Did Slavery Impede the Growth of American Capitalism?

Two Natural Experiments Using Farm Values per Acre

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Abstract

Lower farm values per acre in slave states relative to free states in the late antebellum period have been used to argue that slavery impeded the growth of American capitalism. Two natural experiments suggest, however, that this was not the case. First, a spatial "regression discontinuity design" (RDD) indicates that any negative effects of slavery's legality on farm values per acre near the free-slave state border were countered by the institution's practical utility for farmers. Second, a "difference-in-differences" (DiD) analysis shows that farm values per acre fell in the slave states relative to the free states following abolition, again due to slavery's practical utility. A plausible interpretation of these results is that slavery provided a cheap labor force in a region where yeoman farmers preferred not to settle, thereby raising farm values in the South in the antebellum period.

Keywords: Slavery, American capitalism, growth, regression discontinuity design, difference-in-differences
JEL codes: N11, N21, N51, O43

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Economic historians have presented low farm values per acre in the antebellum South as evidence of how slavery impeded the growth of American capitalism. "An increase in land value is an appropriate measure of wealth accumulation for a society as well as for private owners," Gavin Wright (2006, 58) notes. Consequently, high farm values in the North demonstrate the region's success because any effects of "pure geography" were soon "overwhelmed by the development juggernaut sprawling across the countryside" (2006, 64). Northern state governments promoted immigration and new transportation infrastructure, boosting farm values. What Wright calls the Southern "laborlords," meanwhile, had little interest in promoting the development of specific localities. Instead, they could simply move their captive labor force from one place to another. As a result, the South was characterized by a few areas of high farm values where the land and climate were particularly suitable for agriculture, but most of it "was either passed over or left behind in the process of settlement" (2006, 65). Wright thus sees farm values as confirming his version of American economic history, in which the North prospered due to its liberal values and good institutions, while slavery made the South poorer, turning the region into a drag on growth. In this way, Wright (2006, 58–63; 2022, 132–134) uses farm values to make the case that American economic history is like a simple morality in which good institutions made the North succeed while an abhorrent institution made the South fall behind.

Two natural experiments nevertheless fail to support this narrative. Both use farm values per acre as the dependent variable.[1] In the first, a spatial "regression discontinuity design" (RDD) is used to test the effects of slavery's

[1] The practical advantage of farm values per acre is that they provide an unambiguous measure of wealth. Other census data, by contrast, are more difficult to interpret. Higher population density, for instance, is not necessarily a sign of prosperity, while the share of improved land could reflect ecological constraints more than growth, as argued by Majewski and Tchakerian (2007). For a discussion of why the choice of dependent variable is so important in this kind of study, see Verghese (2024). Titiunik (2021) provides a discussion of the concept of natural experiments. The present paper meets the criteria that he sets for using the term.

legality on farm values per acre around the free-slave state border in 1850 and 1860. The results indicate considerable heterogeneity across the border. They suggest that slavery's legality did have a negative effect, but it was countered by the practical utility of slavery for farmers.[2] The second test then applies a "difference-in-differences" (DiD) analysis to the abolition of slavery. It finds that slavery's legality boosted farm values per acre in the slave states in the late antebellum period, again because it made possible slavery as a practice. For this reason, farm values fell in the former slave states relative to the free states when slavery was abolished, which implies that the null hypothesis—that slavery facilitated the growth of American capitalism in the antebellum period—cannot be rejected. Furthermore, the patterns found in the data are quite easy to explain: free Americans preferred not to settle in parts of the South due to environmental conditions; slavery then facilitated the growth of Southern agriculture by providing a captive labor force, especially for cotton in the Deep South. Its effect as a practice was therefore to boost farm values per acre, which overrode any negative impact it had as a legal institution. The Wrightian morality tale should be discarded.

Crossing the Border

A spatial RDD is an econometric method that aims to measure the effect of a treatment when crossing a cut-off point. In this case, the treatment is the legality of slavery and the cut-off point is the free-slave state border. Distance from that border then becomes a running variable that allows the RDD to estimate the effect of crossing from free states to slave states on farm values per acre. The basic equation is:

$$Y_i = \beta_1 \cdot \text{slavery} + \beta_2 \cdot \text{distance} + \beta_3 \cdot \text{slavery} \cdot \text{distance} + \beta_0 + \varepsilon_i \qquad (1)$$

[2] This finding is in stark contrast to a previous attempt to apply the RDD methodology to this question (Bleakley and Rhode 2024). See Francis (2024) for a critique of that study.

in which farm values per acre (Y) in a county (i) are the result of a dummy variable for slavery's legality, distance from the border, and the interaction between the two. The coefficient β_1 becomes the measure of slavery's effect of farm values—that is, the treatment effect.

Various tools are available to implement this model. The most important is the R package "rdrobust" by Sebastian Calonico et al. (2023; also Calonico, Cattaneo, and Titiunik 2014; 2015), while some elements can also be borrowed from the "SpatialRDD" package by Alexander Lehner (2023; 2024). Following Lehner's example, the border is first split into 50 points. Equation 1 is then applied to each border point using a sample determined by a mean-square-error-optimal bandwidth selector that attempts to balance the bias that comes from using data too far from the border with the variance that arises from using too little data. When calculating the regressions, a triangular kernel gives greater weight to counties nearer the border point. A quadratic regression is then applied to each side of the border to correct for bias in the linear relation analyzed in the main regression. Robust standard errors are calculated to account for both variability in the original estimate and the additional uncertainty introduced by the bias correction process. There is, then, considerable complexity built on top of the simple foundations provided by Equation 1.

The initial results suggest that any negative effects that slavery's legality may have had on farm values were highly localized in the antebellum period. In Map 1, the color of the dots equals the magnitude and sign of slavery's coefficient in Equation 1, while their size indicates their p-values. Most of the border points are statistically insignificant, with p-values above 0.05. To the extent that slavery had any negative effect, it was concentrated at the Ohio-Virginia border and, to a lesser extent, in northeast Missouri, on the border with Iowa and Illinois. In both these areas, the slave-state side was more mountainous, but it is notable that the pattern persists—albeit to a lesser degree—when elevation and slope are added as covariates in Map 2.[3] In Map 3, meanwhile, the slave counties

[3] The maps for elevation and slope were rasterized and converted to county data using zonal

Map 1

A Spatial RDD for Farm Values per Acre (Specification 1), 1850 and 1860

(a) 1850

(b) 1860

Note: The circles represent the coefficients for slavery's legality (β1) in Equation 1. Their color denotes the magnitude and direction of the effect on the natural logarithm of farm values per acre, while their size indicates the statistical significance, calculated using robust standard errors. Counties west of Minnesota Territory (in 1850), Dakota Territory (in 1860), Iowa, Missouri, Arkansas, and Texas are excluded from the analysis. The calculations are based on census data and shapefiles from Manson et al. (2022).

that were actually on the border have been excluded in an attempt to account for how the institution became weaker where it was easier for the enslaved to

statistics in QGIS before being used in the scripts underlying this paper.

Map 2

A Spatial RDD for Farm Values per Acre (Specification 2), 1850 and 1860

(a) 1850

(b) 1860

Note: In this specification, elevation and slope are included as covariates, taken from the US Geological Survey (2011; 2012). Otherwise, see Map 1.

escape. Addressing this "spillover effect" results in many of the coefficients becoming more negative and significant, but they remain inconsistent across the border.

Such inconsistency makes it difficult to infer any causality from these results. Even on the Ohio-Virginia border, for example, it is hard to say that slavery made the slave side poorer. Indeed, historians have moved away from this argument in the substantial literature on why northwestern Virginia fell behind, eventually leading to the establishment of West Virginia as a state during the

Map 3

A Spatial RDD for Farm Values per Acre (Specification 3), 1850 and 1860

(a) 1850

(b) 1860

Note: In this specification, the slave counties that were on the border have been excluded. Otherwise, see Maps 1 and 2.

Civil War. Traditionally, the region's relative poverty was ascribed to its political marginalization in Virginia's legislature, given the over-representation of the planter class from the more easterly counties. From this perspective, the region's relative backwardness was an indirect political result of slavery, rather than a direct consequence of the institution's legality (Adams 2004). Furthermore, even this indirect causal mechanism has been complicated by Adam Zucconi's (2016) recent work, which has stressed how West Virginia's secession from Virginia

was highly contingent upon the Civil War. Many of the region's political demands had already been met, most notably with two new state constitutions, first in 1830 and then another in 1851. Various prominent western Virginians then decided that slavery actually reinforced their democratic rights. At the same time, as John Majewski (2009) has documented, the Virginia state government began a program of state-led "modernization" in the 1850s that sought to mimic the policies that were believed to have led to the success of Midwestern states, including Ohio. Ultimately, Scott A. MacKenzie (2023) argues, secession from Virginia in 1863 was more a response to the exigencies of war than any strong desire for independence. Statehood also seemed like the best way to maintain the racial hierarchies that had been established through slavery. Hence, the historiography suggests that no simple line of causality can be drawn from slavery to lower farm values per acre on the Ohio-Virginia border, which is where slavery was most likely to have had a negative effect, at least according to the spatial RDD.

There is, however, an important caveat. It comes from adding the enslaved percentage of the population as a covariate in the spatial RDD, as shown in Map 4. As can be seen, in this case, slavery's legality seems to have a more consistently negative effect across the border, especially in 1860, by which time anti-slavery sentiment had hardened due to the Free Soil movement and the emergence of the Republican Party. Here, then, is evidence that slavery as a legal institution did have a negative effect on farm values, but slavery as a practice—measured by the percentage of the population that was enslaved—tended to cancel it out. The result was the overall neutral effect seen in Maps 1 to 3.[4]

The picture offered by spatial RDD is thus one of complexity. Most importantly, it suggests that it is necessary to distinguish between slavery as a legal institution and as a practice. The rising tide of anti-slavery sentiment in the 1850s may have depressed farm values in parts of the slave states where only a small

[4] This practical usefulness of slavery could support Earle's (1978) argument that Midwestern corn farmers were becoming more attracted to slavery in the late antebellum period.

Map 4

A Spatial RDD for Farm Values per Acre (Specification 4), 1850 and 1860

(a) 1850

(b) 1860

Note: In this specification, the percentage of the population enslaved has been added using census data from Manson et al. (2022). Otherwise, see Maps 1 to 3.

part of the population was enslaved. Overall, however, that negative effect from crossing the free-slave state border was cancelled out by the benefits that slaveholders reaped from their ability to exploit their captive laborers. To use Wright's (1986, Ch. 2) terminology, there was no contradiction between being a "laborlord" and a "landlord" in the antebellum period. For this reason, the spatial RDD does not support his tale of how slavery impeded the growth of American capitalism. And nor does what happened to farm values per acre in the

South after abolition.

The Abolition Effect

The DiD analysis abolition's effect on farm values is fairly simple. The equation is as follows:

$$Y_{it} = \beta_1 \cdot \text{slavery} + \beta_2 \cdot \text{post-1860} + \beta_3 \cdot \text{slavery} \cdot \text{post-1860} + \beta_0 + \varepsilon_{it} \qquad (2)$$

in which farm values per acre (Y) in a county (i) in a particular year (t) are a function of a dummy for slavery's legality, another dummy for the post-abolition years after 1860, and an interaction between those two dummy variables, with the dummy for slavery fixed to its 1860 value from 1870 onward. This time, β_1 gives an idea of slavery's effect on farm values before abolition. The key coefficient, however, is for the interaction term: β_3 indicates the post-abolition effect of slavery having previously been legal. In a DiD framework, this is the effect that measures the difference in outcomes between the treatment group (counties where slavery was legal) and the control group (free counties) when, in this case, the treatment was removed (slavery abolished) in 1865.

This model can be applied to census-year data from 1850 to 1900. To do so, all the census data are first normalized by projecting them onto the 1900 county boundaries. Farm values per acre are then converted into a percentage of the national average in each census year. The result is a panel dataset that can be used to analyze farm values in consistent county units across the period. Free counties are then treated as those north of the free-slave state border, excluding any states west of Dakota Territory and Iowa to reflect how slavery's legality was disputed beyond the Midwest before the Civil War. South of the border, Missouri, Arkansas, and Texas are used as the westward boundary for the counties in which slavery was legal.

The results suggest that slavery probably raised farm values in the South in the antebellum period. Table 1 presents the results of the regression for the slave states as a whole and for two subregions. In Column (a), the interaction

Table 1

A DiD Analysis of Farm Values per Acre, 1850–1900

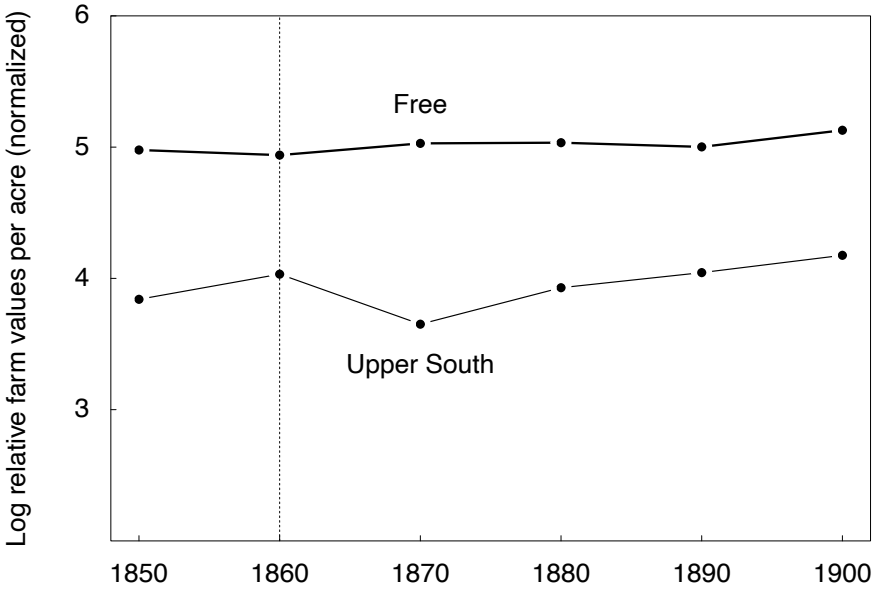
	All slave states		Upper South		Deep South	
	(a)	(b)	(c)	(d)	(e)	(f)
Slavery	-1.170***	-1.508***	-1.007***	-1.299***	-1.361***	-2.454***
(legal up to 1860 = 1)	(0.179)	(0.222)	(0.186)	(0.194)	(0.233)	(0.240)
Post-1865	0.096	0.100	0.096	0.100	0.096	0.100
(1870 onwards = 1)	(0.107)	(0.106)	(0.108)	(0.107)	(0.108)	(0.107)
Slavery · post-1865	-0.292*	0.141	-0.078	0.286	-0.466**	0.353
	(0.143)	(0.153)	(0.161)	(0.149)	(0.169)	(0.275)
% enslaved		0.010***		0.012*		0.024***
(fixed from 1860)		(0.003)		(0.005)		(0.003)
% enslaved · post-1865		-0.012***		-0.016***		-0.015***
		(0.003)		(0.002)		(0.003)
Intercept	4.956***	4.956***	4.956***	4.956***	4.956***	4.956***
	(0.125)	(0.125)	(0.126)	(0.126)	(0.126)	(0.126)
Observations	12,988	12,744	9,147	9,104	8,777	7,533
Adjusted R^2	0.47	0.48	0.40	0.42	0.63	0.65

Note: Column (a) shows results of Equation 2 applied to the natural logarithm of farm values per acre, while the enslaved percentage of the population has been added as a covariate in Column (b). Both slavery's legality and the enslaved share of the population are fixed at their 1860 levels in subsequent years. Columns (c) to (f) display the same results, but with the slave states split between the Upper South and the Deep South. The Deep South consists of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas, while the other slave states (including Missouri) are assigned to the Upper South. Counties are weighted by their acreage of farmland, while standard errors have been clustered at the state level and are shown in parentheses. Statistical significance is indicated as: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The calculations are based on census data and shapefiles from Manson et al. (2022).

term for slavery multiplied by the post-1865 dummy indicates that farm values fell by 29 percent relative to the national average in the long postbellum period up to 1900, although the coefficient is only significant at the 5 percent level. Column (b) then adds the percentage of the county's population that was enslaved

Figure 1

Farm Values in the Free States and the Upper South, 1850–1900



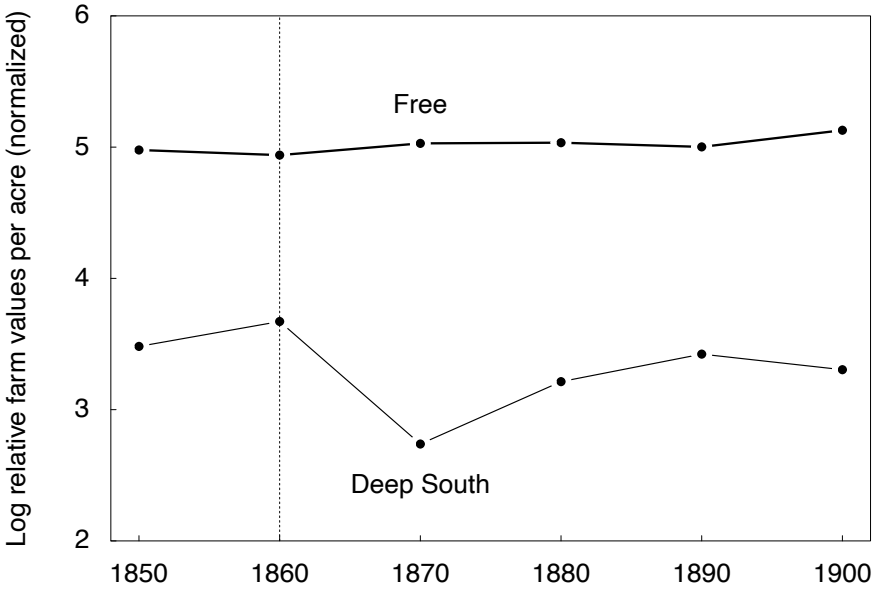
Note: The series show the natural logarithm of farm values per acre as a percentage of the national average in each census year, weighted by each county's farmland. The vertical dashed line marks 1860—the last census year before abolition. Otherwise, see Table 1.

as a covariate to determine whether this negative effect was due to slavery's abolition as a legal institution or as a practice. The latter seems to have dominated, given that the interaction term from Column (a) becomes positive and insignificant in Column (b); instead, the results suggest that, after abolition, land values fell by 1.2 percent for every percentage point of the population that was enslaved in 1860. Columns (c) to (f) then find similar patterns in both the Upper South and the Deep South, with the caveat that the interaction term in Column (c) suggests that slavery's legality had no significant effect in the former—a result that is consistent with the spatial RDD's finding that slavery being legal did not affect farm values at the border.

Visual inspection confirms these findings. Figures 1 and 2 show the

Figure 2

Farm Values in the Free States and the Deep South, 1850–1900



Note: See Figure 1.

natural logarithm of farm values per acre relative to the national average for the Upper South and Deep South, respectively, compared to the free states. In the case of the Upper South, there is a moderate reduction in relative farm values from 1860 to 1870, but it is followed by a swift recovery, which reflects how only a relatively small percentage of the population was enslaved. In the Deep South, by contrast, slavery was so widespread as a practice that relative farm values experienced the sharper and longer-lasting dip seen in Figure 2.[5] It was here, then, in the cotton belt that slavery appears to have had a positive effect on farm values due to its practical utility for the planter class.

[5] Both figures show that there is some deviation from the parallel trends assumption in the years 1850 and 1860, but correcting for it would only strengthen the conclusion that abolition had a negative effect on relative farm values in the slave states.

Table 2

TWFE Models of Farm Values per Acre, 1850–1900

	All slave states		Upper South		Deep South	
	(a)	(b)	(c)	(d)	(e)	(f)
Slavery · post-1865	-0.360*	0.117	-0.249	0.120	-0.490*	0.162
	(0.141)	(0.132)	(0.141)	(0.126)	(0.206)	(0.287)
% enslaved		0.036**		0.035***		0.037*
(fixed from 1860)		(0.013)		(0.008)		(0.015)
% enslaved · post-1865		-0.015***		-0.016***		-0.015***
		(0.001)		(0.001)		(0.004)
Counties	2,199	2,195	1,534	1,530	1,497	1,493
Observations	12,988	12,744	9,147	9,104	8,777	7,533
Adjusted R^2	0.88	0.89	0.88	0.89	0.89	0.89
Within R^2	0.05	0.17	0.04	0.13	0.09	0.17

Note: Dummy variables for each county have been added to Equation 1, as well as for each of the six years. The dummy variables for slavery's legality and post-1865 then get absorbed into the fixed effects. Otherwise, see Table 1.

Two-way fixed effects (TWFE) models suggest that these results are robust. Indeed, including dummy variables for counties and for years tends to make the coefficients for the interaction effects slightly larger and more significant, as reported in Table 2. This is particularly notable because it suggests that the positive correlation between the enslaved share of the population and relative land values before abolition was not because the planter class had monopolized the best land. In addition, fluctuations in cotton prices are encompassed by the dummy variable for census years, negating Wright's (1974) explanation for any downturn in the postbellum South. The TWFE models instead suggest that it was abolition rather than reduced world demand for cotton that reduced relative farm values.[6]

[6] Slavery and the percentage enslaved are equivalent to fixed effects from 1860 onwards, which explains why the within R^2 of the TWFE models are of so low. Given this, it is particularly notable that the significance of the interaction terms is robust enough to be detected even

Some causality may therefore be inferred from the DiD analysis: using abolition as a natural experiment suggests that slavery as a practice had a positive impact on farm values per acre in the antebellum period. In the Deep South, especially, there was a sharp fall in relative farm values that persisted for the rest of the nineteenth century. Far from impeding the growth of American capitalism, the abolition effect therefore suggests that slavery in fact facilitated it. The question then becomes why.

Southern Discomfort

Explaining the results of these econometric exercises is not difficult. Klas Rönnbäck (2021) has demonstrated that the enslaved were a cheaper source of labor than economic historians have previously recognized—considerably cheaper than free labor. As such, slavery made possible the exploitation of Southern land in a way that would not have been feasible without it. Southern cotton, most notably, required the South's cheap captive labor to be competitive on the world market. As late as the Panic of 1819, it seemed as though India would become the world's dominant cotton producer. Imports of Indian cotton into Britain had surged, leading to a collapse in prices that helped pushed the United States into a financial crisis. As Indian cotton even began to arrive at New York, leading some protectionists to call for a tariff to be placed on it (Ellison 1886, 87n1; Rothbard 1962, 160–162). Nonetheless, in the 1820s, the cotton boom could continue thanks to the South's captive laborers, who were made to grow the crop despite the lower prices. As Richard Steckel (1986; 2007; Rathbun and Steckel 2002) has demonstrated, planters were able to pass the risks of cotton production onto enslaved children in particular by cutting their rations as a way to maintain their profit margins. Slavery thus had distinct practical advantages for the planter class.

Yeoman farmers, meanwhile, seem to have prioritized soil and climate over institutions. As settlers began in move westward into the border region,

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with limited explanatory power for within-county variation.

contemporary accounts suggest that they were not perturbed by slavery's legality. In the late eighteenth century, the politician Benjamin Rush (1951, 1:405), for example, wrote that "the migrants from Pennsylvania always travel to the southward. The soil and climate of the western parts of Virginia, North and South-Carolina, and Georgia," he continued, "afford a more easy support to lazy farmers than the stubborn but durable soil of Pennsylvania." For farmers, the Southern border region was well-suited to the mixed farming that they were used to. "*Here*," Rush explained, referring to his native Pennsylvania, "our ground requires deep and repeated plowing to render it fruitful—*there*, scratching the ground once or twice affords tolerable crops." Livestock, moreover, could prosper over the border. "In Pennsylvania the length and coldness of the winter make it necessary for the farmers to bestow a large share of their labor in providing for and feeding their cattle, but in the southern states cattle find pasture during the greatest part of the winter in the fields or woods." In this way, Rush illustrates how settlers prioritized practical concerns relating to soil and climate above institutions. Consequently, the Upper South was attractive to them.[7]

Lower farm values in the Deep South seem to have reflected the fear of the region's environment, rather than slavery. Karen Ordahl Kupperman (1979; 1984; 2007, Ch. 5) has documented how widespread this fear was in the seventeenth century, and it persisted subsequently. The fear was, moreover, well-founded, given the far greater risk of disease. Indeed, as Elena Esposito (2022) has argued, Africans' greater resistance to malaria helps to explain why slavery became so important to the South's settlement in the colonial era. Furthermore, Sok Chul Hong's (2007; 2011) estimates indicate that the risk of malaria was higher precisely in those areas where the enslaved share of the population was greatest in the late antebellum period. Slavery's contribution to growth had thus come from forcing the enslaved to live and work in regions where free settlers

[7] Wright (2006, 78) quotes Rush as if he were referring to the entire South, but it is clear that he is referring to the border region (also see Otto 1989, 48–50).

preferred not to live, making possible the antebellum cotton boom.

The consensus view should therefore be revised. Until now, American economic historians' arguments have been too convenient. Wright (2022, 130), for example states that "the consensus among economic historians is that long-term growth processes were underway in the 1790s, if not earlier. Explanations for growth acceleration at this time," Wright continues, "typically give prime place to certain institutions established by the US Constitution of 1789 and the fiscal reforms of the first Washington administration undertaken by Alexander Hamilton." From this perspective, the Founders' liberal values and the good institutions they built seem like the principal cause of growth, whereas slavery only brought poverty to the South. This morality tale is, however, contradicted by the analysis made here, especially given that farm values are one of the key pieces of evidence that Wright himself has used to make his case. Far from impeding the growth of American capitalism, this paper has found that slavery probably facilitated it. Whatever negative effect its legality may have had was outweighed by its practical utility, which resulted in higher farm values in the Deep South in particular. Consequently, it is necessary to revisit the question of how the horrors inflicted upon black Americans in the antebellum period helped to make their nation great.

Appendix

To perform a robustness check for the spatial RDD, different settings in rdrobust can be employed to assess their impact on the results. Table A.1, for example, reports the results of applying rdrobust to the whole border with counties' distance to the nearest point on it used as the running variable and the bandwidths selected using six different algorithms; half are based on the mean-square-error (MSE) method and the other half on the coverage error rate (CER). In this way, it approximates an average treatment effect across the border to show how sensitive the results are to changes in the regressions (Zajonc 2012, Ch. 2). Specifications 1 to 3 suggest some weak effect of slavery's legality on farm values in 1850, although the coefficients become statistically insignificant in 1860. On the

Table A.1

Average Treatment Effect in the RDD, 1850 and 1900

	Specification			
	(1)	(2)	(3)	(4)
		(a) 1850		
Common MSE-optimal, single	-0.229*	-0.206	-0.401**	-0.790***
	(0.117)	(0.122)	(0.148)	(0.151)
Separate MSE-optimal	-0.270*	-0.216	-0.348*	-0.818***
	(0.108)	(0.119)	(0.145)	(0.128)
Sum-based MSE-optimal	-0.229*	-0.254*	-0.400**	-0.818***
	(0.114)	(0.114)	(0.149)	(0.128)
Common CER-optimal, single	-0.153	-0.145	-0.305	-0.841***
	(0.134)	(0.141)	(0.187)	(0.193)
Separate CER-optimal	-0.215	-0.146	-0.276	-0.820***
	(0.126)	(0.137)	(0.179)	(0.155)
Sum-based CER-optimal	-0.149	-0.163	-0.305	-0.835***
	(0.132)	(0.131)	(0.189)	(0.172)
		(b) 1860		
Common MSE-optimal, single	-0.099	-0.119	-0.382**	-0.813***
	(0.118)	(0.107)	(0.125)	(0.139)
Separate MSE-optimal	-0.121	-0.135	-0.393***	-0.740***
	(0.109)	(0.109)	(0.111)	(0.117)
Sum-based MSE-optimal	-0.209*	-0.150	-0.344**	-0.867***
	(0.097)	(0.099)	(0.133)	(0.089)
Common CER-optimal, single	-0.066	-0.087	-0.402*	-0.819***
	(0.138)	(0.125)	(0.159)	(0.187)
Separate CER-optimal	-0.104	-0.084	-0.405**	-0.847***
	(0.126)	(0.129)	(0.134)	(0.150)
Sum-based CER-optimal	-0.121	-0.079	-0.433*	-0.803***
	(0.113)	(0.115)	(0.174)	(0.109)

Note: These are the coefficients for slavery's legality in Equation 1, with the robust standard errors in parentheses, using distance from the border as the running variable and the indicated bandwidth selectors. Statistical significance is indicated as: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Otherwise, see Maps 1 to 4.

Table A.2

Average Treatment Effect in the RDD without the Ohio-Virginia Border, 1850 and 1860

	Specification			
	(1)	(2)	(3)	(4)
	(a) 1850			
Common MSE-optimal, single	-0.105	-0.043	-0.082	-0.610***
	(0.136)	(0.145)	(0.182)	(0.173)
Separate MSE-optimal	-0.159	-0.060	-0.099	-0.632***
	(0.127)	(0.139)	(0.165)	(0.144)
Sum-based MSE-optimal	-0.119	-0.094	-0.138	-0.588***
	(0.131)	(0.136)	(0.171)	(0.149)
Common CER-optimal, single	-0.022	-0.017	-0.025	-0.745**
	(0.159)	(0.168)	(0.239)	(0.227)
Separate CER-optimal	-0.089	-0.010	-0.006	-0.617***
	(0.150)	(0.160)	(0.206)	(0.174)
Sum-based CER-optimal	-0.025	-0.020	-0.018	-0.658***
	(0.154)	(0.158)	(0.220)	(0.187)
	(b) 1860			
Common MSE-optimal, single	0.072	0.050	-0.175	-0.686***
	(0.141)	(0.132)	(0.147)	(0.271)
Separate MSE-optimal	0.050	-0.070	-0.182	-0.603***
	(0.128)	(0.123)	(0.129)	(0.134)
Sum-based MSE-optimal	-0.040	0.009	-0.110	-0.686***
	(0.113)	(0.120)	(0.162)	(0.110)
Common CER-optimal, single	0.039	0.030	-0.158	-0.817***
	(0.166)	(0.156)	(0.188)	(0.201)
Separate CER-optimal	0.025	-0.041	-0.212	-0.743***
	(0.151)	(0.145)	(0.157)	(0.167)
Sum-based CER-optimal	0.057	0.034	-0.222	-0.647***
	(0.133)	(0.141)	(0.214)	(0.134)

Note: All counties with centroids within 50 miles of the Ohio-Virginia border have been excluded. Otherwise, see Table A.1.

other hand, Specification 4, which includes the enslaved share of the population as a covariate, yields a statistically significant negative coefficient for slavery's legality regardless of the bandwidth selector used. That significance generally persists, moreover, when counties whose centroids are within 50 miles of the Ohio-Virginia border are removed from the sample, as in Table A.2. In no other specification does the coefficient for slavery's legality remain significant. The average treatment effect thus reflects the influence of a particular part of the border, where the historiography suggests that slavery was not the principal cause of the slave side's relative poverty. For this reason, it is important to look at the spatial RDD in two-dimensional terms, as this paper has attempted to do.[8]

Turning to the DiD analysis, it is important to mention the parallel trends assumption. The control and treatment groups should ideally have similar pre-treatment trends for the DiD method to work. Without such parallel trends, measuring the treatment effect becomes challenging. It is, however, violated in the case of this paper. Table A.3 illustrates how there tended to be an insignificant downward trend in relative farm values in free counties between 1850 and 1860, whereas the trend was upward and more significant in slave counties. Adjusting for these non-parallel trends, as in Table A.4, then leads to a far greater negative treatment effect for abolition. How much should be read into this is nevertheless questionable, given that the pre-treatment trend is based on only two data points. That said, the results reported in Table A.4 do suggest that this paper may have underestimated the extent to which slavery as a practice boosted relative farm values in the antebellum period.[9]

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[8] As further robustness checks, the scripts underlying this paper also use epanechnikov and uniform kernel functions instead of the triangular function used here. The results are generally similar, as can be seen in the supporting files produced by those scripts available at http://kingcotton.info.

[9] In the scripts for this paper, it is also possible to run the DiD without weights. The treatment effect for the Deep South then becomes insignificant, but that is due to the effect of Texas, which expanded rapidly post-1865. When Texas is excluding Texas, the unweighted treatment effect for the Deep South becomes larger and more significant than in Table 1.

Table A.3

A Parallel Trends Test, 1850–1860

	All slave states	Upper South	Deep South
Slavery	-41.721*	43.811	-43.811*
(legal up to 1860 = 1)	(19.438)	(22.903)	(20.327)
Year	-0.004	-0.004	-0.004
(particular year = 1)	(0.009)	(0.009)	(0.009)
Slavery · year	0.022*	0.023	0.023*
	(0.010)	(0.012)	(0.011)
Intercept	12.187	12.187	12.187
	(16.889)	(16.963)	(17.008)
Observations	4,274	3,014	2,870
Adjusted R^2	0.36	0.34	0.46

Note: See Table 1.

Table A.4

A Trend-Corrected DiD Analysis of Farm Values per Acre, 1850–1900

	All slave states	Upper South	Deep South
Slavery	-1.178***	-0.906***	-1.268***
(legal up to 1860 = 1)	(0.180)	(0.185)	(0.235)
Post-1865	0.096	0.096	0.096
(1870 onwards = 1)	(0.107)	(0.108)	(0.108)
Slavery · post-1865	-0.980***	0.776***	-1.212***
	(0.147)	(0.161)	(0.149)
Intercept	4.956***	4.956***	4.956***
	(0.125)	(0.126)	(0.126)
Observations	12,988	9,147	8,777
Adjusted R^2	0.62	0.58	0.75

Note: The slavery is corrected by subtracting the product of the coefficient of the interaction term for slavery multiplied by year in Table A.3 and the number of years since 1860. Otherwise, see Table 1.

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