\zeta_2 > 0$.

Prediction 3: In counties with a higher outside option, *ceteris paribus Sharecropping* decreases more with *Post Office*: $\zeta_3 < 0$.

The interactions between *Post Office* and the treatments should reflect Corollary 1. The final check on the mechanism predicted by the model involves the total number of farms. Proposition 2 states that the number of farms decreases with a simultaneous increase in labor turnover and the outside. Corollary 2 states that the number of farms decreases more with a simultaneous increase in labor turnover and the outside option when a county has higher turnover costs or higher outside options.

$$\begin{aligned} &Farms_{c,d} = \gamma_c + \gamma_d + \eta_1 Post\ Office_{c,d} \\ &+ \eta_2 Post\ Office_{c,d} \times Rain_c + \eta_3 Post\ Office_{c,d} \times Coal_c + \bar{\eta} X_{c,d} + \epsilon_{c,d} \end{aligned} \tag{4.3}$$

Regression 4.3 has similar components and, hence, a similar interpretation to those in regression 4.2.

Prediction 4: *Ceteris paribus Farms* decreases with *Post Office*: $\eta_1 > 0$. In addition, $\eta_2 < 0$ and $\eta_3 < 0$.

4.3 Baseline Results

[*Insert table 6 here.*]

Column (1) in table 6 brings the results from regression 4.1: ζ_1, the coefficient of *Post Office*, is negative. According to Prediction 1, the outside option seems to be the dominant driver of *Sharecropping*. The treatment *Rain* is added in column (2) and it yields the sign predicted in Prediction 2: *Sharecropping* decreases less with a new *Post Office* in counties with higher turnover costs. The treatment *Coal* in column (3) has the sign expected by Prediction 3, but the coefficient of *Post Office* becomes insignificant. This last step might suggest that the results in columns (1) and (2) are completely driven by the counties in this treatment. In fact, table 7 brings evidence that the biggest jump in *Sharecropping* occurs when the treatment *Coal* = 1. However, column (4) presents the estimation results from regression 4.2 and confirms the patterns expected in Predictions (1) to (3): *Sharecropping* is mostly driven by the outside option perceived by the employees.

Again, it is unlikely that *Post Office* is a sign of local development. These regressions give quantitative backing to this conclusion. *Sharecropping* significantly decreases with *Industry* but the latter does not explain away the effect of *Post Office*. Similarly, population density is frequently used in economics literature to approximate economic development (Michalopoulos and Papaioannou, 2013): both *Rural Pop. Dens.* and *Urban Pop. Dens.* do not explain away the effect of *Post Office*. Finally, *Wage* is a state-level variable, which allows causality claims assuming that none of the counties is relevant enough to drive individually the market of farm wage labor. Also, the model concludes that wages in farms are determined by the outside option. That is, the wage in the market of farm wage labor is a proxy for the outside option of the employees. As predicted in section 3, *Wage* decreases *Sharecropping* but without subtracting the effect of *Post Office* and the effect of any of the treatments.

There is another concern about the variable *Post Office*. USPS (2007, p. 25) refers an increase of the number of rural delivery routes, replacing smaller Post Offices after 1901.

That is, the overall number of post offices peaks in 1901 and decreases from then until the end of the sample. On the one hand, this policy might have actually made the current empirical analysis to downplay the role of each office. That fact would imply a downward bias on the estimations displayed in table 6. On the other hand, more worryingly, there can be a trend affecting the validity of the estimations. Therefore, a regression including interaction terms between *Post Office* and decade dummies is run. The gist and the significance of the results stay the same: the marginal effect of *Post Office* is still negative and significant at the 1% level.[35]

The treatment *Coal* might also relate to the labor turnover level of a region: Wright (1986) provides examples of young laborers temporarily leaving the fields during the farming season to work in mining. But that would involve an underestimation of the coefficient of *Coal* in *Sharecropping* because labor turnover just affects those employers indifferent between inactivity and wage labor, whereas the outside option affects both those same employers and employees indifferent between sharecropping and the outside option. That is, even if the treatment *Coal* increases more labor turnover than the outside option, the effect must be strong enough to compensate for the fact that labor turnover affects less economic agents than the outside option does.

Analyzing the other controls in column (4), the variables concerning legislation reveal some interesting patterns with possible, intuitive explanations.[36] Because those laws were approved and enforced at the state level, causal claims at the county level can be made.[37] *Contract Enforcement laws* has a negative sign in all regressions. These laws were designed to avoid that employees working as sharecroppers leave the contract in the middle of the season: thus, as the costs to renegade a contract in the middle of the season increases, the contract becomes less desirable for the employees. Similarly, *Vagrancy laws* prevented laborers to look for better jobs. Hence, unsurprisingly *Vagrancy laws* increase *Sharecropping*. Then, *Convict-lease system* was a way of decreasing labor turnover during the season and decreasing outside options: convicts provided private contractors cheap labor that could not

[35]The same conclusion was reached when regressing *Sharecropping* on the difference between *Post Office* and the sample average of *Post Office* in each decade.

[36]See Appendix B for further details about this legislation.

[37]Similarly to *Wage*, the underlying assumption is that no county or set of counties is especially important to impose this legislation alone to the whole state.

leave at will. Thus, *Convict-leasing system* naturally decreases *Sharecropping*.

[*Insert table 8 here.*]

Table 8 displays the estimation results of regression 4.3. According to Prediction 5, the results confirm that the outside option dominated labor turnover as a driver of *Sharecropping*. So, a simultaneous increase in labor turnover and the outside option decreased the number of farms. Unfortunately, the second part of the Prediction 5 is not confirmed: *Farms* does not decrease more in turnover costs or in the outside option. A possible explanation for this might be that the effect of *Post Office* alone is so strong that extra variation brought by *Rain* and *Coal* does not add information. Also in the upside, the interaction terms do not have significant coefficients with opposite signs. That is, the results do not confirm but also do not contradict the second part of Prediction 4.

Like table 6, *Contract Enforcement laws* and *Convict-leasing system* are also significant but with positive signs. *Contract Enforcement laws* makes it harder for employees to break contracts in the middle of the season, making farming profitable for more employers. *Convict-leasing system* makes wage labor profitable for more employers. Differently from table 6, *Vagrancy laws* are not significant, but *Enticement laws* and *Emigrant-agent laws* have a positive, significant relation with *Farms*. *Enticement laws* made it a crime for an employer to poach employees from another employer. *Emigrant-agent laws* prevented employment agents hiring employees across states, especially those moving workers out of the South.

[*Insert table 9 here.*]

Table 9 introduces the marginal effects from column (4) of table 6. The first line implies that a one-standard-deviation increase in *Post Office* in a county without higher turnover costs nor a higher outside option decreases *Sharecropping* in 0.8 percentage points. This effect becomes insignificant in counties with higher turnover costs, different from what happens in counties with higher outside option, where the effect stays significant and changes to -1.6 percentage points. The effect in a county with higher turnover costs and a higher outside option is about -1.0 percentage points. The remaining columns give both a better understanding of the scale of these effects and how they change in importance across time.

In the whole sample, a one standard deviation increase in *Post Office* would decrease *Sharecropping* by a number between between 2.8% and 5.6%, depending on the level of turnover costs and of the outside option. In 1880, the same type of change would decrease *Sharecropping* between 3.7% and 7.6%. The range in 1940 changes to an interval between -2.5% and -5.2%. The decrease of the effect of *Post Office* on *Sharecropping* from 1880 to 1940 stems from three sources: the relative importance of mail decreased with the appearance of new communication technologies such as the radio and the telephone (Gordon, 2016); the first wave of migration out of the South after 1914 (Collins and Wanamaker, 2015); the Jim Crow era, and hence the benefits from employer paternalism, strengthened after 1900 (Higgs, 1977; Alston and Ferrie, 1993).[38]

These marginal effects demonstrate that labor turnover was a strong reason behind *Sharecropping* across the US South, as thoroughly documented in section 2. The effect of post offices in counties with higher turnover costs is always lower or even insignificant. But, overall, there is evidence to conclude that the lack of outside options in counties across the US South was the dominant driver of the rise of sharecropping after the American Civil War. Employers were certainly affected by increased labor turnover during the season, but their effect on the market seemed to have been smaller than that of the employees indifferent between sharecropping and other jobs.

4.4 Robustness Checks

4.4.1 Effect of the treatments *Rain* and *Coal*

[*Insert table 10 here.*]

Table 10 splits the sample between treated and untreated samples according to the treatments, *Rain* and *Coal*. In the case of the treatment *Rain*, *Post Office* only has a significant effect in the untreated counties. This gives support to the discussion in section 3 when the outside option is high enough: low enough turnover costs suffice for a simultaneous increase of labor turnover and the outside option to decrease the proportion of sharecropping. Comparing the results of the treatment *Coal* with Proposition 1, the proportion of sharecropping

[38] In fact, table 9 documents that *Sharecropping* increased between 1880 and 1940.

increases with a simultaneous increase in labor turnover and the outside option as long as turnover costs do not become too high.

There is an especially interesting pattern emerging from both treatments: if *Post Office* is simply a proxy for local development, then the significance and the sign of its coefficient would not change much across samples. But the effect of *Post Office* varies across treated and untreated groups in both treatments, whereas other variables related to local development, such as *Wage* and *Industry* have a much stabler behavior.

The last column of table 10 gives more evidence that *Post Office* approximates communication, not local development. Similarly to regression 4.2, the marginal effect of *Post Office* on *Sharecropping* is put together with an interaction term between that marginal effect and the distance of each county to the closest coal deposit. As in all regressions of table 6, *Post Office* not only has a significant, negative impact on *Sharecropping* but this effect becomes less negative as the distance to a coal deposit increases. Then, it seems that *Post Office* becomes less important as the further away job opportunities are. Taking into account that other controls for local development are used and that *Dist. Coal* is weakly correlated with *Industry*,[39] *Post Office* much more likely explains the impact of enhanced communication than any coincidental local development.

[*Insert table 7 here.*]

Confirming the analysis of table 5, table 7 shows that turnover costs definitely played a role: *Sharecropping* increases from counties with $Rain = 0$ to $Rain = 1$. Yet note again that the treatment *Coal* determines the size of that change: changes in *Rain* barely increases *Sharecropping* in counties with $Coal = 0$, whereas *Sharecropping* more than doubles where $Coal = 1$. Also note that if $Rain = 1$, *Sharecropping* increases with a change of from $Coal = 0$ to $Coal = 1$. Therefore, even when controlling for other factors, the proxy for the outside option seems to have a determinant impact for *Sharecropping*. This is further evidence supporting the possibility that the outside option played the dominant role in the sharecropping phenomenon in the US South.

[39] *Dist. Coal* and *Industry* share a 0.02 correlation. This correlation is only significant at the 10% level.

4.4.2 Local Power vs Federal Power

[*Insert table 11 here.*]

Post offices, as a branch of the federal government, may have decreased the political clout of the local elites. By consequence, that would interfere with the size of the paternalistic perks given by the local elites. Ager (2013) uses a measure of property inequality in 1860 to demonstrate that prewar elites still played a central role in local politics. Consequently, a treatment is used to split the sample according to whether a county is on the bottom or top 50% of counties in terms of land inequality in 1860: the more unequal land distribution was in 1860, the more powerful the local elite was.

The results on table 11 demonstrate that the size, sign, and significance of the coefficient do not change across treated and untreated groups. It is true that the effect of *Post Office* becomes stronger in the *Bottom Land* regression, but the sign and significance level remain the same. These results are hardly surprising in the light of the discussion of section 2: the state capacity of the federal government is still under debated by social scientists, and evidence points that the federal government was at best indifferent to the evolution of labor institutions in the US South.

The remaining controls in the first two controls present the same pattern: most variables keep their significance and their signs from the treated to the untreated groups. Also the fact that most counties are in the top 50% of land inequality in 1860 becomes enlightening when combined with the analysis by Ager (2013) and Alston and Ferrie (1993). Elaborating, most counties had politically powerful local elites that could distort public provision to improve the sharecropping option in the eyes of the employees relative to other employment options.

4.4.3 Tenure Composition

[*Insert table 12 here.*]

Table 12 displays two extra regressions that inspect the proportion of fixed-rent farms and the proportion of owner-managed farms, respectively, relative to the total farms applying the same model as in regression 4.2. Although the model of section 3 does not include all

the steps in the tenancy ladder,[40] these results conform to what can be predicted from the literature.

Comparing the column *Fixed Rent* to column *Sharecropping*, the proportion of fixed-rent farms also decreases with a simultaneous increase in labor turnover and in the outside option but it decreases less when the outside option increases and does not react to an increase in turnover costs. This is consistent with the fact that those employees most suited for sharecropping eventually became fixed-rent tenants (Ransom and Sutch, 1977; Wright, 1986). According to the model of section 3, more employees on the border between sharecropping and the outside option drop when the latter improves. But that also means that the population of remaining sharecroppers has a higher average managerial ability. Hence, following the heuristics given by the literature, it is expected that a core of fixed-rent tenants remains even with very high outside option because they have extremely low management costs.[41]

Interesting results also arise from analyzing column *Owner vis-à-vis* column *Sharecropping*. As predicted by the model of section 3, *Owner* increases with a simultaneous increase in labor turnover and the outside option, but this derivative is only significantly affected by the level of turnover costs hinged by the treatment *Rain*. This result lends support to the idea that labor turnover was only a problem for employers and higher wages could be absorbed with tenancy agreements.

Inspecting the remaining variables is also quite illuminating. *Enticement laws*, which do not affect *Sharecropping*, appear to transfer farms from *Owner* to *Fixed Rent*, which is consistent with an increase in the value of fixed-rent contracts to employers due to lower chance of contractual breach. *Contract Enforcement laws* seem to carry an extra burden only for sharecroppers, which again is consistent with the idea that fixed-rent tenants were the most able tenant farmers and, hence, less affected by marginal changes in the value of the contract. Consistent with the idea that *Vagrancy laws* increased job search costs and, hence, depressed the outside option, this set of laws increases both types of tenancy and decreases the importance of owner-run farms. *Emigrant-agent laws* and *Convict-leasing*

[40] Steps of the tenancy ladder: wage labor, sharecropping, fixed-rent tenancy, and ownership of the land (Shlomowitz, 1984; Alston and Kauffman, 2001; Naidu, 2010).

[41] In addition, the model of this paper assumes that employers and employees are uniformly distributed. The comparative statics might change when assuming a distribution skewed to employers and employees with high management costs.

system depress labor turnover and the outside option. Yet they only increase *Fixed Rent*, having a negative or insignificant impact in the other two types of land tenure. Lastly, *Wage* has a positive impact on both *Fixed Rent* and *Owner*. This result is consistent with the idea that the outside option was mostly a concern for employees indifferent between sharecropping and other types of jobs, that is, employees with higher management costs. If *Wages* was essentially a consideration in the cost structure of employers, that would decrease *Owner*, not increase it. Furthermore, a positive effect on *Fixed Rent* has a similar interpretation to the derivative between *Fixed Rent* and *Post Office*. After each simultaneous increase in labor turnover and the outside option, the remaining fixed-rent tenants are those with the lowest management costs.

4.4.4 Extra robustness checks

[*Insert table 14 here.*]

Three extra robustness checks are run. Table 14 addresses concerns about the states included in the sample. First, the county borders changed quite significantly in Florida and Texas (NHGIS, 2011), a potential sign of underlying changes in the settlement in those regions. Kentucky and West Virginia did not join the confederates in the American Civil War. Moreover, figures 1 and 2 shows that all these states have a higher sample average of *Post Density* and a low sample average of *Sharecropping*. Overall, all results, although the magnitude and significance of the results vary somewhat, excluding these states in particular does not change the gist and the significance of the results shown in column (1) of table 6.[42]

[*Insert table 15 here.*]

The second extra robustness uses random effects estimation circumvents the fact that treatments *Rain* and *Coal* are time invariant.[43] Although the model in section 3 does not

[42] *Postal History*, the source of the variable *Post Office*, classifies the data of Post Offices in Virginia as 'subpar'. However, excluding Virginia does not affect the results.

[43] Although a random-effect estimator allows for time-invariant components, it also requires a stricter assumption on exogeneity. Bearing this last shortcoming in mind, regression 4.2 is run using a random-effects estimator, and including the level of each treatment in the set of control variables. At a first glance, table 15 shows that almost all coefficients keep their significance and sign when changing from a fixed-effects estimation to a random-effects estimation. The R-Squared also does not change by much. These findings give some extra confidence when reading the coefficients of time-invariant variables.

handle hypothetical long-term effects of those treatments, interpreting those treatments gives further evidence to the main conclusion of this paper. Briefly, the treatment *Rain* has no significant level effect on *Sharecropping* but the treatment *Coal* has a positive level effect on *Sharecropping*. Path dependence gives one possible story. Since employers had slaves in cotton plantations before the American Civil War, the labor turnover problem in cotton cultivation proxied by the treatment *Rain* was not a problem. Likewise, the outside options brought by the treatment *Coal* already existed before the American Civil War, which affected choices in other crops besides cotton. An alternative story relates to the possibility that *Coal* captures labor turnover that is not explained by the treatment *Rain*. That effect would be consistent with the predictions of the model. In other words, the treatment *Coal* alone mostly increases labor turnover permanently but, when combined with more post offices, it also improves the chances of news about new job openings that shift the outside option.

[*Insert table 16 here.*]

The final extra robustness check tackles the effect of selection in unobservables on the results in table 6. Although the dataset provides enough variables to capture the thresholds of the model of section 3, this empirical exercise uses aggregate observational data to test decisions taken at employer and/or employee level. This paper follows the methodology proposed by Altonji, Elder, and Taber (2005) and improved by Oster (2016), which gives a ratio to analyze the variation in the coefficient of each variable from a regression model with less variables, called the *restricted* model, to the regression model with all the variables used in the regressions of this section, called the *full* model. The numerator consists of the coefficient of the full model, β_F. The denominator consists of the difference between the coefficient of the restricted model, β_R, and β_F. Overall, the larger the absolute value of this ratio, the stronger the selection on unobservables must be to explain away the findings of this model. Oster (2016) proposes that ratio to be multiplied by another ratio where the numerator is the difference between the R-Squared of the full model, R_F, and that of the restricted model, R_R, and the denominator is the difference between the R-Squared of the model including the unobservables, R_{Max}, and R_F.[44]

[44]Oster (2016) recommends a $R_{Max} = 1.3R_F$ due to the chance that all variables, including the proxies for unobservables, would have some measurement error in the real world.

The first line of table 16 tests the robustness of the coefficient of *Post Office* presented in column (1) of table 6, whereas the next three lines test the robustness of the coefficients of *Post Office* and its interactions with the treatments *Rain* and *Coal*. Note that the restricted model in columnes (1) to (4) includes the variables that historical evidence in subsection 2.2 identifies as drivers of *Post Office*: population density and proximity to railroads. Following a suggestion by Oster (2016), columns (3) and (4) measure how strong the selection on unobservables would have to be to make those coefficients equal to their asymmetric value.

The results in the first line prove the robustness of the coefficient *Post Office*. In columns (1) and (2), the selection on unobservables would have to be 44% to 100% (2.88 and 3.99 times) stronger than the selection on observables to make the coefficient insignificant (to invert the sign of this coefficient). Therefore, it is unlikely that some unobserved heterogeneity can explain away the findings in column (1) of table 6. However, in the next three lines, only the coefficient of the interaction term between *Post Office* and the treatment *Coal* has a similar performance, which raises doubts about the coefficients of column (4) of table 6. But, again, the first line hints that the coefficient of *Post Office* is robust to unobservables. Thus, two extra treatments are perhaps noisy proxies to labor turnover and the outside option, contaminating the coefficient of *Post Office*. The R-Squared increases very little from column (1) to column (4) in table 6. Also table 7 signals that the greatest drop in *Sharecropping*, almost 20 percentage points, occurs when the treatment *Rain* changes in counties with $Coal = 1$. So, the increased noise of *Post Office* might be caused by the fact that *Sharecropping* decreases much more when turnover costs decrease in counties with a higher outside option. This story is consistent with the core message of the paper: whenever there are more news of better jobs outside of agriculture, turnover costs need to be dramatically high for an increase in the proportion of sharecropping to happen. Above all, to contradict the core conclusion of this paper, the coefficient signs would have to be the opposite: selection on unobservables would have to be stronger than that on observables to explain away the interaction terms.[45]

[45] As reported in the last footnote of table 16, Oster (2016) warns for several serious limitations to this method.

5 Concluding Remarks and Future Research

The rise of sharecropping contracts in the US South between 1880 and 1940 offers a neat case study to disentangle the dominant driver behind a specific labor contract: economists and economic historians agree on the primacy of labor turnover in the emergence of these share contracts; the terms of these share contracts were standardized before 1880, meaning decisions of both employers and employees were mostly on the extensive margin; some employees benefited more from sharecropping than others; the rural South lived in isolated and, thus, unaware of large transformations brought by industrialization; also before 1880, the Post Office service was already a well-established, capable communication service that could counteract isolation. Hence, an additional post office certainly increased labor turnover and the outside option, affecting both employers indifferent between sharecropping and wage labor, and employees indifferent between sharecropping, wage labor and the outside option.

The propositions discussed in subsection 3.2 demonstrate that if the outside option is low enough, a simultaneous increases in labor turnover and the outside option increase the proportion of sharecropping. In other words, the proportion of sharecropping is driven by employers who wish to minimize labor turnover. Otherwise, if the outside option is high enough, the proportion of sharecropping will be driven by employees who are left indifferent between sharecropping and any other option inside or outside the farming sector. In that case, a simultaneous increase in labor turnover and the outside option decreases the proportion of sharecropping. Section 4 translates these propositions into empirically-testable predictions using the variation in post office density at county level as the identification variable of a simultaneous increase in labor turnover and the outside option.

The gist of non-parametric and parametric empirical evidence is unambiguous: labor turnover faced by the employers was certainly not the dominant force behind the proportion of sharecropping; all the evidence gives that role to the outside option of the employees. The proportion of sharecropping is negatively correlated to the post office density. The baseline regression in column (1) of table 6 presents a statistically-significant, negative coefficient of post office density. The treatments *Rain* and *Coal*, respectively measuring turnover costs and the outside option, give further evidence of the adherence of the propositions from subsection

3.2 and, again, that all the evidence points in favor of the dominance of the outside option. Several robustness checks do not only reinforce the key message of this paper but they also downplay the role of post office as a proxy for local development or for the presence of the federal government.

Figure 6 demonstrates the relevance of the issue at hand: the higher the proportion of sharecropping in a county between 1880 and 1940, the lower GDP per capita in 2014. This descriptive statistic points for a possible distortion in resource allocation that still affects the economy nowadays. A back-of-the-envelope calculation using the marginal effects of table 9 tells that a one-standard-deviation increase in post office density in the past would have increased the GDP per capita in 2014 somewhere in between 0.5% and 1.1%. The discussion in subsection 4.3 tells that these values most likely underestimate the impact of communication: mailing delivery routes improved in this time, increasing the efficiency of each post office; more communication means were made available to the population, such as the radio; the first wave of migration out of the South happened after 1914 as direct result from World War 1; after 1900, the Jim Crow era meant diminished labor mobility and increased paternalistic benefits for employees. All in all, according to section 2, sharecropping was a great solution among the feasible arrangements to solve labor supply problems in the farming sector. However, the present study gives robust evidence that sharecropping mostly resulted from employees who took those contracts due to low outside options. The negative relation between sharecropping and GDP per capita entices future research about a possible significant cost that the US South still bears today.

As discussed in the introduction, share contracts abound in the modern economy. The literature found several reasons inside of particular firms or industries to use them. However, this paper finds evidence of the adoption of a share contract mostly due to a low outside options for employees created by deficient communication. This is a phenomenon that might well explain the persistence of sharecropping in developing economies nowadays (Townsend and Mueller, 1998). Using non-parametric evidence, Hall and Krueger (2016) also discuss the role of outside options to make sure they do not affect the rapid increase in the number of Uber's driver-partners. The emergence of franchising contracts (Pruett and Winter, 2011) might also be affected by the level of the outside option: the same way

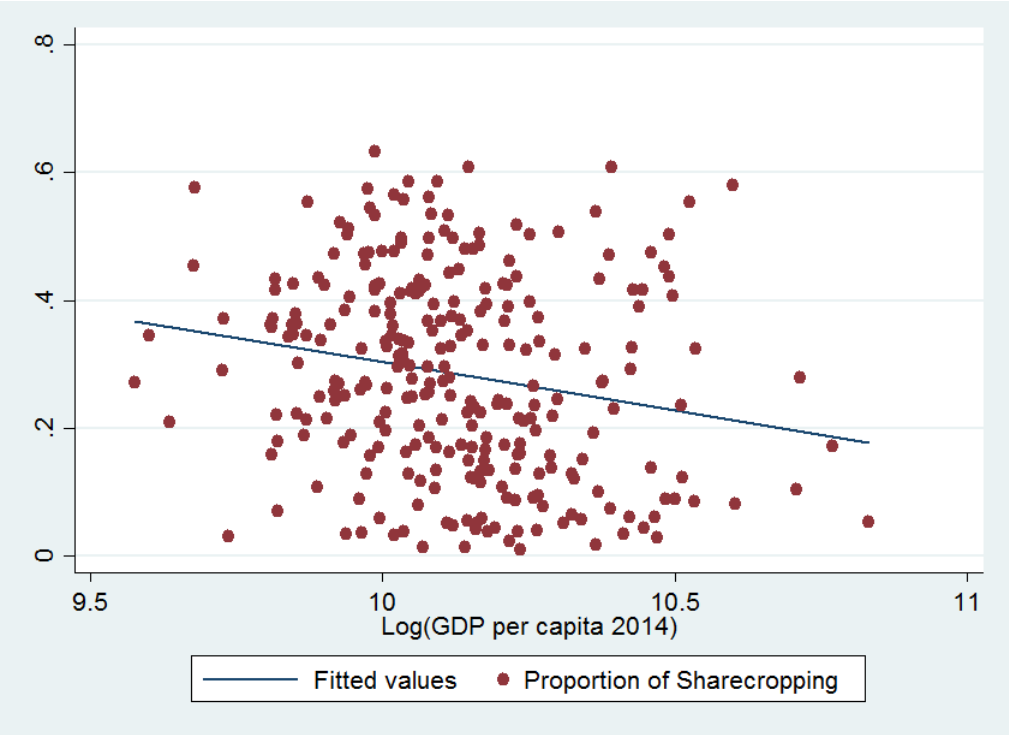

Figure 6: Correlation between GDP per capita in 2014 and number of sharecropping farms over the total number of farms, 1880-1940 average. Correlation: -0.20, significant at 1%. Sources: NHGIS (2011).

sharecropping contracts gave access to a crucial input, land, to several impoverished farmers, less-able entrepreneurs nowadays might only find some crucial inputs, such as branding, through franchising contracts.

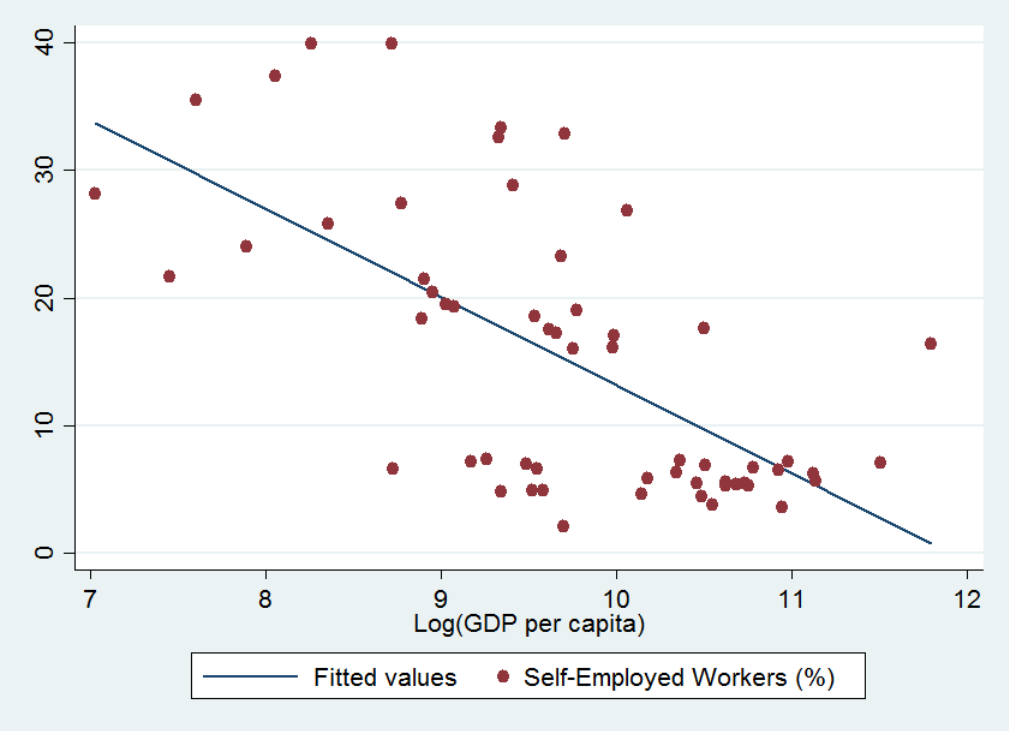

Figure 7: Correlation between GDP per capita and Entrepreneurial Activity. Correlation: -0.65, significant at 1%. Sources: The Economist; International Monetary Fund.

Since franchising is a form of entrepreneurship (Pruett and Winter, 2011), this paper gives a possible interpretation of figure 7: the higher the GDP per capita, the less important entrepreneurs are in the labor force. Further evidence of the role of the outside option is brought by table 13 and GEM (2015). First, the top 5 most entrepreneurial countries are poorer than any of the bottom 5 countries. Although Suriname and Russia are not necessarily very sophisticated or diversified economies, it is easy to see the role of the outside option when comparing any of the Top 5 economies with Italy, Hong Kong and Japan, all economies with a long, established tradition of world-class entrepreneurs. Second, GEM (2015) states the proportion of Spanish workers who became entrepreneurs out of necessity increased from 14.8% in 2008 to 29.8% in 2014 at the same time the total entrepreneurial activity rate decreased from more than 7% in 2008 to 5.5% in 2014. That is, when the financial crisis

depressed a modern economy like Spain, the proportion of entrepreneurs potentially with a binding participation constraint more than doubled. Thus, future research should take steps along the lines of Paulson, Townsend and Karaivanov (2006) in order to investigate the dominant factors behind entrepreneurship.

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Tables

Table 1: Main Variables

Variable	Definition and Sources	Median Value (Standard Deviation)	Obs.
Sharecropping:	Number of sharecropping farms relative to total number of farms in each county. Source: NHGIS (2011).	0.2938 (0.1775)	8,058
Farms:	Number of farms relative to the total area of each county. Source: NHGIS (2011).	1.5020 (0.9459)	8,106
Post Office:	Number of post offices per square kilometer in each county. Source: Postal History, https://postalhistory.com/.	0.0136 (0.0123)	7,840
Rain:	1 if the county belongs to the top 50% of the counties with the highest average, monthly standard deviation of precipitation from September to December, 0 otherwise. Source: NOAA (2016) and Hong (2013).		8,148
Coal:	1 if the county sits on a coal deposit, 0 otherwise. Source: USGS (1996).		8,148
Laws and *Convict-lease system*:	1 if the county is in a state where this legislation is enforced in each decade, 0 otherwise. Source: Figure 8.		
Rural Pop. Dens.:	Population per square kilometer living in locations with less than 2.500 inhabitants in each county. Source: NHGIS (2011).	12.0981 (8.7294)	8,122
Wage:	Farm labor wage rates per day without board per state. Source: USDA (1942).	1.0778 (0.4033)	8,148
Urban Pop. Dens.:	Population per square kilometer living in locations with more than 2.500 inhabitants in each county. Source: NHGIS (2011).	4.0397 (27.3124)	8,122
Avg. Farm Size:	Average size of farms in square meters in a county. Source: NHGIS (2011).	699.6453 (456.2196)	8,073
Prop. of Blacks:	Proportion of black labor force relative to white labor force in the county. Source: NHGIS (2011).	0.2647 (0.2341)	8,104
Industry:	Industrial production in millions of dollars. Source: NHGIS (2011).	3.1234 (15.0550)	8,148
Dist. Railway:	Distance of the county's centroid to the nearest railway line. Source: Atack (2013).	15.4724 (37.1110)	8,148
Temperature SD:	Average monthly standard deviation of the average temperature. Source: NOAA (2016) and Hong (2013).	1.6752 (0.2532)	8,126
Precipitation SD:	Average monthly standard deviation of precipitation. Source: NOAA (2016) and Hong (2013).	46.4452 (9.3920)	8,126

All variables cover the period 1880 and 1940, one data point per decade. Number of observations equals to the product of the cross-section and the time-series dimensions. *Sharecropping* variable definition varies according to data availability. Between 1880 and 1900, the census just mentions share tenants. After 1910, there is still significant variation from census wave to census wave. For a matter of consistency, sharecropper, share tenant, share cash tenant, sharecropper and other tenants are all included in the *Sharecropping*. The treatments *Rain* and *Coal* are proxies for turnover costs and the outside option, respectively.

Table 2: Robustness Variables

Variable	Definition and Sources	Median Value (Standard Deviation)	Obs.
Fixed Rent:	Number of fixed rent farms relative to total number of farms in each county. Source: NHGIS (2011).	0.1054 (0.1197)	8,058
Owner:	Number of owner-run farms relative to total number of farms in each county. Source: NHGIS (2011).	0.5928 (0.2046)	8,058
Dist. Coal:	Distance to the closest coal deposit to each county centroid in kilometers. Source: USGS (1996).	64.95882 (85.2052)	8,148
Land:	1 if the county belongs to the top 50% of the counties with the highest land inequality in the 1860 census, 0 otherwise. Source: Nunn (2008).		8,148

All variables cover the period 1880 and 1940, one data point per decade. Number of observations equals to the multiplication of the cross-section and the time-series dimensions, and varies according to data availability. *Sharecropping* variable definition varies according to data availability. *Fixed Rent* and *Owner* farms face the same data availability issues as *Sharecropping*.

Table 3: Correlation between *Post Office* with *Sharecropping*, *Farms*, treatments and control variables.

		Post Office						
	Whole Sample	1880	1890	1900	1910	1920	1930	1940
Sharecropping	-0.24***	0.01	0.02	0.09***	-0.29***	-0.38***	-0.43***	-0.36***
Farms	0.08***	0.18***	0.04	0.02	0.05*	-0.03	-0.06*	0.03
Rain	-0.22***	-0.20***	-0.21***	-0.20***	-0.28***	-0.28***	-0.30***	-0.29***
Coal	-0.01	-0.14***	-0.13***	-0.10***	0.07*	0.1***	0.1***	0.10***
Rural Pop. Dens.	0.44***	0.69***	0.66***	0.63***	0.36***	0.39***	0.39***	0.37***
Wage	-0.09***	-0.33***	-0.41***	-0.30***	-0.05*	0.11***	0.36***	0.36***
Urban Pop. Dens.	0.05***	0.12***	0.11***	0.11***	0.04	0.05*	0.05	0.04
Industry	0.02*	0.17***	0.14***	0.11***	0.02	0.04	0.03	0.02
Dist. Railway	-0.16***	-0.43***	-0.30***	-0.28***	-0.09***	0.02	0.04	0.04
Avg. Farm Size	0.04***	0.29***	0.21***	-0.06**	-0.22***	-0.24***	-0.22***	-0.22***
Prop. of Blacks	-0.07***	-0.07***	-0.12***	-0.11***	-0.15***	-0.15***	-0.17***	-0.16***
Temperature SD	0.04***	0.27***	-0.12***	0.34***	0.33***	0.34***	0.09***	0.16***
Precipitation SD	-0.05***	-0.16***	0.00	0.02	-0.15***	-0.25***	-0.22***	-0.05

This table presents the correlation between the crucial identification variable, *Post Office*, and every treatment and every control variable. 'Whole sample' includes all within and between variation. This table justifies the need to control for several variables identified in historical literature, and to separate within and between variation. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 4: Mean differences in variables due to the *Rain* and *Coal* treatments.

	Rain	*No Rain*	*Dif.*	*Coal*	*No Coal*	*Dif.*
Sharecropping	0.33	0.26	0.07***	0.31	0.29	0.03***
	(4,056)	(4,002)	(8,058)	(2,475)	(5,583)	(8.058)
Farms	0.12	0.11	0.00***	0.12	0.11	0.01***
	(4,056)	(4,034)	(8,090)	(2,475)	(5,615)	(8,090)
Post Office	0.11	0.17	-0.01***	0.01	0.01	0.00
	(3,885)	(3,955)	(7,840)	(2,429)	(5,411)	(7,840)
Rural Pop. Dens.	11.66	12.54	-0.88***	11.69	12.28	-0.59***
	(4,056)	(4,066)	(8,122)	(2,475)	(5,647)	(8,122)
Wage	1.03	1.13	-0.09***	1.13	1.06	0.08***
	(4,074)	(4,074)	(8,148)	(2,492)	(5,656)	(8,148)
Industry	3.76	2.49	1.28***	2.71	3.31	-0.60*
	(4,074)	(4,074)	(8,148)	(2,492)	(5.656)	(8,148)
Dist. Railway	10.15	20.80	-10.65***	12.92	16.60	-3.68***
	(4,074)	(4,074)	(8,148)	(2,492)	(5.656)	(8,148)
Urban Pop. Dens.	4.74	3.34	1.40**	2.95	4.52	-1.57***
	(4,056)	(4,066)	(8,122)	(2,475)	(5,647)	(8,122)
Avg. Farm Size	703.67	695.58	-8.09	725.02	688.43	36.60***
	(4,056)	(4,107)	(8,073)	(2,475)	(5,598)	(8,073)
Prop. of Blacks	0.34	0.19	0.16***	0.27	0.26	0.01**
	(4,057)	(4,047)	(8,104)	(2,475)	(5,629)	(8,104)

This table shows the effect of the treatments *Rain* and *Coal* on the independent, identification and control variables. Below the mean of each variable in the treatment and control groups, there is the number of observations in parentheses. The value and signs of the differences between treatment and control groups gives an extra argument for the inclusion of control variables. ***, ** and * indicate 1%, 5% and 10% significance level, respectively. Find the number of observations in parentheses.

Table 5: Average of *Sharecropping* conditional on "Rain" and "Coal" treatments.

	Coal=1	*Coal*=0
Rain=1	36.85%	30.43%
Rain=0	21.45%	27.07%

Sample average depending on treatments' combinations. Table 7 gives the fitted values controlling for other factors.

Table 6: Regressions including "Rain" and "Coal" treatments.

	Sharecropping			
	(1)	(2)	(3)	(4)
Post Office	-1.2246***	-1.5222***	-0.3724	-0.6585**
	(0.2289)	(0.2470)	(0.2673)	(0.2904)
Post Office×*Rain*		1.3355***		1.0877**
		(0.4275)		(0.4340)
Post Office×*Coal*			-2.2794***	-2.1624***
			(0.4057)	(0.4176)
Enticement laws	0.0017	0.0020	0.0056	0.0057
	(0.0076)	(0.0075)	(0.0076)	(0.0076)
Contract Enforcement laws	-0.0120*	-0.0126*	-0.0137**	-0.0141**
	(0.0069)	(0.0070)	(0.0069)	(0.0069)
Vagrancy laws	0.0272***	0.0266***	0.0211***	0.0210***
	(0.0065)	(0.0064)	(0.0066)	(0.0066)
Emigrant-agent laws	-0.0022	-0.0018	-0.0025	-0.0022
	(0.0052)	(0.0052)	(0.0052)	(0.0052)
Convict-lease system	-0.0105***	-0.0120***	-0.0122***	-0.0133***
	(0.0037)	(0.0037)	(0.0037)	(0.0037)
Rural Pop. Dens.(-1)	0.0012*	0.0014**	0.0014**	0.0016**
	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Wage	-0.2450***	-0.2522***	-0.2432***	-0.2491***
	(0.0138)	(0.0142)	(0.0140)	(0.0143)
Urban Pop. Dens.(-1)	-0.0006***	-0.0006***	-0.0006***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Avg. Farm Size(-1)	0.0001***	0.0001***	0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Prop. of Blacks(-1)	0.0005	0.002	0.0022	0.0025
	(0.0402)	(0.0400)	(0.0402)	(0.0401)
Industry	-0.0004***	-0.0004***	-0.0004***	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Railway	-0.0001	-0.0001	-0.0002	-0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Temperature SD	0.0015	-0.0044	-0.0013	-0.0037
	(0.0113)	(0.0114)	(0.0113)	(0.0114)
Precipitation SD	0.0020***	0.0020***	0.0019***	0.0019***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
County Fixed Effects	Yes	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes	Yes
N	7,609	7,609	7,609	7,609
R-Squared	0.4376	0.4388	0.4415	0.4423

These regressions examine whether the increase in the density of post offices in a county from one decade to another increases or decreases the use of sharecropping contracts relative to all types of farm contracts. Column (1) uses the simplest identification strategy, whereas the remaining tables use difference-in-differences strategy. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 7: Average Fitted Value of *Sharecropping* conditional on "Rain" and "Coal" treatments.

	Coal=1	*Coal*=0
Rain=1	35.38%	29.88%
Rain=0	16.54%	29.87%

The regressions ran with all control variables except the identification variable *Post Office* used in the regressions of table 10. Then, the fitted values were averaged out across all counties and all decades.

Table 8: Regressions on the total number of Farms.

	Farms			
	(1)	(2)	(3)	(4)
Post Office	-2.0058*	-1.4516	-3.2016***	-2.6368**
	(1.0958)	(1.2315)	(1.0471)	(1.1733)
Post Office×*Rain*		-2.4867		-2.1467
		(1.9029)		(1.8837)
Post Office×*Coal*			3.1980	2.9672
			(2.0362)	(2.0083)
Enticement laws	0.0823***	0.0817***	0.0768***	0.0766***
	(0.0261)	(0.0262)	(0.0257)	(0.0258)
Contract Enforcement laws	0.0741***	0.0752***	0.0766***	0.0774***
	(0.0269)	(0.0267)	(0.0271)	(0.0269)
Vagrancy laws	-0.0344	-0.0333	-0.0260	-0.0257
	(0.0242)	(0.0243)	(0.0247)	(0.0247)
Emigrant-agent laws	0.0850***	0.0844***	0.0855***	0.0849***
	(0.0213)	(0.0214)	(0.0213)	(0.0214)
Convict-lease system	0.0221*	0.0249**	0.0245**	0.0268**
	(0.0123)	(0.0125)	(0.0122)	(0.0125)
Rural Pop. Dens.(-1)	0.0463***	0.0460***	0.0460***	0.0457***
	(0.0061)	(0.0062)	(0.0061)	(0.0062)
Wage	-0.3910***	-0.3776***	-0.3935***	-0.3818***
	(0.0641)	(0.0650)	(0.0638)	(0.0648)
Urban Pop. Dens.(-1)	-0.0009	-0.0009	-0.0008	-0.0008
	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Avg. Farm Size(-1)	0.0001***	0.0002***	0.0001***	0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Prop. of Blacks(-1)	-0.3620**	-0.3629**	-0.3644**	-0.3650**
	(0.1586)	(0.1590)	(0.1585)	(0.1589)
Industry	-0.0018*	-0.0018*	-0.0018*	-0.0018*
	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Dist. Railway	0.0007***	0.0008***	0.0008***	0.0008***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Temperature SD	0.0497	0.0551*	0.0495	0.0541*
	(0.0320)	(0.0321)	(0.0319)	(0.0322)
Precipitation SD	0.0026***	0.0027***	0.0027***	0.0027***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)
County Fixed Effects	Yes	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes	Yes
N	7609	7609	7609	7609
R-Squared	0.5223	0.5226	0.5228	0.5229

Analogous exercise to that of table 6 but applied to *Farms* in place of *Sharecropping*. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 9: Marginal Effects of column (4) of table 6, including "Rain" and "Coal" treatments.

			Sharecropping		
	Marginal Effect	*Marginal S.D.*	*Full Sample Avg.*	*1880 Avg.*	*1940 Avg.*
Post Office	-0.6585**	-0.8 p.p.	-2.8%	-3.7%	-2.5%
	(0.2904)				
Post Office with *Rain*	-0.1117	-0.1 p.p.	-0.5%	-0.6%	-0.4%
	(0.2907)				
Post Office with *Coal*	-1.3360***	-1.6 p.p.	-5.6%	-7.6%	-5.2%
	(0.2464)				
Post Office with *Rain* and *Coal*	-0.7892***	-1.0 p.p.	-3.3%	-4.5%	-3.0%
	(0.2612)				

From table 1, the standard deviation of *Post Office* is 0.0123. In column *Marginal S.D.*, the value equals the standard deviation of *Post Office* times the value in column *Marginal Effect* (where p.p. stands for "percentage point"). The four last columns equal the value in column *Marginal S.D.* divided by the average of *Sharecropping* in the full sample, in 1880, in 1930, and in 1940, respectively. The averages of *Sharecropping* across counties in the full sample, in 1880, in 1930, and in 1940 are 29.38%, 21.71%, and 31.85%, respectively. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 10: Regressions depending on whether the county is in the treatment *Rain* (*Coal*).

	Sharecropping				
	Rain	*No Rain*	*Coal*	*No Coal*	*Dist. Coal*
Post Office	0.2058	-1.3172***	-2.3726***	-0.1862	-1.5800***
	(0.5140)	(0.2606)	(0.3611)	(0.3037)	(0.2875)
Post×Dist. Coal					0.0083**
					(0.0034)
Enticement laws	-0.0218**	0.0523***	0.0501**	0.0047	0.0040
	(0.0094)	(0.0128)	(0.0212)	(0.0079)	(0.0077)
Contract Enforcement laws	-0.0131	-0.0186	0.0085	-0.0172**	-0.0122*
	(0.0084)	(0.0137)	(0.0126)	(0.0077)	(0.0069)
Vagrancy laws	0.0233**	0.0205**	0.0500***	-0.0066	0.0249***
	(0.0117)	(0.0085)	(0.0139)	(0.0074)	(0.0066)
Emigrant-agent laws	-0.0024	-0.0073	-0.0026	-0.0102**	-0.0030
	(0.0078)	(0.0069)	(0.0113)	(0.0057)	(0.0052)
Convict-lease system	0.0072	-0.0268***	-0.0115	-0.0091**	-0.0110***
	(0.0058)	(0.0047)	(0.0080)	(0.0042)	(0.0037)
Rural Pop. Dens.(-1)	0.0046***	-0.0009	0.0003	0.0026***	0.0013**
	(0.0011)	(0.0006)	(0.0007)	(0.0008)	(0.0006)
Wage	-0.3037***	-0.2332***	-0.3255***	-0.1620***	-0.2452***
	(0.0299)	(0.0178)	(0.0247)	(0.0168)	(0.0139)
Urban Pop. Dens.(-1)	-0.0008***	-0.0005	-0.0006	-0.0005***	-0.0006***
	(0.0003)	(0.0003)	(0.0005)	(0.0002)	(0.0001)
Avg. Farm Size(-1)	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Prop. of Blacks(-1)	-0.0009	0.0356	-0.0970	0.0891*	-0.0001
	(0.0476)	(0.0707)	(0.0607)	(0.0507)	(0.0402)
Industry	-0.0005**	-0.0001	-0.0003	-0.0005***	-0.0004***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0001)
Dist. Railway	-0.0002	-0.0001	-0.0002	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Temperature SD	-0.0020	-0.0007	-0.0277	0.0073	-0.0012
	(0.0166)	(0.0162)	(0.0198)	(0.0136)	(0.0113)
Precipitation SD	0.0012***	0.0026***	0.0023***	0.0019***	0.0019***
	(0.0003)	(0.0004)	(0.0005)	(0.0003)	(0.0003)
County Fixed Effects	Yes	Yes	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes	Yes	Yes
N	3,825	3,784	2,384	5,225	7609
R-Squared	0.4784	0.4144	0.5819	0.3855	0.4383

In place of the interaction terms in table 6, the regressions in this table are split according to treatments *Rain* and *Coal*. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 11: Regressions depending on whether the county is in the treatment *Land*.

	Sharecropping		
	Top Land	*Bottom Land*	*Dif-in-Dif*
Post Office	-1.0868***	-1.4061***	-1.0659***
	(0.3250)	(0.3231)	(0.2994)
Post Office×*Land*			-0.3266
			(0.3487)
Enticement laws	0.0072	-0.0061	0.0019
	(0.0101)	(0.0109)	(0.0076)
Contract Enforcement laws	-0.0085	-0.0090	-0.0120*
	(0.0089)	(0.0109)	(0.0069)
Vagrancy laws	0.0288***	0.0163*	0.0273***
	(0.0089)	(0.0099)	(0.0065)
Emigrant-agent laws	-0.0044	-0.0061	-0.0021
	(0.0067)	(0.0084)	(0.0052)
Convict-lease system	-0.0063	-0.0207***	-0.0105***
	(0.0048)	(0.0058)	(0.0037)
Rural Pop. Dens.(-1)	0.0017*	0.0009	0.0012*
	(0.0009)	(0.0007)	(0.0006)
Wage	-0.2498***	-0.2303***	-0.2448***
	(0.0188)	(0.0201)	(0.0139)
Urban Pop. Dens.(-1)	-0.0008	-0.0005***	-0.0006***
	(0.0005)	(0.0001)	(0.0001)
Avg. Farm Size(-1)	0.0001***	0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0000)
Prop. of Blacks(-1)	0.0763	-0.0667	0.0001
	(0.0472)	(0.0716)	(0.0402)
Industry	-0.0005*	-0.0003*	-0.0004***
	(0.0003)	(0.0002)	(0.0001)
Dist. Railways	-0.0003*	0.0001	-0.0001
	(0.0002)	(0.0003)	(0.0001)
Temperature SD	0.0060	-0.0072	-0.0015
	(0.0135)	(0.0202)	(0.0114)
Precipitation SD	0.0020***	0.0020***	0.0020***
	(0.0003)	(0.0004)	(0.0003)
County Fixed Effects	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes
N	4522	3087	7609
R-Squared	0.4913	0.3713	0.4377

This table uses a treatment that proxies the power of political elites, *Land*. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 12: Regressions on *Fixed Rent* and *Owner* compared with regression on *Sharecropping*.

	Fixed Rent	*Owner*	*Sharecropping*
Post Office	-0.8110***	1.4172***	-0.6585**
	(0.1837)	(0.3020)	(0.2904)
Post Office×*Rain*	0.0501	-1.1985***	1.0877**
	(0.3079)	(0.3576)	(0.4340)
Post Office×*Coal*	1.9493***	0.1985	-2.1624***
	(0.3132)	(0.3550)	(0.4176)
Enticement laws	0.0196***	-0.0258***	0.0057
	(0.044)	(0.0066)	(0.0076)
Contract Enforcement laws	0.0005	0.0097*	-0.0141**
	(0.0055)	(0.0073)	(0.0069)
Vagrancy laws	0.0113**	-0.0324***	0.0210***
	(0.0050)	(0.0053)	(0.0066)
Emigrant-agent laws	0.0054***	0.0009	-0.0022
	(0.0038)	(0.0040)	(0.0052)
Convict-lease system	0.0186***	-0.0019***	-0.0133***
	(0.0038)	(0.0033)	(0.0037)
Rural Pop. Dens.(-1)	0.0010**	-0.0021**	0.0016**
	(0.005)	(0.0005)	(0.0006)
Wage	0.0841***	0.1612***	-0.2491***
	(0.0099)	(0.0113)	(0.0143)
Urban Pop. Dens.(-1)	0.0000	0.0005***	-0.0006***
	(0.0001)	(0.0002)	(0.0001)
Avg. Farm Size(-1)	0.0000	-0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0000)
Prop. of Blacks(-1)	0.2630***	-0.2809***	0.0025
	(0.0288)	(0.0368)	(0.0401)
Industry	0.0001	0.0002*	-0.0004***
	(0.0001)	(0.0001)	(0.0001)
Dist. Railways	-0.0003***	0.0004***	-0.0002
	(0.0001)	(0.0001)	(0.0001)
Temperature SD	0.0316***	-0.0300**	-0.0037
	(0.0089)	(0.0118)	(0.0114)
Precipitation SD	-0.0007***	-0.009***	0.0019***
	(0.0002)	(0.0002)	(0.0003)
County Fixed Effects	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes
N	7,609	7,609	7,609
R-Squared	0.2088	0.4314	0.4423

Column *(Sharecropping)* is the same as column (4) of table 6. This table shows the impact of *Post Office* in the composition of the farming contracts. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 13: Top 5 and bottom 5 countries in terms of Entrepreneurial Activity.

Highest	*Lowest*
Nigeria (39.9%)	Suriname (2.10%)
Zambia (39.9%)	Hong Kong (3.60%)
Cameroon (37.4%)	Japan (3.83%)
Uganda (35.5%)	Italy (4.42%)
Namibia (33.3%)	Russia (4.69%)

Definition: percentage of active population who are either a nascent entrepreneur or a owner-manager of a new business. Source: The Economist.

Table 14: Regressions excluding certain states.

	Sharecropping		
	Sub-Sample 1	*Sub-Sample 2*	*Whole Sample*
Post Office	-0.4830*	-1.1854***	-0.6585**
	(0.2851)	(0.3832)	(0.2904)
Post Office×*Rain*	1.3000***	2.3558***	1.0877**
	(0.4361)	(0.5420)	(0.4330)
Post Office×*Coal*	-2.0554***	-3.3632***	-2.1624***
	(0.4049)	(0.9337)	(0.4176)
Enticement laws	0.0102	-0.0042	0.0057
	(0.0077)	(0.0087)	(0.0076)
Contract Enforcement laws	0.0122	-0.0121*	-0.0141**
	(0.0075)	(0.0069)	(0.0069)
Vagrancy laws	0.0098	-0.0211**	0.0210***
	(0.0072)	(0.0101)	(0.0066)
Emigrant-agent laws	0.0032	-0.0010	-0.0022
	(0.0067)	(0.0060)	(0.0052)
Convict-lease system	-0.0246***	-0.0074*	-0.0133***
	(0.0037)	(0.0043)	(0.0037)
Rural Pop. Dens.(-1)	0.0013**	0.0053***	0.0016**
	(0.0006)	(0.0009)	(0.0006)
Wage	-0.2461***	-0.2334***	-0.2491***
	(0.0146)	(0.0185)	(0.0143)
Urban Pop. Dens.(-1)	-0.0005***	-0.0006***	-0.0006***
	(0.0001)	(0.0002)	(0.0001)
Avg. Farm Size(-1)	0.0000***	0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0000)
Prop. of Blacks(-1)	0.0191	0.1083**	0.0025
	(0.0477)	(0.0430)	(0.0401)
Industry	-0.0004	-0.0007***	-0.0004***
	(0.0002)	(0.0002)	(0.0001)
Dist. Railways	-0.0002	-0.0002*	-0.0002
	(0.0002)	(0.0001)	(0.0001)
Temperature SD	0.0324***	-0.0003	-0.0037
	(0.0122)	(0.0130)	(0.0114)
Precipitation SD	0.0026***	0.0013***	0.0019***
	(0.0003)	(0.0003)	(0.0003)
County Fixed Effects	Yes	Yes	Yes
Decade Fixed Effects	Yes	Yes	Yes
N	5963	5821	7609
R-Squared	0.4472	0.4743	0.4423

Column *Whole Sample* is the same as column (4) of table 6. *Sub-Sample 1* excludes Florida and Texas because the borders of their counties changed the most between 1880 and 1940. *Sub-Sample 2* excludes Kentucky, Tennessee and West Virginia because of the Appalachian Region, which is historically less dependent on slave labor and on cotton production. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 15: Regressions using Random Effects.

	Sharecropping	
	Random Effects	*Fixed Effects*
Post Office	-1.8264***	-0.6585**
	(0.2666)	(0.2904)
Rain	-0.0018	-
	(0.0098)	
Post Office×*Rain*	1.7342***	1.0877**
	(0.3973)	(0.4330)
Coal	0.0571***	-
	(0.0094)	
Post Office×*Coal*	-1.5951***	-2.1624***
	(0.3720)	(0.4176)
Enticement laws	-0.0181***	0.0057
	(0.0064)	(0.0076)
Contract Enforcement laws	-0.0113*	-0.0141**
	(0.0065)	(0.0069)
Vagrancy laws	0.0287***	0.0210***
	(0.0062)	(0.0066)
Emigrant-agent laws	-0.0077	-0.0022
	(0.0050)	(0.0052)
Convict-lease system	-0.0252***	-0.0133***
	(0.0036)	(0.0037)
Rural Pop. Dens.(-1)	0.0014**	0.0016**
	(0.0006)	(0.0006)
Wage	-0.2222***	-0.2491***
	(0.0139)	(0.0143)
Urban Pop. Dens.(-1)	-0.0005***	-0.0006***
	(0.0001)	(0.0001)
Avg. Farm Size(-1)	0.0001***	0.0001***
	(0.0000)	(0.0000)
Prop. of Blacks(-1)	0.0475***	0.0025
	(0.0169)	(0.0401)
Industry	-0.0005***	-0.0004***
	(0.0002)	(0.0001)
Dist. Railway	-0.0001	-0.0002
	(0.0001)	(0.0001)
Temperature SD	0.0277***	-0.0037
	(0.0100)	(0.0114)
Precipitation SD	0.0015***	0.0019***
	(0.0002)	(0.0003)
Decade Fixed Effects	Yes	Yes
N	7609	7609
R-Squared	0.4368	0.4423

Column *Fixed Effects* is the same as column (4) of table 6. The standard-deviations, below each coefficient in parentheses, are clustered at the county level. ***, ** and * indicate 1%, 5% and 10% significance level, respectively.

Table 16: Effects from selection in unobservables.

	Sharecropping			
	Insignificant Coefficients		*Opposite Sign*	
	(1)	*(2)*	*(3)*	*(4)*
Post Office	2.00	1.44	3.99	2.88
Post Office	0.58	0.40	1.16	0.80
Post Office×*Rain*	1.16	0.80	2.33	1.61
Post Office×*Coal*	2.40	1.54	4.80	3.01
Variables included in the restricted model:				
Rural Pop. Dens.(-1), Urban Pop. Dens.(-1) and Dist. Railway				
Variables included in the full model:				
Wage, *Avg. Farm Size*(-1), *Prop. of Blacks*(-1), *Industry*, *Temperature SD*, *Precipitation SD*, *Enticement*, *Contract Enforcement*, *Vagrancy* and *Emigrant-agent laws*, and *Convict-lease system*				
All columns include County Fixed Effects and Decade Fixed Effects.				

The values in the first four lines follows the work by Altonji et al. (2005) and Oster (2016): the higher the value in each cell, the higher selection on unobservables would have to be relative to selection on observables to explain away the OLS coefficients. Altonji et al. (2005) and Oster (2016) recommend a value equal or greater than 1.

In each pair of columns, the column to the left solely uses the absolute value of the ratio $\frac{\beta_F}{\beta_R - \beta_F}$, where β_F is the coefficient in the full model and β_R is the coefficient in the restricted model. The column to the right brings the contribution by Oster (2016) of multiplying the previous ratio by $\frac{R_F - R_R}{R_{Max} - R_F}$, where R_F and R_R are respectively the R-Squared of the full and that of the restricted model, and R_{Max} is the R-Squared of a model with all observable and unobservable variables. Following Oster (2016), $R_{Max} = 1.3R_F$.

In columns (3) and (4), it is used $\frac{\beta_F - (-\beta_F)}{\beta_R - \beta_F}$ in place of $\frac{\beta_F}{\beta_R - \beta_F}$. That is, the exercise is the same as in the remaining columns, but instead of calculating the power from selection on unobservables needed to make the coefficient insignificant, it is calculated the power from selection on unobservables needed to obtain a symmetric coefficient.

Oster (2016) warns that "the baseline assumptions underlying the linear model" do not support the inclusion and exclusion of observables as way to test the size of the omitted variable bias. Furthermore, the approach proposed by Altonji et al. (2005) makes "the extreme assumption that the relationship between treatment and unobservables can be fully recovered from the relationship between treatment and observables" (Oster, 2016). Even if the previous assumption is valid, the stability of the coefficient of the treatment variable is not enough: in case the set of observables has lower variance than the unobservables, the coefficient is more stable not "not because the bias is smaller but simply because less of the [...] outcome [variable] is explained by the controls" (Oster, 2016).

Appendix

A Solution of the Model in Section 3

There are three thresholds that determine whether employees or employers are setting the proportion of sharecropping contracts. One of those thresholds also reveals whether all employers are active.

Wage Labor

Each employer sets a. Thus, $w = \frac{a^2}{2} + \bar{u}$ to satisfy the participation constraint of the employee. In equilibrium, $a = 1$, giving the employer:

$$\Pi^E_{wage} = \frac{1 - \beta^2\sigma^2}{2} - \bar{u} - \delta \tag{A.1}$$

Therefore, wage labor is only profitable when employers have a δ lower or equal than δ_w:

$$\delta \leq \delta_w = \frac{1 - \beta^2\sigma^2}{2} - \bar{u} \tag{A.2}$$

Notice that all employees working as wage laborers earn $\bar{u}$. That is, they are indifferent between the outside option and wage labor.

Furthermore, given that $\bar{u} > 0$, $\delta_w < 1$. To see this, let us suppose that $\delta_w \geq 1$. Then:

$$\bar{u} \leq -\frac{1 + \beta^2\sigma^2}{2} \tag{A.3}$$

This is impossible. Thus, there is always a number of inactive employers and, hence, of farms.

Sharecropping

The employee chooses effort such that $a = s$. Then, the employer chooses s to maximize his payoff facing the following participation constraint:

$$\frac{s^2}{2}\left(1 - \sigma^2\right) - \alpha \geq \bar{u} \tag{A.4}$$

The employers know the distribution of α. So, they set s so that all the employees with $\alpha \leq \alpha_s$ take the sharecropping contract:

$$s \geq s_s = \sqrt{2\frac{\bar{u} + \alpha_s}{1 - \sigma^2}} \tag{A.5}$$

The first-order condition of the problem can be used to find the optimal α_s after plugging $s = s_s$ in:

$$\alpha_s = \frac{1 - \sigma^2}{2}\left(\frac{1 + \sigma^2}{2 + \sigma^2}\right)^2 - \bar{u} \tag{A.6}$$

Thus, sharecropping gives the employer:[46]

$$\Pi^E_{share} = \frac{1}{2\left(2 + \sigma^2\right)} \tag{A.7}$$

Employees with $\alpha = \alpha_s$ working as sharecroppers earn $\bar{u}$, while all employees with $\alpha < \alpha_s$ working as sharecroppers earn more than $\bar{u}$. Thus, employees working as sharecroppers earn an information rent. That is consistent with the necessity of a premium for employers to convince employees to take sharecropping contracts in the US South (Alston and Ferrie, 1993).

Employer's choice

Employers choose sharecropping over wage labor when δ is such that $\Pi^E_{share} \geq \Pi^E_{wage}$:

$$\delta \geq \delta_s = \frac{1 - \beta^2\sigma^2}{2} - \frac{1}{2\left(2 + \sigma^2\right)} - \bar{u} \tag{A.8}$$

To be sure, $\delta_s > 0$ as long as $\bar{u}$ and β are low enough:

$$\frac{\beta^2\sigma^2}{2} + \bar{u} \leq \frac{1}{2}\left(1 - \frac{1}{2 + \sigma^2}\right) \tag{A.9}$$

Proportion of Sharecropping Contracts and Active Farms

The discussion finds 2 key values on the δ continuum and 1 key value on the α continuum:

[46] Note that $s \geq 1 \Leftrightarrow \alpha \geq \frac{1-\sigma^2}{2} - \bar{u}$, which is always larger than the equilibrium α. That is, sharecropping never becomes unprofitable.

1. δ_w: employers with $\delta \leq \delta_w$ remain active.

2. δ_s: employers with $\delta \geq \delta_s$ seek sharecropping contracts; employers with $\delta < \delta_s$ always use wage labor contracts.

3. α_s: employees with $\alpha \leq \alpha_s$ seek sharecropping contracts. The remaining employees always choose to work as wage laborers or the outside option.

Hence, $1 - \delta_s$ employers and α_s employees are available to work together in a sharecropping arrangement. The probability that one employee meets an employer that wants a sharecropper equals to the proportion of sharecropping farms relative to the total number of farms divided by total number of active farms, $\mathbf{p}$:

$$\mathbf{p} = \frac{\alpha_s(1 - \delta_s)}{\textit{Active Farms}} \tag{A.10}$$

The underlying assumption is that there are some search costs both for employers and employees that stop them for looking continuously for a sharecropping contract. For instance, there is a time limit to begin farm work because crop calendars are exogenous to any of the agents. Meanwhile, the number of active farms is lower than 1:

$$\textit{Active Farms} = 1 - (1 - \alpha_s)(1 - \delta_w) \tag{A.11}$$

Basically, there are $1 - \delta_w$ employers who are only active with sharecropping contracts. Yet $1 - \alpha_s$ of those employers cannot find an employee willing to work with a sharecropping contract. Thus, $(1 - \alpha_s)(1 - \delta_w)$ employers become inactive. *Active Farms* can be rewritten into a new expression:

$$\textit{Active Farms} = \alpha_s + (1 - \alpha_s)\delta_w \tag{A.12}$$

Hence, the proportion of sharecropping can also be rewritten into a different form:

$$\mathbf{p} = \frac{\alpha_s(1 - \delta_s)}{\alpha_s + (1 - \alpha_s)\delta_w} \tag{A.13}$$

Proposition 1 and Corollary 1 - Derivatives of Proportion of Sharecropping Contracts

For simplicity, this solution focus on the case when $\delta_w \geq 1$, i.e. all employers are active. The derivatives of δ_s and δ_w relative to β and $\bar{u}$:

1. $\frac{\partial \delta_s}{\partial \beta} = \frac{\partial \delta_w}{\partial \beta} = -\beta\sigma^2$.

2. $\frac{\partial \delta_s}{\partial \bar{u}} = \frac{\partial \delta_w}{\partial \bar{u}} = -1$.

The derivatives of α_s relative to β and $\bar{u}$:

1. $\frac{\partial \alpha_s}{\partial \beta} = 0$.

2. $\frac{\partial \alpha_s}{\partial \bar{u}} = -1$.

Now, it is straightforward to find the derivative of $\mathbf{p}$ relative to β and $\bar{u}$:

1. $\frac{\partial \mathbf{p}}{\partial \beta} = \alpha_s \frac{\delta_w + \alpha_s(2-\delta_w-\delta_s)}{(\alpha_s+(1-\alpha_s)\delta_w)^2}\beta\sigma^2$.

2. $\frac{\partial \mathbf{p}}{\partial \bar{u}} = -(1-\delta_s)\frac{\delta_w - \alpha_s(1-\alpha_s)}{(\alpha_s+(1-\alpha_s)\delta_w)^2}$.

Clearly, $\frac{\partial \mathbf{p}}{\partial \beta}$ is always positive, and $\frac{\partial \mathbf{p}}{\partial \bar{u}}$ is only negative if $\delta_w > \alpha_s(1-\alpha_s)$. In case $\frac{\partial \mathbf{p}}{\partial \bar{u}}$ is negative, the total effect of a simultaneous increase in β and $\bar{u}$ on p is negative if β is low enough:

$$\beta < \bar{\beta} = \frac{1}{\sigma^2}\frac{(1-\delta_s)\delta_w}{\alpha_s(1-\delta_s+\delta_w+\alpha_s(1-\delta_w))} \tag{A.14}$$

Otherwise, a simultaneous increase in β and $\bar{u}$ on p is positive. This shows the statement in Proposition 1: depending on the size of labor turnover and/or turnover costs, a simultaneous increase in labor turnover and in the outside option may decrease or increase the proportion of sharecropping.

The second derivatives in order to β and to $\bar{u}$:

$$\begin{aligned}
&\frac{\frac{\partial \mathbf{p}}{\partial \beta} + \frac{\partial \mathbf{p}}{\partial \bar{u}}}{\partial \beta} = \\
&\left(\frac{1}{\beta} + \alpha_s\beta^2\sigma^4\left(\frac{2\alpha_s - 1}{\delta_w + \alpha_s(2-\delta_w-\delta_s)} + \frac{2(1-\alpha_s)}{\alpha_s+(1-\alpha_s)\delta_w}\right)\right)\frac{\partial \mathbf{p}}{\partial \beta} + \\
&\beta\sigma^2\left(\frac{1}{1-\delta_s} - \frac{1}{\delta_w - \alpha_s(1-\alpha_s)} + \frac{2(1-\alpha_s)}{\alpha_s+(1-\alpha_s)\delta_w}\right)\frac{\partial \mathbf{p}}{\partial \bar{u}}
\end{aligned} \tag{A.15}$$

$$\frac{\frac{\partial \mathbf{p}}{\partial \beta}+\frac{\partial \mathbf{p}}{\partial \bar{u}}}{\partial \bar{u}} =$$
$$\left(\alpha_s\beta\sigma^2\left(2\frac{2-\delta_w-\alpha_s}{\alpha_s+(1-\alpha_s)\delta_w}-\frac{2-\delta_w-\delta_s+1-2\alpha_s}{\delta_w+\alpha_s(2-\delta_w-\delta_s)}\right)-\frac{1}{\alpha_s}\right)\frac{\partial \mathbf{p}}{\partial \beta}+$$
$$+\left(\frac{1}{1-\delta_s}+2\frac{2-\delta_w-\alpha_s}{\alpha_s+(1-\alpha_s)\delta_w}\right)\frac{\partial \mathbf{p}}{\partial \bar{u}} \tag{A.16}$$

It is true that $\frac{\frac{\partial \mathbf{p}}{\partial \beta}+\frac{\partial \mathbf{p}}{\partial \bar{u}}}{\partial \beta} > 0$ if:

$$\frac{\partial \mathbf{p}}{\partial \beta} > \frac{\alpha_s\beta\sigma^2}{\alpha_s+(1-\alpha_s)\delta_w}\frac{1-2\alpha_s}{2(1-\alpha_s)} \tag{A.17}$$

This last condition always holds in case $\alpha_s < \frac{1}{2}$.

Finally, it is true that $\frac{\frac{\partial \mathbf{p}}{\partial \beta}+\frac{\partial \mathbf{p}}{\partial \bar{u}}}{\partial \bar{u}} < 0$ if:

$$\frac{\partial \mathbf{p}}{\partial \beta} < \frac{\alpha_s\beta\sigma^2}{2(\alpha_s+(1-\alpha_s)\delta_w)}\left(1+\frac{1-2\alpha_s}{2-\delta_w-\alpha_s}\right) \tag{A.18}$$

Proposition 2 and Corollary 2 - Derivatives of Active Farms

The total number of active farms always decreases on $\bar{u}$ and β when $\bar{u} \geq \bar{u}_h$. The derivatives of the active farmers to β and $\bar{u}$:

1. $\frac{\partial Active\ Farms}{\partial \beta} = -(1-\alpha_s)\beta\sigma^2 < 0$
2. $\frac{\partial Active\ Farms}{\partial \bar{u}} = \alpha_s + \delta_w - 2 < 0$

Note that $\alpha_s + \delta_w < 2$ because $\alpha_s, \delta_w < 1$. This shows the statement in Proposition 2: when there are inactive farms, a simultaneous increase in β and $\bar{u}$ unambiguously decreases the number of active farms.

Corollary 2 is also quite forward to demonstrate by analyzing the second derivatives:

$$\frac{\partial \frac{\partial Active\ Farms}{\partial \beta}+\frac{\partial Active\ Farms}{\partial \bar{u}}}{\partial \beta} = -(1+\beta-\alpha_s)\sigma^2 < 0 \tag{A.19}$$

$$\frac{\partial \frac{\partial Active\ Farms}{\partial \beta}+\frac{\partial Active\ Farms}{\partial \bar{u}}}{\partial \bar{u}} = -(\beta\sigma^2+2\bar{u}) < 0 \tag{A.20}$$

Notice that $1 + \beta - \alpha_s > 0$ since $\alpha_s < 1$.

B Extra control variables

Enticement, *Contract Enforcement*, *Vagrancy*, *Emigrant-agent laws*, and *Convict-Leasing System*

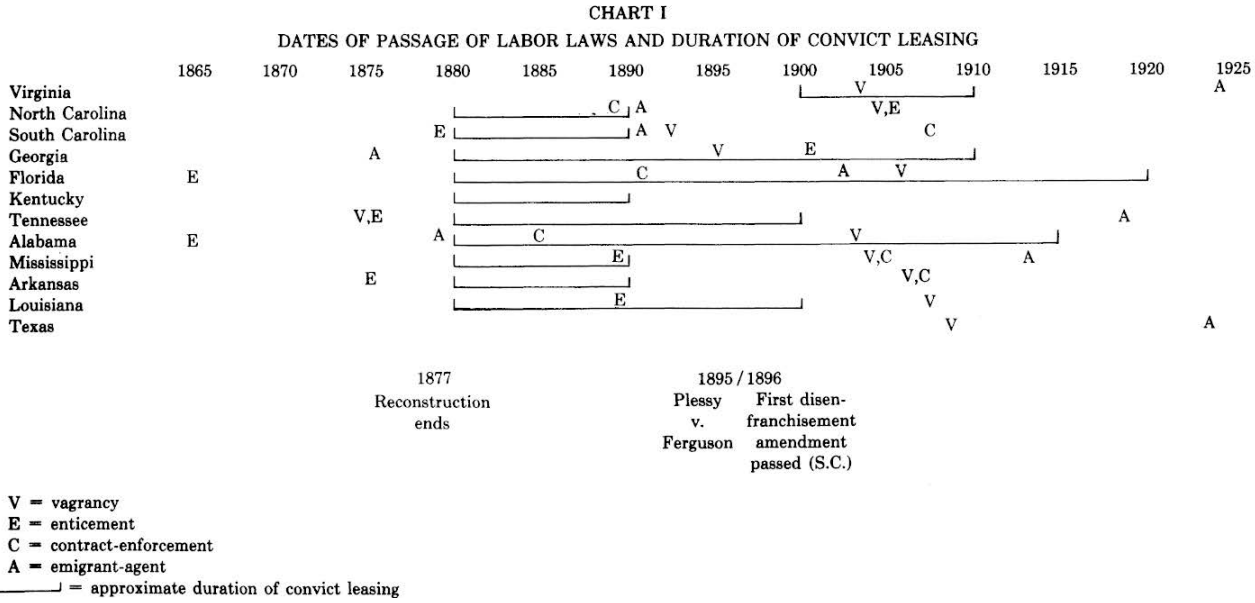

Figure 8: Laws restricting labor mobility approved across the South (1865-1925). Source: Roback (1984).

After 1877, the South progressively revived the Black Codes. This body of legislation was part of the Jim Crow Era, during which blacks were relegated to a *de facto* second-class citizen status until the 1960s. Wright (1986) states that employers used racial discrimination to drive wages to whites and blacks alike. Naidu (2010) finds that a negative impact of that legislation over different labor market outcomes, such as returns on working experience. Roback (1984) also defends the need for this sort of legislation to enforce sharecropping contracts. Figure 8 summarizes the evolution of the enactment of those laws:[47]

- Enticement and Contract Enforcement laws - The former "made it a crime for an employer to 'entice' a laborer who had a contract with another employer", whereas the later guaranteed that "a laborer who signed a contract and then abandoned his job could be arrested for a criminal offense." Basically, these laws reduced competition to the beginning of the season, when employers and employees could sign new contracts.

[47]The quotes in the following descriptions are from Roback (1984).

- Vagrancy laws - These "essentially made it a crime to be unemployed or out of the labor force", increasing the search cost for better jobs.

- Emigrant-agent laws - These laws prevented agents hiring workers across states, especially those moving workers out of the South.

- Convict-lease system - It was a penalty for transgressors of contract enforcement and vagrancy laws. The government would lease prisoners to private entities, relinquishing any monitoring of day-to-day use of those prisoners.

Rural Pop. Dens. and *Urban Pop. Dens.*

The US census also provides rural and urban population. Population density is used in place of the absolute number to control for the county size. These variables are strongly correlated with the number of post offices in an area, as discussed in subsection 2.2, as well with the use of sharecropping contracts (Alston, 1981).

Wage

The wage of agricultural laborers measures the competition for the local labor force. The literature agrees on a competitive rural labor market for the entire period, even across racial lines (Roback, 1984; Shlomowitz, 1984; Wright, 1986; Alston and Kauffman, 2001; Naidu, 2010; Collins and Wanamaker, 2015). Also recall from section 2 that farm and non-farm labor markets mutually affected each other. Consequently, *Wage* directly controls for the cost of farm labor, and indirectly gauges the job opportunities in the non-farm sector. This assumption follows the result in section 3 where the outside option equals farm wages in equilibrium.

Avg. Farm Size

The regressions also include the average farm area in the county. This was a crucial decision variable in sharecropping contracts and, consequently, in the crop mix of each farm (Ransom and Sutch, 1977; Wright, 1978). Alston (1981) argues that it affected farm supervision costs, too. Finally, farm size might also relate to how powerful the local elite was

and, thus, the value of many of the non-pecuniary perks included in sharecropping contracts (Alston and Ferrie, 1993; Ager, 2013).

Prop. of Blacks

The proportion of blacks in the whole population is controlled because of the role of racial relations, as discussed in section 2. Alston and Ferrie (1993) present evidence of sharecropping contracts as a source of paternalistic protection from racial violence, such as racially-motivated lynching (Ager, 2013). Wright (1986) also presents evidence that the distribution of skills of the black population had lower average, median and variance relative to that of the white population.

Industry

Wright (1986) and Roback (1984) provide plenty of evidence of the possibilities farm workers had to move to non-farm sectors. Moreover, Roback (1984) states that *Emigrant-agent laws* were particularly targeted to avoid this possibility.

Dist. Railway

As argued in section 2.2, they were one of the decision variables behind the opening a new post office. Atack (2013) provides county-level evidence of the impact of railways on the opening of new banks, on urbanization, on farm productivity, and on land value.

Temperature SD and *Precipitation SD*

In order to distinguish risk from the augmented costs associated to labor turnover, the regressions include average monthly standard deviations of temperature and precipitation, decade by decade. Note that the model of section 3 includes these variables. These variables are also based upon a vast literature that regards sharecropping as a risk-sharing contract (Cheung, 1969).