Abstract

While U.S. slave institutions formally guaranteed slaveowner property, the threat of fugitive slaves constrained economic development in the slave sector. We present new evidence on the economics of the slave South, focusing on the enforcement of slave property rights. We collect data on the characteristics of, and money rewards offered to slave catchers for, individual runaway slaves from 20,000+ newspaper advertisements. We also construct the first panel dataset describing the universe of individual slaveholdings in the USA 1840-1860. We link the data from runaway slave advertisements to the slaveowner data to document trade offs faced by entrepreneurs using slave labor over which property rights were contested. While we find that more productive plantations experienced more runaways and paid higher rewards individually, at the county level higher runaways and rewards are associated with lower plantation size and growth rates. Contrary to previous research, we find that fugitive slaves were more prevalent than once thought, and required substantial expenditures to manage.
“Drapetomania, or the disease causing negroes to run away...is unknown to our medical authorities, although its diagnostic symptom, the absconding from service, is well known to our planters and overseers.” – Dr. Samuel Cartwright, “Diseases and Peculiarities of the Negro Race” (1851)

1 Introduction

Slavery and American economic development are deeply intertwined. Slavery marked not just Southern agriculture, but influenced the entire economic structure of the slave states. In the context of U.S. economic history, perhaps no debate has been as contentious as the one surrounding the relative productivity of slave labor in agriculture (Fogel and Engerman 1974). While a large literature posits that costly enforcement of slave property rights was a substitute for scarce free labor at the macro level, comparatively little has been written about the costs of slave resistance and the tradeoffs it imposed on Southern planters.

This paper constructs new micro-data on thousands of individual runaway slaves and panel data on slaveowners across the USA. The runaway advertisements provide data on slave characteristics and rewards offered to slave catchers. The money rewards contain information that we use to document variations in the security of slaveowner property rights across time and space, and the microeconomic determinants of reward values across slaveowners in a given time and place.

The key thesis is that the threat of runaway slaves was pervasive and imposed costly tradeoffs on slaveowners. Planters with higher productivity, or enjoying positive productivity shocks, had incentives to expand production and extract more effort. Slavery provided an integrated, elastic market for labor that allowed entrepreneurs to assign workers to locations and tasks to exploit these advantages. However, slave resistance imposed a set of countervailing costs on profit-seeking entrepreneurs. We document that locally, larger slaveowners paid more for runaway slaves and that differential commodity price shocks were also associated with higher rewards. The tradeoff between these costs and benefits characterized the slave economy. We find that across counties, where rewards were higher plantations were smaller. Rewards were high, and plantations relatively small in counties closer to free states, even controlling for the underlying soil and climate endowments that would have made slave agriculture profitable.

Security of property rights has been a core interest for both economic historians and development economists. Both historical and contemporary evidence suggests that secure
property rights do lead to improved investment incentives, opportunities for credit and trade, and increased availability of resources previously used to privately secure property rights (see Besley and Ghatak 2010 for a comprehensive review). While economists have studied historical property rights in land and even animals extensively, there has been comparatively little economic work evaluating the economic effects of weak slave property rights. The very nature of slave property creates a natural conflict over the security of the title between the slave and the slaveowner; this conflict manifested itself as thousands of fugitive slaves. While most slaves returned or were eventually caught, the steady flow of absconding slaves was a constraint that limited the growth of plantations and drained the South of resources.

2 Runaways

There is some controversy over the nature and magnitude of the runaway threat. Southern politicians and historical observers suggested that the number of runaways was very large and that runaways presented a serious threat to property rights. For instance, Senator James Mason of Virginia told the 31st Congress (1849-1851) that slaveholders in Virginia were losing over $100,000 per year\footnote{At prevailing prices this suggests more than 200 slaves per year.} Former Louisiana Governor John Quitman claimed that 100 thousand slaves escaped from the South 1810-1850 (Siebert 1898, p. 341). These views were echoed by contemporary observers who were not representatives of slaveowning populations. Frederick Law Olmsted (1860, p. 476) observed, “throughout the South slaves are accustomed to ‘run away’.” In contrast, the 1850 and 1860 Censuses report only 1,011 and 803 runaways out of populations of 3.19 and 3.95 million, respectively. Franklin and Schweninger (1999, p. 282) review plantation records, newspaper advertisements, and evidence from Southern jails and conclude that the Census data dramatically undercounted the number of runaways and “failed even to hint at the magnitude of the problem.”\footnote{“Olmsted’s impressionistic observation was far more accurate than the ‘scientific’ data provided in the United States Census.” Siebert (1898, p. 343) similarly argues that the Census figures undercount the true number of fugitives.} In the next section we provide quantitative evidence on runaways drawn from newspaper advertisements.

However, it is uncontroversial that fugitives were at the heart of the national debate over slavery. What has proved a mystery to political historians of the period is that the relatively few fugitives (generally thought to be a thousand per year out of 4 million slaves) seem to have been worth creating national crises over. Hummel and Weingast (2007) argue that the 1850 fugitive slave law had a double purpose: firstly to secure slave
property in the border states, and secondly as a signal to maintain political alliances between the North and the South.

Famously, the Underground Railroad spirited slaves away from the border states to the North or Canada. Despite the presence of this clandestine network, permanent fugitives were relatively rare. Most fugitives absconded, stayed near the plantation for a time, and then often returned voluntarily (McDougall 1891 pg 57). However, large communities of permanent fugitives formed near the Great Dismal Swamp between Virginia and North Carolina, and many fugitive slaves lived off the land for extended periods of time.

3 Institutions for Protecting Slave Property

Legal institutions and private enforcement mechanisms were designed to limit the runaway threat to slaveowner property. Behind the slave market lay mechanisms for enforcing slave property rights, both public and private, supported by legislation, a well-articulated body of common law precedent, and an array of enforcement mechanisms.

At the state level, courts and legislators passed laws to facilitate the capture of runaways. The enforcement mechanisms included government organized slave patrols to police the movements of slaves and prevent escapes. Slave patrols were ubiquitous in Southern states, enlisting both slaveowning and non-slaveowning free whites in the task of retrieving runaways and deterring unrest (Hadden 2001). Overseers for large plantations were made mandatory by law (Wiethoff 2006), and a ready market in private slave catchers and bounty hunters was regularly advertised in newspapers (Franklin and Schweninger 1999). In the next sections we analyze new data on the private enforcement of slaveowners’ property rights drawn from newspaper advertisements for runaways that offered money rewards to slave catchers.

At the national level, a series of acts provided for the protection of slaveowners’ property rights. Article IV of the Constitution required that the Federal government secure slaveowners’ property claims. The Fugitive Slave Act of 1793 stipulated that anyone who acted to “knowingly and willingly obstruct or hinder” the recovery of runaway slaves was to be fined $500 or eight times GDP per capita.\(^3\) The 1850 Fugitive Slave Act made any law enforcement official who did not arrest an alleged runaway slave liable to a $1,000 fine and made any person aiding a runaway slave liable to a $1,000 fine and six months imprisonment (GDP per capita was $110 in 1850). The 1850 act further

\(^3\)Nominal GDP per person remained below $150 throughout the pre-Civil War era. See http://eh.net/hmit/gdp/.
stipulated that alleged runaways were not entitled to trial by jury and could not testify in court on their own behalf.

4 Data on Runaway Slaves

To document the runaway threat to slaveowners’ property, we construct a database of over 25,000 runaway slave advertisements placed in Southern newspapers 1840-1860. Historic runaway advertisements typically provide a description of the slave, record the county from which the slave fled, the name of the slave owner, and the dollar value and terms of the reward offered for the capture of the runaway. To our knowledge no previous research has constructed or exploited similar individual level data on runaways.

We collect information on the geographic distribution of runaways from historic newspapers. To gather information from runaway slave advertisements we search Newsbank’s collection America’s Historical Newspapers (Series I-VIII) for all advertisements containing the words “abscond*” or “runaway*” or “ran away*” or “run away*” or “apprehen*.” From the image files of the advertisements, we and our research assistants manually code information on the age, sex, height, sex, owner, owner’s location (township, county, state), and the reward offered. For the period 1840-1860, our search returns 26,121 advertisements listed in 63 newspapers printed in slave states.

Historic runaway advertisements records the county from which a slave fled and provide both descriptions of the runaway and the rewards offered. The database contains 20,807 advertisements (80%) which identify the county location from which the slave fled. Of these, 19,726 specify the monetary value of the reward offered. The data contain 7,486 unique advertisements and 18,635 are reposted advertisements – i.e. advertisements slave-owners ran repeatedly because the runaways in question had not been captured. For the 20,807 where we identify the county the slave fled, there are 3,185 unique (first-run) advertisements and 17,622 repost advertisements. Map 1 shows the location of counties where we observe money rewards for runaway slaves.

4 Previous economic research has largely ignored the number and distribution of runaway slaves. An exception is Komlos (1989), who collects heights recorded in 13,519 newspaper advertisements for runaway slaves placed before 1821. Unlike our data – which provide county-level variation and cover the period 1845-1860 – Komlos’ data only record the state from which the runaway fled and do not record the rewards offered. Franklin and Schweninger (1999) construct a database of 2,011 runaway slaves 1838-1860 as a primary source for their historical work on resistance to slavery. We contacted Schweninger to inquire about these data, however that the database is no longer accessible.

5 There are 16 newspapers that appear in each year. Of these, 6 were published in Virginia, 2 in Texas, 1 in Missouri, 3 in Maryland, 1 in Louisiana, 2 in Georgia, and 1 in Arkansas. Newspapers in these and other states enter and exit our database. Altogether, we search for advertisements in 486 newspaper years.
Map 1: Counties with Rewards in Runaway Slave Advertisements

Note: Counties with runaway slave advertisements in which money rewards are observed. Data restricted to counties that were within 300 miles of an active newspaper every year 1845-1860. See text for details.

We summarize the data by initially restricting attention to unique (first run) advertisements that explicitly indicate the county where the slaveowner is located.

Table 1 presents summary statistics on runaway ads for select states and documents several key features of the data. Two aspects of the data stand out. First, across all states runaways were overwhelmingly men (80%+) between their late teens and late 30s. Second, the value of rewards offered varied substantially at the state level, running from a low of approximately $30 in Mississippi to over $100 in Virginia and Maryland. As discussed below, this geographic variation in rewards reflected differences in slaveowner property rights that were largely determined by the distance a fugitive would have to travel to a free state or – in the case of Texas – Mexico.

Figures 1-3 present the data in time series form and distinguish between advertisements where the money reward is offered with no geographic qualifications and advertisements where the reward schedule stipulates a “geographic premium” with a higher reward for slave catchers who apprehend a runaway across state or county lines. Figure 1 shows the means values of rewards with and without geographic premia. Figure 2 shows the mean distance between slaveowners and the newspaper in which they posted their advertisements. Figure 3 shows the number of unique advertisements posted per year.

---

6 Below we discuss analysis identifying owners posting advertisements that do not explicitly provide the owner’s county location. We also discuss the fact that large numbers of ads were reposted and appear
Table 1: Runaway Ads Summary Statistics

<table>
<thead>
<tr>
<th>State</th>
<th>Quantity</th>
<th>Male</th>
<th>Age</th>
<th>Reward</th>
<th>Repost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>mean</td>
<td>0.97</td>
<td>28.84</td>
<td>69.64</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.17)</td>
<td>(11.22)</td>
<td>(58.44)</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>931</td>
<td>634</td>
<td>796</td>
<td>931</td>
</tr>
<tr>
<td>Arkansas</td>
<td>mean</td>
<td>0.93</td>
<td>27.56</td>
<td>99.89</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.25)</td>
<td>(9.60)</td>
<td>(78.11)</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>250</td>
<td>235</td>
<td>132</td>
<td>250</td>
</tr>
<tr>
<td>Florida</td>
<td>mean</td>
<td>0.86</td>
<td>27.29</td>
<td>30.56</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.35)</td>
<td>(7.04)</td>
<td>(31.08)</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>274</td>
<td>187</td>
<td>150</td>
<td>274</td>
</tr>
<tr>
<td>Georgia</td>
<td>mean</td>
<td>0.81</td>
<td>29.22</td>
<td>49.04</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.39)</td>
<td>(11.21)</td>
<td>(57.87)</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>1,995</td>
<td>1,521</td>
<td>1,007</td>
<td>1,995</td>
</tr>
<tr>
<td>Louisiana</td>
<td>mean</td>
<td>0.78</td>
<td>26.93</td>
<td>36.68</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.42)</td>
<td>(8.40)</td>
<td>(35.60)</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>8,373</td>
<td>7,347</td>
<td>7,509</td>
<td>8,373</td>
</tr>
<tr>
<td>Maryland</td>
<td>mean</td>
<td>0.86</td>
<td>24.93</td>
<td>125.92</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.35)</td>
<td>(8.43)</td>
<td>(98.39)</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>3,855</td>
<td>3,371</td>
<td>2,394</td>
<td>3,855</td>
</tr>
<tr>
<td>Mississippi</td>
<td>mean</td>
<td>0.95</td>
<td>27.71</td>
<td>31.62</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.21)</td>
<td>(7.54)</td>
<td>(16.02)</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>325</td>
<td>297</td>
<td>176</td>
<td>325</td>
</tr>
<tr>
<td>North Carolina</td>
<td>mean</td>
<td>0.97</td>
<td>23.06</td>
<td>27.67</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.18)</td>
<td>(2.97)</td>
<td>(9.66)</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>62</td>
<td>43</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td>South Carolina</td>
<td>mean</td>
<td>0.82</td>
<td>28.61</td>
<td>47.41</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.38)</td>
<td>(10.52)</td>
<td>(75.36)</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>905</td>
<td>549</td>
<td>697</td>
<td>905</td>
</tr>
<tr>
<td>Texas</td>
<td>mean</td>
<td>0.95</td>
<td>27.36</td>
<td>80.08</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.21)</td>
<td>(9.62)</td>
<td>(93.27)</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>250</td>
<td>217</td>
<td>131</td>
<td>250</td>
</tr>
<tr>
<td>Virginia</td>
<td>mean</td>
<td>0.89</td>
<td>26.58</td>
<td>110.41</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>sd. dev.</td>
<td>(0.31)</td>
<td>(7.91)</td>
<td>(111.67)</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>obs.</td>
<td>2,838</td>
<td>2,494</td>
<td>2,260</td>
<td>2,838</td>
</tr>
</tbody>
</table>

Note: See text.

5 Data on Slaveowners

We assemble data on slaveowners from the manuscripts of the US Census of Population and US Census of Population Slave Schedules. We match slaveowners based on name and location. To aid in matching replace common abbreviations with their full name multiple times in the same newspaper. For now we exclude all reposted advertisements.

Distance is calculated from the location of the newspaper city to the centroid of the county where the slave owner was located. For a subset of slaveowners we have information on the precise township in which they lived. Distances calculated using township locations are similar.
equivalents. For instance, all individuals listed on the Census schedules with a first name of “Benj” we assume are “Benjamin”. We consult both the microfilm at the National Archives and the Ancestry.com transcriptions. Once names are digitized we iteratively use string matching software to determine the minimum distance between names and
make manual corrections to establish correspondences between slaveowners. The key assumptions is that if a slaveowner in county $j$ at time $t$ is matched to one and only one identically (or almost identically) named slaveowner in county $j$ at time $t+1$, they are the same person. Figure 4 presents a summary of the matching for 1850-1860. A similar procedure delivers matches between slaveowners in the 1840 and 1850 Censuses, and between slaveowners posting newspaper advertisements and the Census data.

6 Conceptual Framework

We motivate our regressions with an extremely simple model, motivated by the literature on labor market frictions. We suppose a representative slaveowner with productivity $A$, number of slaves $S$, and output $AS$. We assume slaveowners are price takers, facing an infinitely elastic supply curve to the plantation, and can therefore buy any number of slaves at the going price $p$. However, slaves runaway at a rate $r > 0$. This creates a steady outflow of runaways $rS$. The outflow of runaways is balanced by the inflow of caught slaves. The rate at which slaves are caught depends on the amount expended to catch them, $E$, divided by the cost of catching the slave $c$. We suppose the rate of catching slaves is given by:
We assume $\theta < 1$. We impose a steady state condition, equating inflows and outflows of slaves to a plantation, which implies $rS = C(E) \Rightarrow S = C(E)/r$. Thus the planter solves:

$$\pi^S(A) = \max_E (1-r)A - p \frac{1}{c^\theta r} E^\theta - E$$

The resulting first order condition is:

$$E = \frac{(1-r)A - p \frac{1}{c^\theta r}}{c^\theta r}$$

The per-fugitive expenditure, which we can think of a reward posted for a fugitive, is

$$\frac{E}{C(E)} = \frac{(1-r)A - p}{\theta r}$$

Thus we can easily see that high productivity planters will pay higher rewards, have larger plantation sizes, and experience more runaways. We can also see that increases in $c$, the cost of catching runaways, decrease expenditures on retrieving runaways, lowering plantation sizes. With the assumption of price taking in the slave market can also be
tested by seeing if the size of a plantation is uncorrelated with the price of the slaves on that plantation.

7 Empirics

In this section we first present evidence that describes how the slave labor market provided elastic supplies of labor. We then document owner-level and productivity determinants of rewards for, and numbers of, runaway slaves to determine whether and how the threat to property rights posed by slave resistance imposed a drag on the development of the slave sector. We then examine the panel of slaveowners observed 1840, 1850, and 1860 to compare the relationship between growth on the one hand and owner-level and county-level runaways on the other. Finally, we examine the negative cross-county relationship between rewards and plantations sizes, and show how rewards rose and plantation sizes fell in counties close to free states.

7.1 The Elasticity of Labor Supply in the Slave Labor Market

By the early 1800s, the domestic market for slaves was well-integrated (Deyle 2004, 2005; Rosenbloom 2002). Slave-owners responded to the price signals in slave markets, transporting slaves over hundreds of miles, and eliminating arbitrage opportunities. Thus in 1835, Farmer’s Register published in Petersburg, VA observed of slaves in Virginia: “Their price here is not regulated by our profits, but by the profits of their labor in other states” (quoted in Deyle 2004, p. 94).

Slave-owners were unusually mobile geographically (Shaefer 1987, Wright 2006). Slave owners were able to pick new, agriculturally productive locations and to begin production for export with limited infrastructure (Wright 2006) and without facing the recruitment costs associated with the free labor market (Hanes 1996). Slave wealth also facilitated inter-state moves through a credit channel. Slaves were a relatively liquid assets, traded in thick markets, and commonly used as collateral on loans that financed new land purchases and relocations.

Consistent with the model’s assumption of elastic supply to a plantation, there is no observable relationship between appraised slave values and plantation sizes. To document this we go to the Gallman-Parker sample of the 1860 Census of Agriculture and the Foust sample of the 1850 Census of Agriculture. For each farm, we observe the net value of personal property. Figure 5 shows that there is no positive relationship between farm
size and average slave values in the Census data. This finding holds whether we use the Census appraisal values or calculate slave values based on demand parameters estimated from over 30,000 slave sales and appraisals provided by Engerman and Fogel (1976). Table 2 shows that there is no significant relationship between slave values and farm sizes.

Figure 5: Farm Size and Slave Values

Effective Slaves per Farm

Net Personal Property per Slave

Dens...
Table 2: Farm Size and Slave Values

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>1860 Farm Sample</th>
<th>1850 &amp; 1860 Farm Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln Net Personal Property per Slave</td>
<td>Ln Estimated Value per Slave</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Ln Slaves on Farm</td>
<td>-0.03</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>County FE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>County x Year FE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1,011</td>
<td>1,011</td>
</tr>
</tbody>
</table>

7.2 Plantation Sizes, Runaways, & Rewards

At the owner-level, we document that owners with larger plantations offered higher rewards for runaways within a given county and that larger plantations faced larger numbers of runaways.

We first document the relationship between owner size measured in number of slaves and rewards at the local level. We examine the set of slaveowners who posted advertisements for runaways and who we are able to identify in the US Census of Population “Slave Schedule” as named slaveowners (778 individuals). For these individuals we examine both the raw mean rewards they offered for runaway slaves and the “residual reward” they offered – where the residual reward is computed by partialing out the variation in rewards due to age, age squared, sex, and gender of the slave.

Table 3 shows that larger slave owners consistently offered higher rewards for runaway slaves. Columns (2) to (4) document the fact that across counties larger slaveowners paid approximately 10% more for runaways. Column (5) shows that this effect is robust to controlling for county specific fixed effects, so that the identifying variation is within county. Column (6) shows that this result holds when we restrict attention to the set of advertisements that do not offer premia for out of state or out of county captures. Column (7) shows that the result holds when we examine residual rewards and those control for observable variations in slave characteristics. Figure 6 presents the underlying data on rewards and plantation sizes. Table 4 shows that the number of runaways sought via newspaper advertisements was also increasing significantly in plantation size, but much less than one for one.

---

The results from this regression are reported in an Appendix. We find that age is significantly positively related to log rewards, age squared is significantly negatively related to log rewards, and that there was a substantial premium for value slaves.
The data on rewards and numbers of runaways suggest that slaveowners were constrained by threat of runaways and the costs associated with privately enforcing their property rights. In contrast, the historical evidence and the quantitative evidence on the positive relationship between size and runaway rewards is thus similar to the positive relationship between firm sizes and wages observed across firms in advanced economies today and across firms in the free labor market in the pre-Civil War USA.
Table 4: Farm Size and Runaway Advertisements by Slaveowners

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>Ln Runaways 1850s</th>
<th>Ln Runaways 1840s</th>
<th>Ln Runaways 1840s &amp; 1850s</th>
<th>Ln Runaways 1840s &amp; 1850s</th>
<th>Ln Runaways 1840s &amp; 1850s</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln Slaves 1850</td>
<td>0.0431 **</td>
<td>0.0775 **</td>
<td>0.0851 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0169)</td>
<td>(0.0313)</td>
<td>(0.0261)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln Slaves 1840</td>
<td></td>
<td>0.0757 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0334)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln Slaves Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0799 ***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.0234)</td>
</tr>
<tr>
<td>IV: Ln Slaves 1840</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>County FE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>353</td>
<td>184</td>
<td>315</td>
<td>315</td>
<td>583</td>
</tr>
</tbody>
</table>

value of slaves on plantations described in the previous section suggest that plantation owners faced an elastic supply of slaves in the slave market. This suggests that important “frictions” centered on the threat to slaveowners’ property rights, and not an inelastic supply curve in the market for slaves.

7.3 Productivity Shocks and Runaways

In this section we examine the relationship between runaways and county-level productivity shocks that varied in time and space. Specifically, we find that counties with soils suitable for cotton growing saw increases in the number of runaways in those years when cotton prices were elevated.

We take the annual prices of agricultural commodities from Cole (1967) as providing measures of exogenous commodity shocks that were differentially distributed across county locations. Shocks to the prices of agricultural commodities had differential impact across locations because of natural endowments. For example, shocks to the price of cotton impacted productivity and profits on farms in counties where the local soil and climate were especially suited to the production of cotton, but would not be expected to similarly impact the productivity of farm-level profits and productivity in locations especially suitable for, say, rice.

To examine the impact of productivity shocks we exploit price data on agricultural commodities from Cole (1967) and county level crop suitability computed from the Global Agro-Environmental Zones (GAEZ) database. We compute county level crop suitability for cotton, sugar, rice, and tobacco.

Table 5 presents regressions on the annual panel of counties and documents that
cotton price shocks were associated with significantly larger numbers of runaways. All estimates control for county and year fixed effects so that the identifying variation is within a year across counties, and within a county across years. Column (2) shows that runaways were increasing in cotton prices. Column (3) shows that the relationship is weakly significant when we control for the price shocks for other crops associated with slavery in agriculture. Columns (4) and (5) examine the binary outcome “any runaways” (1/0) and find a weaker and statistically insignificant relationship.

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>County Runaways</th>
<th>County Runaways</th>
<th>Any County Runaways</th>
<th>Any County Runaways</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Cotton Price x Cotton Suitability</td>
<td>0.737* (0.379)</td>
<td>0.937* (0.527)</td>
<td>0.374 (0.261)</td>
<td>0.459 (0.324)</td>
</tr>
<tr>
<td>Sugar Price x Sugar Suitability</td>
<td>-0.0714 (0.122)</td>
<td>-0.00426 (0.0302)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco Price x Tobacco Suitability</td>
<td>-0.0175 (0.132)</td>
<td>0.0135 (0.0975)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice Price x Rice Suitability</td>
<td>-0.0434 (0.0595)</td>
<td>-0.0666** (0.0322)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>County FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>10,206</td>
<td>10,206</td>
<td>10,206</td>
<td>10,206</td>
</tr>
</tbody>
</table>

### 7.4 Runaways and Plantation Growth in the Micro-data

This section exploits individual-level panel data to document that the experience of a runaway is negatively but weakly associated with plantation growth at the individual level, but that plantations in counties with lots of runaways grew slowly over those periods when the numbers of runaways were especially high.

To examine the relationship between runaways and plantation growth we construct the panel of US slaveowners observed in the Census of Population 1840, 1850, and 1860. We provisionally restrict attention to the set of 10,398 slaveowners who (1) did not move between counties over this period and (2) were in counties with newspaper advertisement coverage.\(^{10}\) (In work currently underway, we examine the determinants of entrance and

\(^{10}\)Our sample comprises slaveowners we are able to match across all three Censuses. Because of the
Table 6 documents the relationship between plantation growth and runaways at the planter level and the county level. The key finding is that county level runaways strongly and negatively predict slaveowner growth, while planter level runaways have a negative but statistically insignificant relationship with growth. All regressions control for slaveowner fixed effects. We measure runaways at the plantation level first as the fraction runaway and then with an indicator for any runaways. We measure runaways at the county level as fraction runaway out of total county slave population. Columns (2) and (3) control for state-cross-year fixed effects so that the relevant county-level variation is between runaway fractions in different counties in a given state-year pair. Columns (4) and (5) control separate for year fixed effects. Because all specifications include slaveowner fixed effects, and because slaveowners are not moving, we also control for time invariant county level differences.

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>Ln Slaves</th>
<th>Ln Slaves</th>
<th>Ln Slaves</th>
<th>Ln Slaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Ln Slaves Lag</td>
<td>-0.47 ***</td>
<td>-0.47 ***</td>
<td>-0.46 ***</td>
<td>-0.46 ***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Own Runaway Fraction</td>
<td>-0.25</td>
<td>-0.22</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>(0.31)</td>
<td>(0.32)</td>
<td>(0.12)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Own Runaway Indicator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>County Runaway Fraction</td>
<td>-18.89 **</td>
<td>-18.83 **</td>
<td>-31.52 ***</td>
<td>-31.47 ***</td>
</tr>
<tr>
<td></td>
<td>(7.91)</td>
<td>(7.91)</td>
<td>(7.79)</td>
<td>(8.12)</td>
</tr>
<tr>
<td>Slaveowner FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>State x Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year FE</td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>31,194</td>
<td>31,194</td>
<td>31,194</td>
<td>31,194</td>
</tr>
</tbody>
</table>

7.5 Reward Ratios and Plantations Size at County Level

This section provides evidence that where rewards were high, plantations were small, that rewards were systematically larger and plantations smaller in counties closer to free states. This relationship holds controlling for local crop suitabilities and when all the recording conventions, we are likely to lose some matches. For instance, if a “Jedediah S. Smithers” was recorded as “J. Smithers” and if there are multiple “J. Smithers” in a given county we will not be able to make a match across years and this individual will fall out of our sample of matched “stayers.”
identifying variation is within state. These facts suggest another way size and location decisions reflected the property rights threat of slave resistance.

Money rewards provide a measure of the security of slaveowners’ property. Rewards that were low relative to slave values reflected slaveowners’ confidence that successful escape to freedom was a low probability event (Franklin and Schweninger 1999, p. 175). High rewards reflected slaveowners’ expectation that runaways would succeed in making a permanent escape with high probability – absent monetary inducements to free citizens and slave catchers.\footnote{While our primary measure of property rights security is the size of money rewards offered relative to slave values, as discussed below we also examine the share of advertisements that were reposted – reflecting situations where runaways remained uncaptured for longer spells.}

We use data from runaway slave advertisements to document variations over time and space in the ratio of money rewards for runaway slaves to underlying slave values. To compute the reward ratio, we compare offered rewards to estimated slave values. Data on offered rewards are manually coded from runaway slave advertisements from the period 1840-1860.\footnote{Some advertisements promise rewards without providing explicit figures. As a rule, advertisements do not indicate the market or appraisal value of the slaves in question.} Slave values are calculated using demand parameters from an analysis of 37,004 slave auctions and appraisals recorded by Fogel and Engerman (1976) for the period 1845-1860. To obtain demand parameters we estimate:

\[ \ln VAL_{it} = \theta_j + \delta_t + \alpha MALE_i + \phi AGE_i + \theta AGE_i^2 + \lambda APP_i + \gamma X_i + \epsilon_i \]

Here \( \theta_j \) and \( \delta_t \) are state and year fixed effects, \( MALE_i \) is an indicator for male slaves, the age variables are self-explanatory, \( APP_i \) is an indicator for an appraisal valuation (as opposed to an auction sale), and \( X \) codes for idiosyncratic skills and/or physical characteristics. We use the parameters estimated from this regression to calculate the values of observed runaways. (For details and regression estimates see Appendix.) We then aggregate by taking the median reward ratio for a given county over a given period (below we perform analyses aggregating the data at the county level across all years 1840-1849 and 1850-1859).

We document the magnitudes of the relationship between rewards and slaveholdings across counties with cross sectional regressions using rewards from the 1850s and slaveholdings as of 1860. Table 7 presents results from a simple regression without controls for state or the crop suitabilities at the county level. Column (2) shows that counties with high reward ratios had smaller average slaveholdings in 1860. Column (3) shows that rewards varied inversely with distance from free states. Column (4) estimates the relationship between rewards and slaveholdings instrumenting for rewards with distance.
Table 8 presents similar results but adds one set of specifications with state fixed effects, so that all the variation in rewards and slaveholdings is within state, and one set of specifications where we control for county level crop suitabilities calculated from the Global Agri-Ecological Zones database.
Table 7: Plantation Size, Reward Ratios, & Distance to Freedom

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>Ln Mean Slavehold</th>
<th>Ln Reward Ratio</th>
<th>Ln Mean Slavehold</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Ln Reward Ratio</td>
<td>-0.27 ***</td>
<td>-0.52 ***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.13)</td>
<td></td>
</tr>
<tr>
<td>Ln Distance to Free</td>
<td>-0.82 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV For Reward</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

Table 8: Plantation Size, Reward Ratios, & Distance to Freedom

<table>
<thead>
<tr>
<th>Regression Model</th>
<th>Reduced Form</th>
<th>First Stage</th>
<th>Instrumental Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln Mean Slavehold</td>
<td>Ln Mean Slavehold</td>
<td>Ln Reward Ratio</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Ln Reward Ratio</td>
<td>-0.12 ***</td>
<td>-0.10 **</td>
<td>-0.86</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.04)</td>
<td>(0.57)</td>
</tr>
<tr>
<td>Ln Distance to Free</td>
<td>0.43 *</td>
<td>0.23 **</td>
<td>(0.22)</td>
</tr>
<tr>
<td>State FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Crop Suitabilities</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

8 Conclusion

This paper presents new data on runaway slaves in the pre-Civil War USA. We find that larger slaveowners offered higher rewards at the local level and that the number of runaways was increasing in the size of slave plantations. We also find that transitory price shocks in cotton increased runaways at the county level. These results are evidence of the tradeoffs facing entrepreneurs who choose to use slave labor over which the property rights were contested. Looking across counties, however, we find that counties with a large number of runaways had smaller plantation growth rates, and where rewards were high plantation sizes were small – and counties closer to the free states had smaller plantations and higher rewards even controlling for local soil characteristics that determined a location’s suitability for the extensive range of crops recorded in the historical Census of Agriculture.

We interpret these findings as evidence of the trade-offs fugitives imposed on slaveowners and the slave sector. These findings and our data are at a preliminary stage.