Did Slavery Impede the Growth of American Capitalism?

Two Natural Experiments Using Farm Values per Acre

Joseph Francis

Working paper
(October 2024)

Abstract

Economic historians have argued that low farm values per acre in slave states in the late antebellum period demonstrate how slavery impeded the growth of American capitalism. Yet two natural experiments complicate this consensus view. A two-way fixed effects (TWFE) event study shows that farm values fell in slave states relative to free states following abolition. A spatial regression discontinuity design (RDD) then suggests that any negative effects of slavery's legality on the free-slave state border were counteracted by the institution's practical utility for the planter class. An explanation is that slavery provided a relatively cheap agricultural labor force in parts of the South where white Americans preferred not to settle. From this perspective, slavery facilitated rather than impeded the growth of American capitalism.

Keywords: American capitalism, growth, slavery, abolition, two-way fixed effects event study, spatial regression discontinuity design
JEL codes: N11, N21, N51, O43

Joseph Francis is an economic historian from Wales (joefrancis505@gmail.com). He is an honorary research fellow at the University of Birmingham. Adam Zucconi provided guidance on West Virginia's historiography, while Matt Curtis and Philip Hoxie gave helpful feedback on a previous draft. For data and scripts, see http://kingcotton.info.

Economic historians see the antebellum South's low farm values per acre 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—that is, the value of land and buildings—in the North reflected the region's success, after the effects of "pure geography" had been "overwhelmed by the development juggernaut sprawling across the countryside" (2006, 64). In the South, by contrast, state governments did not promote immigration or new transportation infrastructure to such a degree—the consequence, according to Wright, of how slavery distorted incentives. The Southern planters had little interest in promoting the development of specific localities because 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, while most of it "was either passed over or left behind in the process of settlement" (2006, 65). Wright (2006, 58–63; 2022, 132–134) 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 fall behind, turning the region into a drag on the country's growth.

Two natural experiments challenge this narrative.[1] In the first, a two-way fixed effects (TWFE) event study is applied to the abolition of slavery in 1865. It finds that farm values per acre fell where slavery had been legal, suggesting that the institution probably made the slave states wealthier in the late antebellum period. Any negative effect from its legality seems to have been more than cancelled out by its practical utility for planters. These findings are then confirmed

[1] Titiunik (2021) provides a discussion of the concept of natural experiments, while Verghese (2024) explains why the choice of dependent variable is key. The advantage of farm values per acre is that they provide an unambiguous measure of wealth, whereas other census data are more difficult to interpret. High population density, for instance, is not necessarily a sign of prosperity, while the share of improved land could reflect ecological constraints more than wealth, as argued by Majewski and Tchakerian (2007).

by the second natural experiment. It analyzes the effects of slavery's legality at the free-slave state border using a spatial regression discontinuity design (RDD). It suggests that even where relatively few people were enslaved, the negative effects of slavery's legality were largely cancelled out by the institution's practical utility.[2] Rather than impeding the growth of American capitalism, then, slavery may have facilitated it. Most likely, this was because it provided planters with a cheap captive labor force in parts of the South where free Americans preferred not to settle, particularly due to the disease environment. The simplistic morality tale in which liberal values and good institutions were the cause of the United States' success should therefore be discarded. Instead, the growth of American capitalism in the nineteenth century was characterized by complexity, both moral and otherwise.

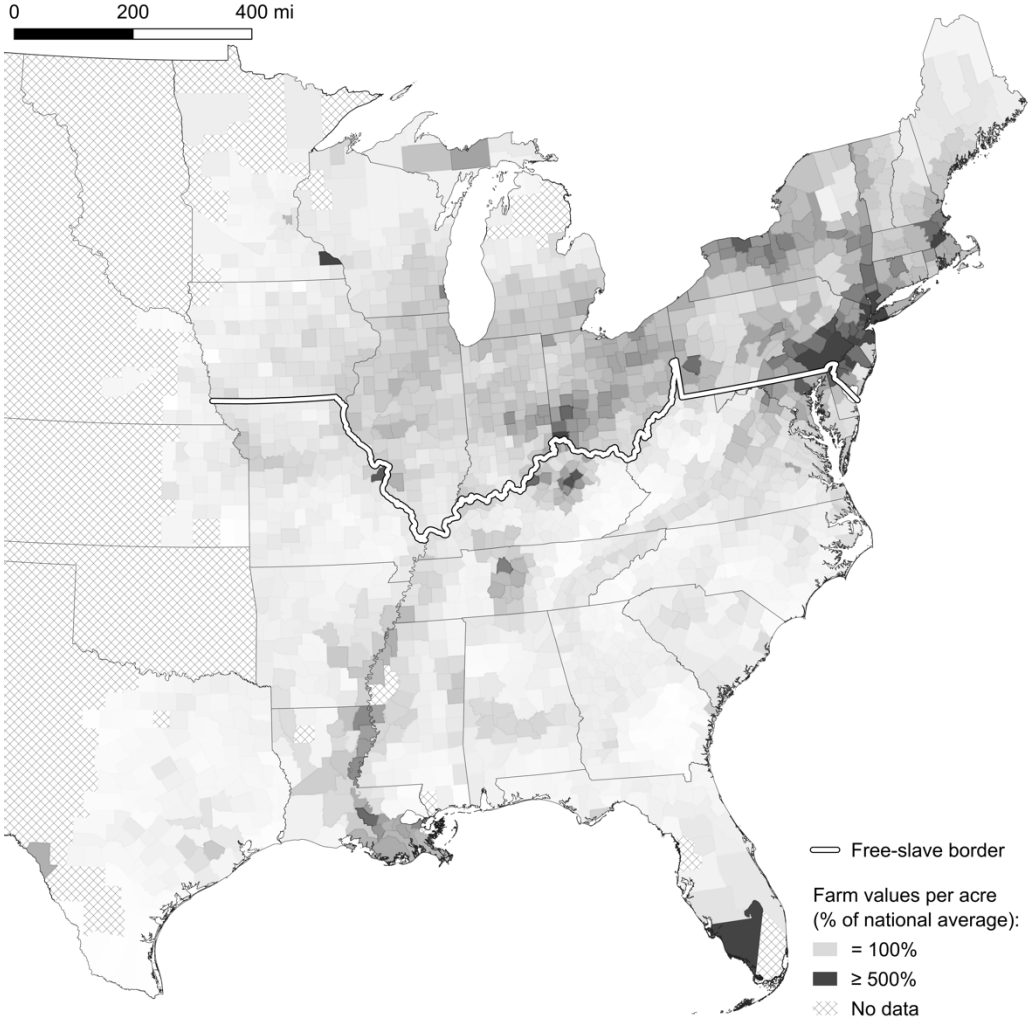
The Abolition Effect

Even simple visual inspection of the census data can reveal a lot. Superficially, economic historians' consensus view receives some support from a map of farm values before the Civil War. Wright (2006, 64, Map 2.2; 2022, 133, Figure 1), for example, presents a version of Map 1 to make his case. It shows farm values per acre in 1860, normalized so that the national average equals 100, with the free-slave state border also marked. As can be seen, farm values were generally lower on the slave side, supporting the consensus view. Yet Figure 1 reveals how farm values in the South actually fell behind the national average after abolition. In the Upper South, they would recover, but the divergence persisted until the end of the nineteenth century in the Deep South. Indeed, Map 2 shows how the contrast between North and South had become starker by 1900. A visual inspection

[2] This finding is in stark contrast to Bleakley and Rhode's (2024) attempt to apply the RDD methodology to this question. When analyzing farm values per acre, their study suffers from a lack of rigor because they do not use bandwidth optimizers or kernels to weight observations closer to the border. As such, they ignore best practice from the RDD literature (Francis 2024).

Map 1

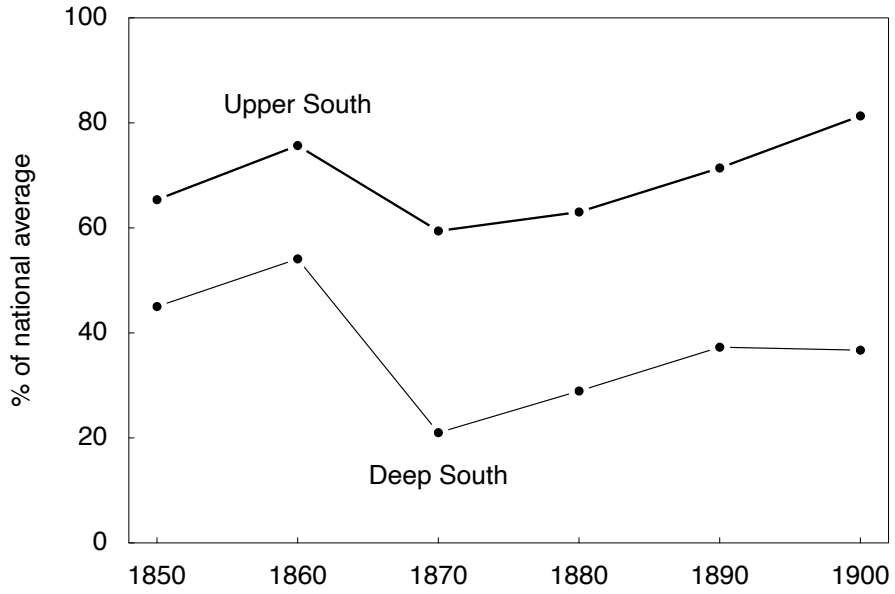
Farm Values per Acre, 1860



Note: Farm values per acre as a percentage of the national average are shown on a linear scale. Any value of 500 percent or above is treated as the maximum. Calculated from Manson et al. (2022).

Figure 1

Farm Values per Acre in the South, 1850–1900



Note: 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. Calculated from Manson et al. (2022).

of the census thereby suggests that abolition did not have the effect that the consensus view would predict. If, as Wright claims, slavery was depressing farm values in the South then they should have risen following abolition, whereas they actually fell.

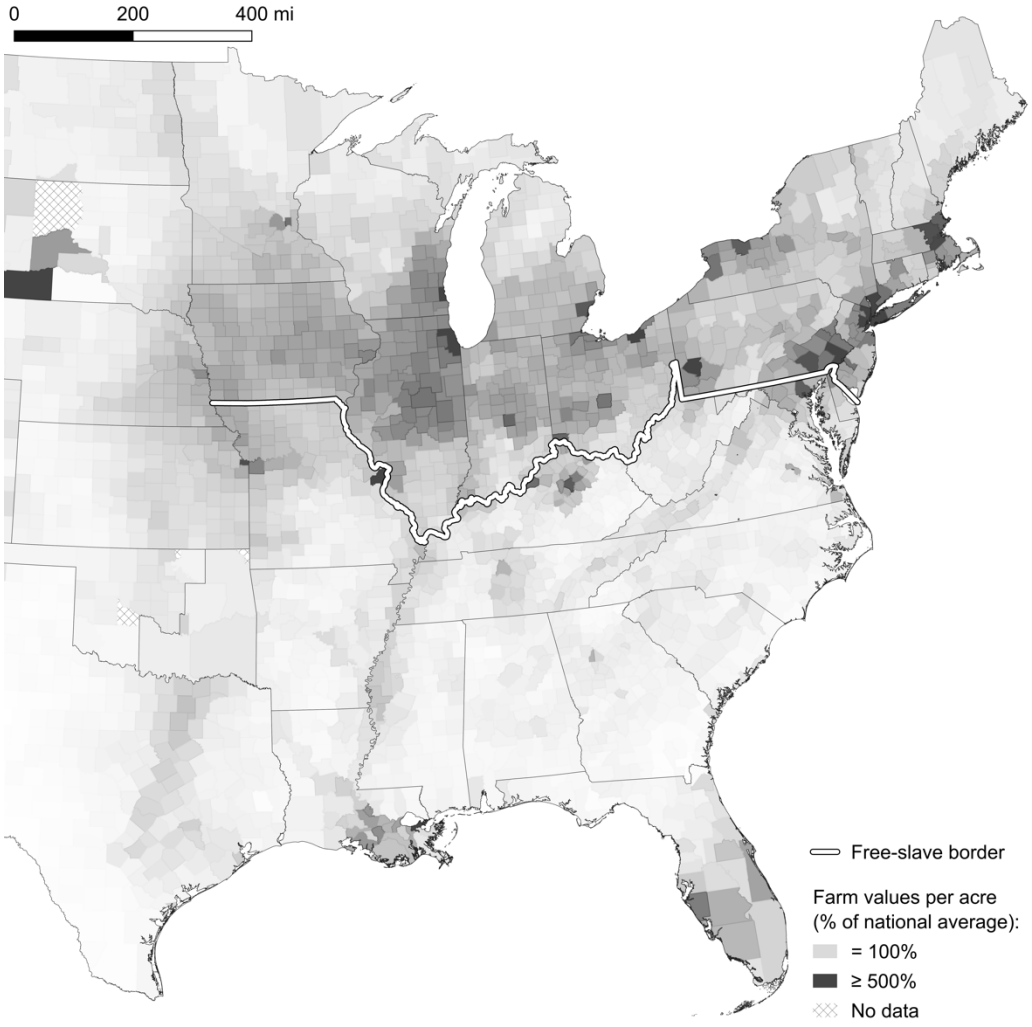
The TWFE event study provides a more formal way to test this finding. It is modelled as:

$$Y_{it} = \Sigma_t \beta_t \cdot (\text{slavery}_i \cdot \text{year}_t) + \alpha_i + \gamma_t + \varepsilon_{it} \quad (1)$$

in which farm values per acre (Y) in a county (i) in a particular year (t) are a function of the sum (Σ) of a dummy for slavery's legality before the Civil War

Map 2

Farm Values per Acre, 1900



Note: See Map 1 for details.

being multiplied by a dummy for each year, plus fixed effects for each county (α) and year (γ), with the results referenced to 1860, the last census year in which slavery was still legal. The result is a dynamic model that provides estimates of how abolition's affected farm values in each year, as measured by β_t.

The test can be applied to census-year data from 1850 to 1900, thereby allowing enough time to separate out the effects of abolition from the more short-term impacts of the Civil War. 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. Counties in any states west of Minnesota, Iowa, Missouri, Arkansas, and Texas are then excluded because slavery's legality was still disputed beyond the Midwest before the Civil War. The result is a panel dataset that can be used to analyze the effects of abolition on relative farm values per acre in consistent county units across the period. If the consensus view were to hold, the expectation would be that the differences in farm values between the treatment group (counties where slavery was legal) and the control group (free counties) should have narrowed when the treatment was removed (slavery abolished) in 1865, although the visual inspection of the census data has already suggested that such a finding is unlikely.

Predictably, the results of the test fail to support the consensus view. The coefficients for slavery's legality multiplied by year dummies are shown in Figure 2, where the effect in 1860 is treated as the baseline. They indicate that counties in which slavery had been legal in 1860 became associated with lower farm values relative to the national average after the Civil War, although the effect diminishes over time and becomes statistically insignificant in 1890 and 1900. To show why the Deep South in particular was affected, the dummy for slavery's legality can be replaced by the percentage of the counties' population that was enslaved, frozen at the 1860 level for subsequent years. As the resulting coefficient in Figure 3 demonstrates, this 1860 level had a persistent negative effect on relative farm values that was highly significant up to the end of the nineteenth century. Columns (a) and (b) in Table 1 reproduce the results of Figures 2 and 3,

Figure 2

Coefficients for Slavery's Legality · Year, 1850–1900

Note: The points are the coefficients while the bars are the 95 percent confidence intervals based on standard errors clustered by state. The coefficient is zero and there are no confidence intervals for 1860 because it is the reference year. Calculated from Manson et al. (2022).

respectively. Column (c) then presents the results when both the dummy for slavery's legality and the enslaved share of the population are included together. This version suggests that the initial impact of the Civil War was felt across the former slave states, but there was then a kind of sorting in subsequent years. Places where more of the population had been enslaved experienced persistently lower relative farm values, whereas they recovered in those places in which there was little slavery. In fact, the coefficients for the slavery multiplied by year dummies in Column (c) suggest that a hypothetical county in which slavery was legal but no one was actually enslaved would have seen its relative farm values rise above their 1860 values in the decades after abolition.

Figure 3

Coefficients for the Enslaved Share of the Population · Year, 1850–1900

Note: The points are the coefficients while the error bars are the confidence intervals based on standard errors clustered by state. The coefficient is zero and there are no confidence intervals for 1860 because it is the reference year. Calculated from Manson et al. (2022).

These results imply that the practical utility of slavery outweighed the negative effects of its legality before the Civil War. When slavery was abolished, therefore, those counties where there had been more people enslaved in 1860 tended to see their farm values more adversely affected, such that they remained depressed even after the short-term impacts of the Civil War had diminished. This is, of course, the opposite of what the Wrightian narrative would predict. Nonetheless, it is what the effects of abolition suggest. It is, moreover, corroborated by the second natural experiment.[3]

[3] As robustness checks, cotton bales produced per capita and the pounds produced per bushel of corn were included as covariates other versions of the model. In neither case does it make

Table 1

A Two-Way Fixed Effects Event Study, 1850–1900

	(a)	(b)	(c)
Slavery · 1850	-0.173		-0.174
	(0.097)		(0.113)
Slavery · 1870	-0.780***		-0.390**
	(0.109)		(0.133)
Slavery · 1880	-0.454***		-0.016
	(0.103)		(0.082)
Slavery · 1890	-0.265		0.225
	(0.147)		(0.135)
Slavery · 1900	-0.278		0.205
	(0.184)		(0.182)
% enslaved · 1850		-0.003	-0.001
		(0.002)	(0.002)
% enslaved · 1870		-0.018***	-0.012***
		(0.001)	(0.002)
% enslaved · 1880		-0.014***	-0.013***
		(0.001)	(0.001)
% enslaved · 1890		-0.012***	-0.015***
		(0.002)	(0.002)
% enslaved · 1900		-0.012***	-0.015***
		(0.003)	(0.002)
Counties	2,199	2,195	2,195
Observations	12,988	12,744	12,744
Adjusted R^2	0.89	0.89	0.90
Within R^2	0.12	0.17	0.23

Note: The dependent variable is the natural logarithm of farm values per acre as a percentage of the national average. Calculated from Manson et al. (2022).

any substantive difference to the results reported here, which suggests that Wright's (2022, 134) claim that any postbellum downturn in the South was due to reduced demand for cotton is incorrect. Furthermore, there is evidence that the reduction in demand was not a great as Wright claims (Hanson 1979; Surdam 1998; also Hummel 2001, 338–340).

Crossing the Border

The free-slave state border can also be exploited to analyze slavery's effects. This time, a spatial RDD can be used. It is an econometric method that aims to measure the effect of a treatment when crossing a geographical 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:

$$Y_i = \beta_1 \cdot \text{slavery} + \beta_2 \cdot \text{distance} + \beta_3 \cdot \text{slavery} \cdot \text{distance} + \beta_0 + \varepsilon_i \qquad (2)$$

in which farm values per acre (Y) in a county (i) are a function 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 on farm values—that is, the treatment effect.

Several tools are used to implement the analysis. 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 Alexander Lehner's (2023; 2024) SpatialRDD package. The border is first split into 50 points. Equation 2 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. Three covariates are also added to Equation 2 to account for geographical differences between counties: the elevation and slope of the land, as well as the pH of the soil. On

top of that, the counties directly on the border are excluded to discount any spill-over effects from the free to slave side or vice versa. There is, then, considerable complexity built on top of the simple foundations provided by Equation 2.[4]

The test suggests that any negative effects that slavery's legality may have had on farm values were highly localized in the antebellum period. In Map 3, the color of the points equals the magnitude and sign of slavery's coefficient in Equation 2, while their size indicates their p-values. When the points are darker, it indicates that slavery's coefficient was negative, whereas its effect was positive at the lighter points; the larger the point, the more statistically significant the coefficient. As can be seen, most of the coefficients are statistically insignificant, with p-values above 0.05. To the extent that slavery had any negative effect in 1850 and 1860, Map 3 suggests that it was mainly concentrated at the Ohio-Virginia border and, to a lesser extent, in northeast Missouri, on the border with Iowa and Illinois. Any effect of slavery's legality on farm values was thus highly inconsistent across the border before the Civil War. In the postbellum period, moreover, the same patterns largely persisted with the exception of the Ohio-West Virginia border, where the coefficients flip to positive. The question then becomes whether that localized transformation was due to abolition or other factors.

The recent historiography of what became West Virginia makes it difficult to argue that slavery was the cause of its lower farm values per acre in the late antebellum period. The traditional view was that slavery played an important role in the origins of the state's initial underdevelopment, but only indirectly. According to this view, the region was marginalized in Virginia's legislature, which was instead dominated by the eastern planter class. From this perspective, West Virginia's relative backwardness was an indirect political result of

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[4] The maps for these covariates were rasterized and converted to county data using zonal statistics in QGIS before being used in the scripts underlying this paper. Robustness tests produced by the scripts accompanying this paper show that their inclusion makes the coefficient for slavery's effect on farm values more significant, as does the exclusion of the border counties. Without these additions to Equation 1, slavery's effect becomes statistically insignificant.

Map 3

Coefficients for Slavery's Legality, 1850–1900

(a) 1850

(b) 1860

(c) 1870

Map 3 (cont.)

(d) 1880

(e) 1890

(f) 1900

Note: The color of each border point denotes the magnitude and direction of the coefficient for slavery in Equation 2, while the size indicates the statistical significance. See the text for further details. Calculated from USGS (2011; 2012), Manson et al. (2022), and ISRIC (2024).

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. Indeed, various prominent western Virginians believed 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. For the postbellum period, Ronald L. Lewis's (1998) argument still seems to hold: the growth of mining and the lumber industry was the result of policies that had begun before the Civil War and continued afterward. Railroads, most notably, expanded rapidly in the future West Virginia in the 1850s and the rate at which they were built in fact fell after it became independent.[5] From this perspective, it is hard to see West Virginia's rising postbellum farm values as the result of abolition.

Yet there is an important caveat. It comes from adding the percentage of the population that was enslaved as a covariate to the spatial RDD, as in Panels (a) and (b) of Map 4. Again, they suggest that in a hypothetical county in which the enslaved share of the population was zero, slavery's legality did in fact have a more consistently negative effect at the border. It also seems to have become more negative from 1850 to 1860, possibly reflecting how anti-slavery sentiment had hardened due to the Free Soil movement and the emergence of the

[5] The future state's network had expanded from 123 miles in 1850 to 405 miles in 1860—an expansion of 281 miles (227 percent). From 1860 to 1870, it grew by 25 miles (6 percent); from 1870 to 1880, by 459 miles (107 percent); from 1880 to 1890, by 381 miles (43 percent); from 1890 to 1900, by 950 miles (75 percent). Calculated from Atack (2023), as well as a shapefile from Manson et al. (2022).

Map 4

Coefficients for Slavery's Legality with the Enslaved Share of the Population as a Covariate, 1850–1900

(a) 1850

(b) 1860

(c) 1870

Map 4 (cont.)

(d) 1880

(e) 1890

(f) 1900

Note: See Map 3 for details.

Republican Party. This suggests that slavery's legality did have a negative impact on farm values that became stronger in the buildup to the Civil War, but even on the border, it was generally counterbalanced by the institution's practical utility. Panels (c) to (f) of Map 4 then use the black share of the population as a covariate to demonstrate how slavery's negative effect disappeared after abolition, once the free-slave state border ceased to exist. Crucially, the presence of black people in this period no longer had a positive effect on farm values, presumably because they could no longer be exploited as slaves.

The results of the RDD are thus consistent with those of the event study. Slavery's legality probably had a negative effect on farm values, but it was counteracted by the institution's practical utility—even on the border, where relatively few people were enslaved. Again, this does not support the narrative that slavery impeded the growth of American capitalism. Further away from the border, where slavery was more prevalent, its practical utility would have been greater, leading to an overall net positive effect on farm values in the South.[6]

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

[6] As a rough average effect (Zajonc 2012, Ch. 2), a border-wide RDD suggests that, in 1850, the farm values per acre increased by 3.5 percent for every percentage of the population that was enslaved, and by 4.3 percent in 1860. By 1900, on the other hand, farm values only increased by less than 0.1 percent for every percentage that was black. As a robustness check, these border-wide RDDs were also run using different bandwidth selectors and kernels for the weights, but they make little difference to the results. On the other hand, excluding counties whose centroids are within 50 miles of the Ohio-Virginia border makes the effect of slavery's legality statistically insignificant in 1850 and 1860, except for when the enslaved share of the population is included as a covariate, confirming what can be seen visually in Maps 3 and 5.

cotton, most notably, required the South's cheap captive labor to be competitive on the world market. Hence, 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. 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 to move westward into the border region, 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 (Otto 1989, 48–50).

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 the fear of the Southern climate was in the seventeenth century, and it persisted subsequently. The fear was, moreover, well-founded, given the far greater risk of disease. 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 thus came from forcing the enslaved to live and work in regions where free settlers 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.

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