# Capital Destruction and Economic Growth: The Effects of Sherman's March, 1850-1920*

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**Abstract**

Using General William Sherman's 1864-65 military march through Georgia, South Carolina, and North Carolina during the American Civil War, this paper studies the effect of capital destruction on short- and long-run local economic activity, and the role of financial markets in the recovery process. We match an 1865 US War Department map of Sherman's march to county level demographic, agricultural, and manufacturing data from 1850-1920 US Censuses. We show that the capital destruction induced by the March led to a large contraction in agricultural investment, farming asset prices, and manufacturing activity. Elements of the decline in agriculture persisted through 1920. Using information on local banks and access to credit, we argue that the underdevelopment of financial markets played a role in weakening the recovery.

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# 1 Introduction

Conflict and environmental disasters have caused economic mayhem throughout human history, but the understanding of its effects on growth remains limited (Skidmore and Toya 2002). In addition, scholars do not know much about which factors affect the recovery process, in particular the role of credit markets. In a standard neo-classical growth model, capital destruction should not affect long-run economic performance because a temporary shock should be followed by rapid growth, bringing the economy back to the original steady state. Evidence in this direction has been presented by several papers, all examining the effects of wartime destruction in the twentieth century (Ikle 1952; Davis and Weinstein 2002; Miguel and Roland 2011). In this paper, we study the long- and short-run effects of capital destruction on local economies using General William Sherman's 1864-65 military march during the American Civil War as a shock to local capital. We find that capital destruction had large negative effects on both the agricultural and manufacturing sectors, with some agricultural effects persisting until 1920. We also find evidence that the underdevelopment of credit markets in the postbellum period played a role in weakening the recovery process.

Writing to Commander Henry Halleck on Christmas Eve 1864 from a freshly conquered Savannah, Georgia, General William Sherman documented how he and his men were fighting "not only... armies, but a hostile people."[1] This required "mak[ing] old and young, rich and poor, feel the hard hand of war," particularly in a region of the South that had not hosted any major fighting (Carr 2015, p. 134). For more than a month, Sherman marched his men 300 miles through the heart of the Confederacy to "enforce devastation" on the seceded states of Georgia, South Carolina, and North Carolina. His military "destroy[ed] mills, houses, cotton-gins, & c.," burned railroads and telegraph lines, and confiscated over 5,000 horses, 4,000 mules, 13,000 cattle, 10.5 million pounds of corn, and 9.5 million pounds of fodder.[2] They were "aveng[ing] the national wrong [Southerners had committed by] dragging [the]

[1]Letter from Sherman to Halleck, December 24, 1864 in US War Department (1901).

[2]William T. Sherman , Military Division of the Mississippi Special Field Order 120, November 9, 1864 in US War Department (1901); Lee (1995).

country into civil war."[3]

The havoc Sherman wreaked on his march—and the destruction brought by the war generally—significantly damaged the South's agricultural and manufacturing output relative to the North's. Sherman boasted in his official report of the Georgia campaign that his march did $100 million in damage to economic infrastructure in Georgia (Trudeau 2008, p. 539). In 1860, prior to the start of the war, the Confederate states produced 38 percent total US agricultural output and 8 percent of national manufacturing output. By 1870, however, even after four years of postwar recovery, Southern agricultural output remained below its prewar level in absolute terms and made up only 28 percent of the US total. Similarly, southern manufacturing lagged behind the rest of the nation, making up only 5 of national output in 1870. As one Georgia planter put it: "I had the misfortune to be in the line of Sherman's march, and lost everything—Devon cows, Merino sheep, Chester hogs, Shanghai chickens, and in fact everything but my land, my wife and children and the clothing we had at that time" (Fite 1984, p. 1).

We begin by studying the declines in economic activity caused by Sherman's march. To do so, we match an 1865 US War Department map of Sherman's march to detailed county level demographic, agricultural, and manufacturing data from US Censuses, 1850-1920. We compare outcomes across geographically close and economically and demographically similar counties in the same states before and after the march: counties through which Sherman marched and their neighbors.[4] This allows us to difference out the effects of larger economic shocks such as changes in global cotton demand and the postwar reduction in labor supply among newly-freed African Americans.[5] We then explore the channels through which the observed short- and long-run effects operated. To perform these analyses, we make use of

[3]Letter from Sherman to Halleck, December 24, 1864 in US War Department (1901).

[4]Throughout the paper, we refer to march and non-march counties. We define march counties as those within 5 miles of Sherman's march lines; that is, within a 10-mile buffer of the march lines. Non-march counties are those outside of the 10-mile buffer, but within 100 miles of the march lines. We exclude the few counties outside of the three march states of Georgia, North Carolina, and South Carolina that are within the non-march zone. These counties are in Alabama, Tennessee, and Virginia.

[5]Wright (1986) discusses the postwar reduction in world cotton demand. Ransom and Sutch (2001) investigate the reduction in labor supply among newly-freed African Americans.

demographic data, information on local infrastructure, such as railroads, and newly-digitized data on local bank and Southern credit market conditions.

With this framework in mind, we have three main results. We begin by providing the first detailed empirical investigation of the motives behind Sherman's campaign. We find evidence that Sherman used the 1860 Census to prepare his route, targeting counties where supplies were more plentiful and easier to collect. The counties through which Sherman marched had, according to the 1860 US Census, more valuable farms and livestock, and higher outputs of major crops like cotton, corn, and potatoes. This is consistent with the qualitative analysis of the historical record by Trudeau (2008), Rubin (2014), and others.

Second, we show that Sherman effectively devastated these counties' postwar economies. In the agricultural sector, we observe a large decline in land investment and farming asset values. These results are significant both statistically and economically. By 1870, the value of march county farms was 21% lower than the value in non-march county farms and the share of land improved was 15% lower. Other agricultural measures such as the value of farmland and the value of livestock also fell.[6] Some of these negative effects persisted for decades after the end of the war. In particular, the relative share of land improved remained lower than the pre-war level through 1920. Nor were these relative economic declines confined to agriculture—at least in the short term. The 1860 to 1870 growth rates of manufacturing output, capital, employment and firm number were also lower in march counties than in non-march counties. This confirms that local entrepreneurial activity and investments were highly affected by capital destruction. Importantly, to strengthen the causal interpretation of our results, we provide a series of robustness tests. First, we show that these results are not driven by differential trends across treatment in the pre-war period. Second, we implement an instrumental variable estimator to tackle to the potential endogeneity of Sherman's path as well as a placebo test using a plausible march route not taken.[7]

[6]Our findings echo diaries of people along Sherman's path. According to Rubin (2014, p. 20), one Sandersville, Georgia resident lamented that people "struggled with deprivation, coping with the lack of livestock and supplies" for years.

[7]Our baseline specification already controls for county fixed effects—which control flexibly for time-

In our third and final result, we argue that post-war underdevelopment in credit markets played an important role in explaining the extent of the relative effects and the delay in recovery. Credit from the banking sector completely dried up after the war: we find that nearly every bank and every branch in Georgia, North Carolina, and South Carolina shut down right after the war. This lack of credit may interfere with the recovery process, leaving larger harm in the counties affected by the shock and allowing some of the effects of the march to show up decades after later.

We provide three main pieces of evidence in favor of this hypothesis. First, we show that potential alternative mechanisms—a demographic shift or the lack of infrastructure—do not explain the large effects of the march, even in the short run. March and non-march counties looked similar demographically before and after the War. Neither whites nor African Americans left march counties at faster rates than fled non-march counties. Infrastructure access or investment, as measured by the number of county railroad miles in each decade from 1850-1920, was not differential across march and non-march counties either.[8]

Second, we find that the provision of credit made the immediate recovery more difficult in the manufacturing sector. In particular, counties that were more dependent on credit before the war experienced slower postwar manufacturing recovery following the march. Since formal credit markets were deeply impaired by the war, we measure dependence by looking at those counties where companies could have more easily accessed financing in the pre-war period. Specifically, we look at counties located closer to a bank branch or where lending markets were particular active based on the number of firms tracked in the county by Dun, Boyd, & Company, a credit ratings agency (Brennecke 2016; González, Marshall, and Naidu 2016). For these counties, we find much larger effects of Sherman on manufacturing

invariant county characteristics—and state-by-year fixed effects, absorbing any time-varying shocks common to all counties within a state. We also augment this specification with a series of pre-shock controls interacted with time dummies, which condition our parameters to heterogeneity in observables across treatment in the pre-war period.

[8]That is not to say that Sherman was unsuccessful in destroying railroads and telegraph lines along the path of the march, but that his destruction was short lived. As we describe later in the paper, railroads were mostly rebuilt by 1870 and telegraph service had been restored before the end of the war.

activity, suggesting that credit drying up exacerbated the recovery for businesses that were more dependent on it.[9]

Lastly, we also provide evidence on the importance of credit markets frictions in the recovery of the agricultural sector. The issue here is that the antebellum banking sector did not serve rural and agricultural needs, especially in the South (Fite 1984; Jaremski and Rousseau 2012); instead many small farmers relied on large local land owners as a source of financing between harvests (Rajan and Ramcharan 2011; Jaremski and Fishback 2016). In principle, these large landowners were less likely to be financially constrained because they had larger amount of non-land wealth and the larger scale of their farming business was able to generate more cash-flow. In this setting, we document two results that are consistent with our hypothesis that credit market frictions had an important impact on the recovery process. First, we find that the march led to a substantial increase in farmland concentration. In line with the discussion in Rajan and Ramcharan (2011),[10] we interpret this result as evidence that wealthier landowners were able to take advantage of small farmers' fire sales, in a context where formal credit is limited or nonexistent. Importantly, this shift in land concentration is both large in magnitude and extremely persistent. Second, we find smaller effects of Sherman's march in counties with a larger share of wealthy land owners. Since large land owners are less financially constrained and they can also provide financing to other farmers, this is consistent with our credit channel in exacerbating the recovery process.

With this paper, we contribute to three related literatures. The first examines the effects of capital and infrastructure destruction on economic local activity. Ikle (1952) studied this in the context of the Allied bombing of German cities during World War II and found that bombed cities rebuilt fairly quickly after the war. Davis and Weinstein (2002) similarly

[9]While this credit mechanism does not require a direct negative effect of Sherman's march on banks, it would be reinforced by one. As we discuss later in the paper, we suspect that Sherman's march did have a negative effect on the banking sector. However, we consider this to be part of the overall treatment. We test the credit mechanism using only potential treatment intensity, based on pre-existing bank or credit access rather than the post-treatment declines.

[10]For instance, Rajan and Ramcharan (2011) argues that large land owners may prefer a weaker banking sector also because they could then take advantage of small farmers' fire sales.

showed rapid postwar reconstruction of Japanese cities destroyed during WWII. More recently, Miguel and Roland (2011) found that Vietnamese districts severely damaged by the United States in the late 1960s and early 1970s also rebuilt shortly after fighting ceased. Our contribution to this literature is threefold. First, we show the effects of wartime capital and infrastructure destruction in an earlier era in the United States, which is characterized with unique economic and institutional characteristics with respect to the previous literature. Second, unlike the other works, we find some effects to be persistent. Third, we are the first to provide direct evidence on the importance of a developed financial market in the recovery from large shock.[11]

Second, we add to the literature on the determinants of local economic growth, with particular interest in the role of the financial sector. Consistent with recent work showing the spatial persistence of economic activity over time—both across and within sector (e.g. Bleakley and Lin 2012, Krugman 1991, Ellison and Glaeser 1997, and Ellison, Glaeser, and Kerr 2010)—we show that this result holds in an earlier period and in a wartime shock setting. In addition, we highlight the importance of the local financial sector on local economic activity (Rajan and Zingales 1998, Petersen and Rajan 2002 and Guiso, Sapienza, and Zingales 2004, Gilje 2013 and more recently in an historical context Ziebarth 2013 and Lee and Mezzanotti 2014), providing evidence for this new channel related through which financial markets can affect the real economy.

Finally, our study of Sherman's march complements the economic history literature on the direct and indirect costs of the US Civil War. Goldin and Lewis (1975) estimated that in the postbellum period, the former Confederate states had a lower per capita income than other states and that income in the South fell after the war. Ransom and Sutch (2001) argued this decline was driven by a reduction in labor supply among newly-freed African Americans. Wright (1986), on the other hand, suggested that a postwar reduction in world

[11] As we discuss later, a social planner redistributing resources to reconstruct the economy may be a substitute for developed financial markets. An example is the case of Vietnam analyzed by Miguel and Roland (2011), but the government was very involved in the reconstruction efforts.

cotton demand—the South's staple cash crop—hurt the Southern economy most. Temin (1976) attempted to reconcile these explanations in light of the finding by Fogel and Engerman (1974) that plantation agriculture was more productive. Most recently, Khan (2015) showed that the misallocation of resources during the war due to declining geographic mobility and increasing payoffs to military technologies were short-lived and did not inhibit the long-term capacity of technological progress. Recent work in economic history has focused on emancipation as a shock to the southern financial system. Slave wealth was a frequent source of collateral (Martin 2010, 2016) and emancipation both eliminated slaves as an asset and made any lending management practices backed by slave finance obselete.[12] González, Marshall, and Naidu (2016) found that slave owners were more likely than wealthy non-slave owners to start businesses before emancipation but not afterwards.[13] Our research design focuses on local economic activity during and after the Civil War by comparing neighboring counties that were similar economically and demographically prior to the war. Hence, it differences out many of the confounding effects in prior work and in turn, isolates the direct and indirect costs of destruction during war.

The remainder of the paper proceeds as follows. Section 2 reviews the history of Sherman's march. Section 3 describes the historical data. Section 4 details our identification strategy. Section 5 presents results. Section 6 examines mechanisms. Section 7 concludes.

[12]Martin (2016) refers to slavery as "a system of finance" and documents counties in Virginia, North Carolina, and Louisiana where between 20 and 80% of loans and mortgages were backed by slaves. According to Martin: "Among the many social and financial repercussions [of the Civil War] was that an enslaved labor force was no longer available as collateral."

[13]Two recent papers study the effects of emancipation as a wealth shock and trace the effects on intergenerational mobility from the antebellum to postbellum south (Ager, Boustan, and Eriksson 2016; Dupont and Rosenbloom 2016).

# 2 Sherman's March and Reconstruction

## 2.1 The March: Historical Background

As the American Civil War progressed into 1864 and Union General Ulysses S. Grant plotted the destruction of Confederate armies in Virginia, his colleague, General William Sherman, trained his sights on the destruction of the Confederate economy and infrastructure (Trudeau 2008, p. 40). Sherman had just finished the successful Atlanta Campaign, a collection of skirmishes from Chattanooga, TN through northwest Georgia during the late spring and summer of 1864 which culminated in Atlanta's capture on September 2, 1864. In Chattanooga he had fought with Confederate armies led by Joseph E. Johnston and later John B. Hood. Though bloody—more than 7,000 total casualties with 4,423 Union dead and 3,044 Confederates dead—the Atlanta Campaign was a conventional operation for its time with the two armies fighting one another in large and small battles. For his next act, Sherman had something else in mind: he planned to "enforce devastation" on the Southern states by "destroy[ing] mills, houses, cotton-gins, &c.," burning railroads and telegraph lines, and confiscating livestock and crops.[14] He wrote to Grant specifically of plans to "break roads and do irreparable damage" to the Southern transportation network (Carr 2015, p. 55).

According to Civil War historians, Sherman used the prewar 1860 US Census of Agriculture to carry out this mission (Trudeau 2008; Rubin 2014). In particular, he mapped out a march path that traversed the agriculturally richest counties in Georgia, North Carolina, and South Carolina while still following Grant's orders to capture the important southern cities of Atlanta and Savannah, Georgia, and Columbia, South Carolina. Writing in December 1864, Sherman recalled how he "had the [1860] [C]ensus statistics showing the produce of every county through which [he] desired to pass" and that he would destroy those counties most abundant in agriculture. "No military expedition was ever based on sounder or surer data," he remarked (Trudeau 2008, p. 538).

[14]William T. Sherman , Military Division of the Mississippi Special Field Order 120, November 9, 1864 in US War Department (1901); Lee (1995).

Based on our analysis of the 1860 Census of Agriculture, Sherman achieved his goal. Figure 1 details the routes each of Sherman's forces traveled. The Union Army started in Atlanta and moved southeast to Savannah after several feints towards Macon and Augusta. Following the capture of Savannah, Sherman's forces marched north, through inland South Carolina to Columbia. The final drive took the army northeast before defeating the only Confederate Army remaining in the Carolinas near Goldsboro, North Carolina.[15] In Table 1, we see that in 1860 counties in Sherman's path—those counties inside a ten-mile band of the main route shown in Figure 1—produced more crops, had far more livestock, and were more valuable than their neighbors.[16]

[Figure 1 about here.]

[Table 1 about here.]

Upon completing this planning, Sherman undertook his march and wreaked substantial destruction. He officially assigned more than 3,000 infantrymen each day to "foraging." Another 3,000 likely joined on many occasions, placing the true number closer to 6,000.[17] The men destroyed hundreds of businesses, homes, farms, railroad lines, and telegraph lines, and expropriated over 5,000 horses, 4,000 mules, 13,000 cattle, 10.5 million pounds of corn, and 9.5 million pounds of fodder.[18]

[15]Goldsboro was a minor railroad connection that Sherman targeted once his army began marching through North Carolina (Angley, Cross, and Hill 1995, p. 35). From March 19 to 21, 1865, the final fights of the campaign took place in Bentonville, 20 miles from Goldsboro. Sherman arrived in Goldsboro, North Carolina in on March 23, 1865. From that point on, his army was supplied by rail from the north, ending the most destructive aspects of the campaign. Grant wrote to Sherman on April 8, telling him that "the confederate armies were the only strategic points at which to strike." (Barrett 1956, p. 198-199).

[16]We discuss later how this result may affect our analysis. However, to the extent that these county characteristics are time-invariant, we can control for them in our regression analysis by including county fixed effects.

[17]Sherman issued orders regulating the destruction of property and foraging, but likely understood that not all of the regulations would be followed. For example, while many of the fires he ordered were managed by the Union Army Corp of Engineers, the controlled blazes often inspired infantrymen to set their own fires, which frequently grew out of hand and engulfed whole sections of towns (Trudeau 2008, p. 128, 543). In addition, while soldiers often offered to pay for their takings, the payments were frequently made in Confederate greybacks, which were not highly valuable by 1864 due to the Confederate government's large-scale printing efforts, and by war's end were of no value.

[18]William T. Sherman, Military Division of the Mississippi Special Field Order 120, November 9, 1864 in US War Department (1901); Lee (1995).

Nor were Sherman's men the only ones causing damage along the march path. Confederate General Joseph Wheeler and his cavalry corps—the main Confederate opposition to Sherman in Georgia and the Carolinas—were also under strict orders from their superiors to "destroy everything from which the enemy might derive sustenance" (Trudeau 2008, p. 85) and "felled trees [and] burned bridges" (Barrett 1956, p. 50). In addition, Wheeler's cavalry requisitioned mules and horses and "burn[ed] up all the corn and fodder" (Glass Campbell 2006, p. 10). So severe was Wheeler in carrying out the orders that one Confederate officer remarked that "the whole of Georgia is full of bitter complaints of Wheeler's cavalry" (Bearss 1991, p. 127). Confederate General Beauregard too ordered his Georgia forces to "obstruct and destroy all roads in Sherman's front, flank, and rear..." (Trudeau 2008, p. 128).

This destruction along the march path marked the first time the war had meaningfully visited Georgia and the Carolinas (Carr 2015, p. 134). Prior to the march, the only military actions seen in those states were the few shots fired at Fort Sumter, South Carolina, to start the war, a union blockade of the ports, and some minor skirmishes in North Carolina. The larger battles, city sieges, and troop movements had taken place farther north or west.[19] Noticing the relatively untouched countryside in the area prior to the 1864 march, one Minnesota soldier among Sherman's infantrymen wrote that "this part of Georgia [had] never realized what war was until we came through on this expedition" (Trudeau 2008, p. 526). A Hillsboro, Georgia native remarked similarly that only when Sherman marched had the "beloved [Georgia] country [been left] to desolation and ruin" (Trudeau 2008, p. 175). Even foreign observers remarked on the novelty of war the region: writing a travelogue through the postbellum south, an English Member of Parliament recalled that Sherman marched "through States which had never had the war brought home to them, or even seen the blue uniform of their Yankee foes" (Kennaway 1867, p. 26).

[19]Before Sherman's army departed Atlanta on November 15, 1864, there had only been 36 fighting events in Georgia, North Carolina, or South Carolina, compared to 294 in all other states. More, only 8 of the battles had had more than 500 total casualties. The median number of total casualties for Civil War fighting events in all states was 513.

## 2.2 Reconstruction

Even before the end of the Civil War, planning for the reconstruction and reintegration of the South into the Union was underway. Reconstruction, dated by historians of the postbellum period from 1863 to 1877, was overseen by Presidents Lincoln, Johnson, and Grant, as well as the Republican Congress.

While the rebuilding of the national railroad infrastructure was a postbellum priority, few other Reconstruction policies were focused on physical reconstruction. No attempts were made to pay back private property owners whose capital had been destroyed during the war.[20] Nor was compensation offered to former slave owners of the Confederacy, as had been common in past emancipation of slaves elsewhere in the western hemisphere (Goldin 1973).

Instead, Reconstruction focused on the reintegration of the South into the nation and the legal revolution which ultimately granted citizenship and de jure rights to the formerly enslaved African-American population.[21] Along with constitutional amendments abolishing slavery, guaranteeing citizenship, and granting the right to vote, Congress enacted several statutes enabling Reconstruction. The creation of the Freedmen's Bureau, the federal agency tasked by Congress with transitioning former slaves into freedom, involved starting schools for both children and adults, as well as provision of food and medical care to newly freed African-Americans. The Freedman's Saving and Trust Company, also known as the Freedman's Savings Bank, was chartered in 1865. It made loans to African-American veterans and newly freed slaves. Directly relevant to our identification strategy, we have not found any qualitative historical evidence of Reconstruction varying in implementation or focus—from the location of Freedmen's Bureau schools or banks, to the protection or enforcement of

[20]Even Thaddeus Stevens, the powerful Radical Republican congressman from Pennsylvania, could not extract repayment for destruction. An iron foundry he owned near Caledonia, PA was destroyed by a raid led by Confederate General Jubal Early, an uncompensated loss Stevens later estimated at $50,000 (Egerton 2014, p. 212-213).

[21]These rights were largely striped at the end of the Reconstruction period when the planter class regained power in the South (Naidu 2010).

Constitutional Amendments—across Sherman march and non-march counties.

# 3 Historical Data

To investigate the economic effects of the war on march counties relative to non-march counties, we gather historical data from five sources.

To start, we classify counties' march status using the 1865 War Department map of Sherman's troop movements, shown in Figure 1. In the map, each line indicates the center of march lines for each of five Sherman military units: the Right Wing (the 13th and 17th Army Corps), the Left Wing (the 19th and 20th Army Corps), and the Cavalry. We digitally trace each of these lines and consider as 'march' counties all counties within five miles of a line. Non-march counties are those outside of this 10-mile-wide band, but within 100 miles of the lines and located in Georgia, North Carolina, and South Carolina. Figure 2 shows the march and non-march counties in our sample. We select five miles as our primary march bandwidth based on historical accounts that the marching soldiers and foragers did not stray far from the main body of the Army (Trudeau 2008, p. 234). Our results are robust to alternative march distance definitions, as shown in the Appendix Section A.[22]

[Figure 2 about here.]

Second, we gather economic and demographic county-level data before and after the march from the US Census, 1850-1920. Haines (2010) provides decadal, county level, agricultural production and asset value data, as well as demographic information for each county, from the Census of Population and the Census of Agriculture. Newly-digitized US Censuses of Manufactures report manufacturing data at the county by industry level in 1860, 1870, and 1880 (Lee 2015b). From both sources, we extract data pertaining to the counties in the states of Georgia, North Carolina, and South Carolina. County level data are standard-

[22]Given the high variation in quality of contemporary town-level maps, the troops assigned to forage may have occasionally done so farther than 5 miles from the main line of the army. In the appendix we also show robustness to various definitions of the control county set.

ized to 1860 county borders, using the county intersection procedure described in Hornbeck (2010).

Because the 1870 Census data were collected in a South that was still recovering from the Civil War, one might worry about data quality. In particular, it would be problematic if under-enumeration in Sherman march counties was more severe than it was in non-march counties.[23] Heterogeneity in data quality across treatment could potentially bias our results in an unknown direction, affecting the reliability of our estimates.

We use data on contemporary marriage records to show that data quality does not seem to be different across treatment and control counties in the Census. Specifically, we test whether men who appear in county marriage records in Georgia and North Carolina, two of our sample states, between 1868 and 1872 are differentially likely to also appear in the 1870 Census based on whether the men were married in a Sherman march county or a non-Sherman march county.[24] Table A.1 shows the match rates for each state and county type, finding no difference across treatment. This suggests that there was not differential under-enumeration across march and non-march counties and allays our concerns about comparing Census outcomes across the two groups of counties.

To investigate the mechanisms behind any march and non-march differences, we augment the Haines (2010) demographic information with three other data sets. The first are infrastructure data from Donaldson and Hornbeck (2016) based on Atack, Bateman, Haines, and Margo (2010): decadal railroad maps that indicate the exact location of all railroad lines from 1850 through 1920. We intersect these railroad lines with 1860 US county boundaries to calculate the number of railroad track miles in each county in each decade.

The second two data sources used to consider the mechanisms driving our results are

[23]See Steckel (1991) and King and Magnuson (1995) on under-enumeration in historical census data generally. Reid (1995) documents under enumeration in the 1870 census in North Carolina of African Americas, particularly union veterans.

[24]The 1868-1872 county marriage records were digitized by a genealogical website, FamilySearch.org. The marriage records are collected locally by state and county governments which contrasts with the Census collected by Federal agents. Marriage records from South Carolina have not been digitized. The name matching procedure follows the machine learning approach to record linkage developed in Feigenbaum (2016).

local credit data from a pair of newly-digitized sources. We collect bank-level entries in two Merchants & Bankers Registers, 1859 and 1864, and firm level records from Dun, Boyd, & Company's *The Mercantile Agency's 1860 Reference Book*.[25] The bank registries provide the name, capitalization amount, and county of location for the approximately 1,800 state- and nationally-chartered US banks in 1859 and 1864.[26] The Dun, Boyd, & Company book lists all firms tracked by Dun, Boyd, & Company, a credit rating firm based in New York, New York, as of 1860. For each firm, the book lists the name, city, and three credit ratings for the firm. This data in its various formats have recently been used by several other papers in the research area between economic history and finance (Brennecke 2016; González, Marshall, and Naidu 2016).[27] We match the city of each firm to an 1860 county and calculate the number of credit-tracked firms in each county. The bank and DB data proxy for different types of local credit availability before the march, allowing us to shed light on the importance of credit in driving our results.

# 4 Identification Strategy

Sherman's objective was to "enforce devastation" on the South; our objective is to measure how effective and persistent Sherman's devastation was, estimating the direct effect of the capital destruction caused by Sherman's march on the local economy. We begin our analysis by comparing agricultural and manufacturing outcomes before and after the march, across march and non-march counties. Depending on the outcome type, this differences-in-differences fixed effect approach produces our two primary estimating equations. When looking at agricultural outcomes, we use county level data between 1850 and 1920 and estimate the following specification:

[25]The bank registries were were scanned by the University of Wisconsin. We digitized them into a machine-readable, manipulable format.

[26]The banks in 1859 were only state-chartered as national-charter banks were not authorized until after the National Banking Act of 1863 (Jaremski 2013).

[27]Brennecke (2016) provides a very detailed explanation of the data, the way they were collected and the general business model of Dun, Boyd, & Company around this period.

$$Y_{cst} = \beta_t 1[Sherman]_c + \delta_c + \delta_{st} + X_c\theta_t + \epsilon_{cst} \quad (1)$$

where $Y_{cst}$ is agricultural outcome $Y$ in county $c$ and state $s$ at time $t$, $1[Sherman]_c$ is an indicator equal to 1 if county $c$ is within five miles of any Sherman march line, $\delta_c$ are county fixed effects, $\delta_{st}$ are state-by-year fixed effects, $X_c$ are 1860 county characteristics that may predict differential post-march changes across march and non-march counties and are interacted with year indicators, and $\epsilon_{cst}$ is the error term. We interact the Sherman march indicator with a full set of year indicator variables—excluding 1860—to estimate the difference in the outcomes between the march and non-march counties in each year, relative to the year 1860 difference. Our sample includes all counties within 100 miles of any march line.[28] Negative estimates of $\beta_t$ for $t > 1860$ indicate lower agricultural outcomes in march counties relative to non-march counties following the war.

There are three important elements of this specification. First, the presence of county fixed effects control flexibly for time-invariant county characteristics such as the quality of soil, climate, or latitude and longitude. To the extent that the 1860 agricultural outcomes Sherman studied when planning his march path were determined by these types of time-invariant characteristics, the county fixed effects control for these characteristics. Second, the state-by-year fixed effects absorb any time-varying shocks common to all counties within a state such as changes in the demand for cotton, state-specific business cycles, or state policy changes. Third, the 1860 county variables interacted with the full set of year dummies allow us to disentangle the direct effects of the march from the differential effects of the war on counties with different antebellum characteristics. The four 1860 characteristics we use are size—as measured by square miles—population—frequently used as a historical proxy for economic activity—the value of farmland, and the amount of cotton produced (Bleakley and Lin 2012, Donaldson and Hornbeck 2016). Importantly, we also provide our results without

[28] We only include counties in the three states where Sherman marched in our sample because, with state-by-time fixed effects, we need within state variation in the treatment to estimate Sherman effects.

the interacted 1860 controls, showing that the addition of controls has little effect on our estimates.[29] Therefore, our identification assumption is that, within the same state, march counties would have experienced a similar change in post-war agricultural value as non-march counties characterized by similar antebellum characteristics. While this assumption is fundamentally untestable, we provide evidence consistent with its validity by studying pre-shock trends in the outcomes. Furthermore, we also provide robustness checks of an IV and placebo test, both of which can help us relax this identification assumption. More discussion about these tests is presented later in the paper.

For agricultural outcomes, we look at measures of investments in land and value of the overall farming sector. In line with previous work in economic history (e.g. Hornbeck 2010), we proxy investment with the share of land improved for farming.[30] This measure is consistently measured across the 1850-1920 US Censuses of Agriculture. To measure the value of the farming activity, we focus on three main measures: the value of the farm, the value of the farmland, and the value of the livestock.[31] In the Appendix, we also examine the output of specific crops and livestock, collected in great detail by the US Censuses of Agriculture.

For manufacturing, our production, capital, revenue, and employment data are at the industry, county and year level between the decennial Censuses of 1860-1880. Therefore, we

[29]For consistency, we report the estimates on both specifications—with and without controls—over the same sample, excluding in the baseline specification the one county that does not have 1860 controls available.

[30]The Census of Agriculture defines improved acres of farmland as land in farms cleared for tillage, grazing, grass, or lying fallow; unimproved areas are defined as uncultivated land connected to farms, including both fertile and waste acres. Majewski and Tchakerian (2007) document lower shares of improved land in the slave south, both before and after the Civil War. The authors argue these low shares reflect the common southern practice of shifting cultivation. In shifting cultivation, planters prepared acreage for farming by burning forests and brush, releasing nutrients into the soil. They then farmed the burned area extensively for five or six years. After exhausting the soil in one area, planters would let the land lay fallow for the next twenty, building the forest and brush back up naturally and moving on to other unimproved acreage ripe for burning. These practices were common in counties in Sherman's path and outside of it and we argue that differences in improved acre share within the south reflect investment choices of farmers and planters. For example, in 1860, counties with more slavery had more improved land, either because these counties were wealthier in the antebellum period or because slave labor could be used to clear and improve acres.

[31]For the outcome value of farmland, we fewer observations (14) than the other outcomes. This is because some counties around 1850-1870 have this variable missing in the original data. These are Appling, Bulloch, Coffee, Effingham, Floyd, Irwin, Pierce, Tattnall, Ware, Wayne, Wilcox in Georgia and Horry in South Carolina.

also consider an alternative specification, which should have better properties than equation (1). In fact, this data structure allows us to control for time-varying industry shocks in the South, as well as the level of county development in manufacturing. To accommodate this different structure of the data and therefore avoid a large number of missing value that the previous log-level specification would entail—in particular in the postbellum period—we estimate a difference-in-difference fixed effect model with an alternative specification. In particular, we collapse the panel differences-in-differences model, comparing the 1860 to 1870 growth rates of manufacturing outcomes across march and non-march counties. The specification is:

$$\Delta Y_{cg(i)s,1860-1870} = \beta_M 1[Sherman]_c + \delta_{g(i)} + \delta_s + X_c + \epsilon_c \tag{2}$$

where $Y_{cg(i)s}$ is the percentage change from 1860 to 1870 in manufacturing outcome $Y$ in county $c$, industry group $g(i)$ where $i$ denotes industry, and state $s$, $1[Sherman]_c$ is an indicator equal to 1 if county $c$ is within five miles of any Sherman march line, and $\epsilon_c$ is the error term.[32] Furthermore, we augment this specification with industry group fixed effects $\delta_{g(i)}$ and state fixed effects $\delta_s$.[33] The industry group fixed effects control flexibly for industry group characteristics such as demand. The state fixed effects absorb any shocks common to all counties within a state such as changes in the state-specific business cycles or state policy changes. As in the previous specification, we also control for county-specific 1860 characteristics, such as size, population, value of farmland, and cotton production. The sample is again all counties within 100 miles of any march line. Negative estimates of $\beta_M$ indicate lower manufacturing growth rates in march counties relative to non-march counties from 1860 to 1870. The general comments on identification and specification made for the

[32]Growth rates are winsorized at 1% at each tail.

[33]The industry group is generated using the industry groupings introduced in the Census of Manufactures in 1900. These groupings were precursors to the Standard Industrial Classification 2-digit groupings, which were introduced in the Census of Manufactures in 1939. In order to apply these year 1900 groupings to the 1860 to 1880 data, we convert all 1860 to 1880 industry classifications into year 1900 industry classifications. The procedure we use for the conversion is based on Lee (2015a). We also run these regressions excluding the pre-march, 1860 county controls, $X_c$. The results are robust to the more parsimonious specification.

agricultural results hold here too for the manufacturing analyses.

# 5 Results

## 5.1 Main Analyses

Comparing Sherman march to non-Sherman march counties using the differences-in-differences specification previously described, we find economically large and statistically significant post-march differences among agricultural outcomes. Table 2 shows the results. After the march, the value of farming activities and investment in agriculture declined substantially. In particular, the share of improved land, the value of farms, the value of farmland, and the value of livestock declined between 14% to 21% more in march counties from 1860 to 1870 relative to the non-march counties. The findings are similar across the specifications with and without controls. Overall, these results show that the capital destruction caused by Sherman's march substantially affected the local agricultural economy, with the effects still visible in 1870, six years later.[34]

[Table 2 about here.]

Moreover, we find that some of the negative effects persisted long after the march—as late as 1920, more than five decades later. We find persistence on the negative effects across both the value and investments measures; however the results are more precisely estimated with investment. In particular, we find that the initial decline of about 15% in the share of improved land remains extremely stable in magnitude and in statistically significance at least until 1920. Figure 3 confirms graphically the results presented in Table 2, by showing the persistent differences along the share in improved land and farm value outcomes following the march. To strengthen our claim that the effects were fairly persistent also for the other

[34]These negative results are consistent with the historical record. In the immediate antebellum period, farming was done with "Sherman horses," the old, "sore-backed" and "abused" animals the Union Army had swapped for fresh rides along the path of the march (Rubin 2014, p. 50-51).

outcomes, we perform for each agricultural outcome a joint test of significance for the effects between 1870-1890. In this way, we confirm that the effect is indeed present for more than 30 years after the march across all the outcomes, despite the potential noise in the year-specific estimates of the coefficients. Across the different outcomes, we always find that the negative effects are on average highly significant in from 1870 to 1890.[35]

[Figure 3 about here.]

Importantly, these results are not driven by differential trends across treatment before the march. In each specification, the coefficient on the 1850 dummy is relatively small in size and never statistically significant. Alternatively, this is also confirmed by Table A.2, which presents a comparison of the 1850 to 1860 changes in agricultural outcomes across the treatment.

The destruction of Sherman's march is also apparent in more detailed crop- and livestock-level outcomes measured in the agricultural census. Output of crops like corn, oats, wool, as well as counts of livestock assets like mules and pigs were all relatively lower in Sherman counties after the war (see Table A.4). The declines in livestock is consistent with the historical accounts from the march: Southerners recalled large-scale slaughter of livestock, either to be eaten by the Union Army or left to rot in the field (Rubin 2014, p. 51).[36] Sherman's march had an immediate and persistent negative effect on the agricultural output of march counties relative to nearby, non-march counties. Given the importance of agriculture in late nineteenth century Georgia, North Carolina, and South Carolina economies this represented a substantial economic loss for march counties relative to non-march counties.

[35]We perform this test as a Chi-squared test of the equality to zero of the coefficients in the interaction between the treatment and the year dummy for 1870, 1880 and 1890. We find that the p-values are smaller than 1% for livestock and improved land, less than 3% for the value of farm and value of farmland. All tests are performed with the specification augmented with 1860 controls.

[36]Fite (1984) details the rise of cotton, as livestock farming fell out of favor in the postbellum period. However, our identification strategy allows us to difference out any aggregate southern trends and examine variation between Sherman and non-Sherman counties. It is possible to read our livestock results as either a direct effect of Sherman's march or as an indirect consequence: Weiman (1985) suggests that the indebted farmers in Georgia were pushed into cotton out of livestock and corn production for home consumption by wartime damage and debt to local merchants.

Turning to manufacturing data, we find that Sherman also reduced manufacturing activity in the South. We first analyze county manufacturing aggregates in Table 3. We are constrained slightly by the limited nature of the 1850 Census of Manufactures, but we observe declines in employment, capital, manufacturing establishments, and production in the Sherman counties after the war, echoing our agriculatural findings.[37] However, while these results are all relatively large, they are quite imprecise: only the effects on capital are statistically significant. In particular, capital in Sherman counties declined 30% more than in non-Sherman counties. However, there are two main issues with county aggregated manufacturing data. First, there is a good deal of heterogeneity in manufacturing specialization across counties as very few counties specialize in the same set of industries. Second, the 1860-1870 decades were characterized by a large variation in demand across industries. In particular, the wartime itself likely led to an increase in demand for certain industries, while impairing others. Furthermore, this period was characterized by a lot of transformations in the manufacturing sector (Engerman 1966). This heterogeneity across industries - even if unrelated to the location of Sherman's march - may increase the noise in the data and therefore it could make it harder to detect march effects in aggregate data. However, we have collected county by industry data at the decade level for 1860, 1870, and 1880 that enables us to account for any such county and industry heterogeneity, including time-varying industry shocks or variation across counties in manufacturing specialization.

[Table 3 about here.]

Using this county by industry data, we examine the differential growth rates from 1860 to 1870 along four manufacturing outcomes for march and non-march counties in Table 4. Overall, we find that the number of establishments grew substantially slower in march counties than in non-march counties following the war, as did value added, employment and capital. These results are large in magnitude: for instance, growth in establishment in Sherman counties was about 50% lower than in non-Sherman counties. The point estimates

[37] Establishment data is not available for 1850.

are very close across specifications with and without controls. Moreover, as with the agricultural results, these differences in manufacturing growth rates were not simply the result of pre-march trends, as we find no difference in aggregate manufacturing growth.[38]

[Table 4 about here.]

Exploiting further the industry level of our data, we test whether within a special 'war' industry such as lumber, the effect of the shock was particularly large. Prior to the march, 75 percent of the counties in the sample had at least one lumber establishment, making the industry the most geographically prevalent manufacturing industry in the data. We find suggestive evidence of relative declines in lumber, even with far fewer observations than in our county by industry growth rate analysis.[39] Table A.3 indicates that capital among lumber mills in march counties grew 51 percent slower than it did in non-march counties between 1860 and 1870—statistically significant at the 10 percent level. The number of establishments, value added, and employment also grew slower, but the coefficients are less precisely estimated. Hence, among prevalent and Sherman-targeted industries, the post-march relative declines were substantial. The economic destruction of Sherman's march extended beyond the agricultural sector and into Southern manufacturing.

However, the effects on manufacturing do not appear to be particularly persistent in the long-term, as we show in the second panel of Table 4. This difference with agricultural outcomes can be explained in two ways. First, the lack in persistence may reflect that the manufacturing data is nosier, which is an hypothesis we cannot exclude. Second, this result may be explained by the strong development in the manufacturing sector in the post-war period, which is a confounding factor when studying local differences in development over a longer horizon. In fact, while the manufacturing sector was still small and underdeveloped in the South before 1860, overall manufacturing grew substantially in the second part of the

[38]We do not have data at industry level prior to 1860, therefore this pre-trend test can only be performed at manufacturing level.

[39]Sherman also targeted the pine forests and resin pits in the Carolinas, the main inputs for the large South Carolina turpentine and tar industries Carr (2015, p. 91).

century relative to the pre-war level; after declining from $71M in 1860 to $57M in 1870, southern manufacturing and mining output grew to $100M in 1880 (Engerman 1966).

Overall, the capital destruction following General Sherman's march led to a strong contraction in land values, agricultural investments and manufacturing output. In addition, the agricultural declines persisted for decades and in some cases through 1920. These effects are not driven by differential trends in economic outcomes across march and non-march counties. In other words, we find Sherman succeeded in bringing economic destruction to the parts of the South through which he marched.

## 5.2 Robustness

In this section, we provide three main robustness tests to our results. First, we employ an instrumental variable estimator to address the potential endogeneity of the march path. Second, we create a placebo march, connecting other large cities in the region to ensure that our results are not driven by a county's geographic position relative to cities. In both cases, the robustness tests support our argument: the instrumental variables estimates largely confirm our main results and the placebo march shows no effect. Lastly, we show that the results are similar across different definitions of treatment and control groups.

### 5.2.1 Robustness: Instrumental Variables Estimator

Sherman's path was not a random walk. As historians have documented—and as we confirmed—the course was plotted based on available economic data from the 1860 Census. Even if the selection we have documented would likely work against our findings, we are still concerned about endogeneity. One worry would be that some unmeasured, time-varying county characteristic was correlated with the path Sherman chose and explains our results. Our inclusion in the main specification of both county fixed effects and state by decade fixed effects, as well as level controls measured in 1860, makes this unlikely, but it cannot rule this possibility out.

To fully assuage these concerns, we instrument for Sherman's march path with a straight-line path between the vertices of the actual march. To replicate the approximate width of Sherman's march, we define as treated any county within 15 miles of the straight line between the march vertices.[40] Sherman was specifically targeting the main cities—Atlanta, Savannah, and Columbia—but many of the counties between these cities were likely hit only because they were on the way along the march.[41] This instrument is likely to satisfy the standard exclusion restrictions—counties between these cities should not be expected to grow less quickly, but for Sherman destroyed many of them during the war. However, the approach may be limited by the strength of the first-stage: while the path of the march can be approximated to a straight line between the main cities, Sherman took deviations from the straight line, in particular when approaching the coastal area.

Overall, this straight-line IV analysis bolsters the findings of our main estimates: Sherman's march had large, negative economic effects in both agriculture and manufacturing, and a number of agricultural declines persisted for several decades. The results, which are shown in Tables 5 for agriculture and 6 for manufacturing, are similar in sign and magnitude to the OLS results of Tables 2 and 4, though they are less precise, at least for farmland value.

[Table 5 about here.]

[Table 6 about here.]

[40] In the main results, we defined as treated any counties within five miles of a march line. However, because the march was undertaken by five units (the 13th and 17th Army Corps in the Right Wing, the 19th and 20th Army Corps in the Left Wing, and Kilpartick's cavalry), in order to match the effective width of the true treatment with the straight-line instrument, we expand the treatment radius to be 15 miles on either side of the line.

[41] It is important to remember that, exactly because of any endogeneity concerns about the cities, these three cities are dropped in the analyses, as is Goldsboro, the town where the march ended after the Confederate opposition surrendered. These exclusions do not affect the results.

### 5.2.2 Robustness: Placebo March

As a second robustness test, we develop a placebo march line to show that differences in postbellum economic responses across counties between cities and counties not between cities cannot explain our results. While the straight-line instrument addresses the concern that an unmeasured, time-varying county characteristic correlated with the path Sherman chose could explain the differential postwar agricultural and manufacturing outcomes, this placebo test exploits inevitable variation across counties that are located between the major cities compared to the rest of the sample. This is problematic if these counties are exposed to different shock in post-war economic activity because of their special location between major economic hubs.

[Figure 4 about here.]

To allay these concerns, our placebo test compares changes in agricultural and manufacturing activities across a fictional treatment that is composed of counties between major cities that were not affected by the march.[42] This placebo path goes through the same major cities that General Sherman targeted and, as in the case of the real march, ends in a coastal city.[43] In particular, we run the same regressions in equations 1 and 2, except we augment the specification with placebo treatment variables as being within fifteen miles of the straight-line path between Atlanta, Columbia, and Charleston, as shown in Figure 4, rather than Atlanta, Savannah, Columbia, and Goldsboro.[44] Tables 7 and 8 show that when we use this alternative group of between-city counties, we do not detect the same significant declines between placebo-march and non-placebo-march counties. In fact, we find no differences in changes in both agricultural and manufacturing outcomes right around the placebo march.

[42] As with the instrument, we use a 15-mile radius around the straight line paths in order to replicate the roughly 30-mile wide path made by all of Sherman's units put together.

[43] In our case, the path ends in Charleston, SC.

[44] It is important to highlight that also the real treatment is included in the specification. Since placebo and treatment are correlated in this setting—due to the geographical structure of our data—we control for the real treatment to rule out that our results were driven by spurious correlation.

[Table 7 about here.]

[Table 8 about here.]

### 5.2.3 Robustness: Different Treatment Definitions

Lastly, we also show that our results are not driven by the specific definition of treatment and control counties that we use in our main results. As discussed before, our main results consider as treated the counties within 5 miles of Sherman's march and as a control those within 100 miles. The treatment bandwidth is based on the historical record: Sherman's troops could only "forage" so far away from the relative safety of the main army. We chose the 100 mile control bandwidth as a reasonable trade off between including more counties from Georgia, North Carolina, and South Carolina and not including counties in those states very different from the counties Sherman laid to waste. In Figure 5a, we test the robustness of our bandwidth choices by presenting estimates of the short-term (1870) effect of the march across different treatment definitions—5, 10, 15, 20 and 25 miles—keeping the control group constant. We find that these alternative definitions of treatment provide very similar results, both statistically and economically. For instance, the estimates using 10 miles are always indistinguishable from the 5 miles results across all the main agricultural outcomes. However, as we use a broader definition of treatment, we tend to find smaller and less significant results. In fact, this finding is reassuring about our identification: as we increase the bandwidth for the treatment, we are bundling together both counties that were struck by Sherman with areas that were most likely unaffected.

We also show that our control bandwidth choice is not driving our findings in Figure 5b. We repeat the same procedure as above, but keeping the treatment definition as constant (at 5 miles) and changing the control. Specifically, we consider 25, 50, 75, 100, 125 and 150 mile bandwidths as potential control groups. Again, we find similar results: the point estimates of our 1870 Sherman effects are extremely stable across specifications. The effects are generally less precisely estimated when we employ a very tight control group—25 or 50

miles—reflecting both the small sample size and the possible contamination of treatment into the control counties.

[Figure 5 about here.]

These results confirm that our definition of treatment and control group is not driving our results. As a last step, we repeat this bandwidth test in the regression framework used previously and examine the Sherman effects in all years. In Table A.5, we use a definition of treatment of 10 miles, keeping the control at 100 miles as before. Also in this case, we find no particular difference with respect to our main results. Similarly, in Table A.6, we show how the main findings do not change when we use only counties 75 miles from the march as a control groups, rather than 100 miles. Despite a substantial reduction in the sample, we find no main differences across the main results. The only minor difference is that we find a statistically significant difference in the pre-trend for value of farmland and this pre-trend has the opposite sign from what we would expect if this effect were driving our results. The choice of treatment and control bandwidths does not affect our manufacturing results either. When using 10 mile as alternative treatment (Table A.8), we are able to replicate all our results, though the estimates in this case are less precisely estimated. Similarly, tightening the control group does not significantly change our conclusion, as we show in Table A.7: the only difference from the main result is a loss of significance for the manufacturing employment outcome when we add 1860 controls.

Overall, these robustness tests increase our confidence that the relative declines we detect in the Sherman march counties were indeed due to the destructive path of Sherman's march. In the next section, we consider what mechanisms could explain these declines.

# 6 The Role of Credit Markets in the Recovery

The capital destruction caused by the Sherman's march had strong, negative effects: the march led to a contraction in investments and asset prices in the agricultural sector, and a

reduction in manufacturing growth in the decade after the war. Furthermore, the decline in agriculture was persistent, with some effects being detected in the 1920s. Overall, these results confirm that the effects of capital destruction may generate long-lasting costs for an economy.

The presence of long-term real effects of capital destruction is partially at odds with a relatively large strand of economic literature, both empirical and theoretical. Standard neo-classical growth models predict that capital destruction should not affect long-term economic performances, because the temporary shock should be followed by a rapid growth, which brings the economy back to the original steady state. In line with this hypothesis, past studies have found no long-term effects of physical and human capital destruction induced by wartime events. As mentioned earlier, Ikle (1952) studied this in the context of the Allied bombing of German cities during World War II and found that bombed cities rebuilt fairly quickly after the war. Davis and Weinstein (2002) similarly showed rapid postwar reconstruction of Japanese cities destroyed during WWII. More recently, Miguel and Roland (2011) found that Vietnamese districts severely damaged by the United States in the late 1960s and early 1970s also rebuilt shortly after fighting ceased. Lastly, some papers even find no effect at all to large natural disaster, even in the very short run (Porcelli, Trezzi, et al. 2014).

The standard neo-classical model implicitly assumes the presence of perfect financial markets or alternatively the presence of a social planner that efficiently redistribute the resources in the economy.[45] If these assumptions fail, a temporary shock to the stock of capital can affect economic activity in the medium- and long-run, since reconstruction efforts are limited by individual financial constraints rather than driven by only investment opportunities. Therefore, when resources are optimally deployed ex-ante, full reconstruction may not be achieved for quite some time. More generally, these imperfections may negatively affect the

[45]For instance, the case of Vietnam discussed by Miguel and Roland (2011) is a situation where credit markets were not particularly developed but the government had a first order role in the reconstruction effort.

overall path to recovery.

In our case, it is reasonable to think that the weakness of credit markets after the Civil War may explain the strength of the effects of the march in the short and medium run. In fact, the overall US banking sector was not particularly developed in the antebellum period (Jaremski 2013), and this underdevelopment was even more acute in the South (Ransom and Sutch 2001). Bensel (1991) argues that the south was capital starved, and this was particularly true in the rural and agrarian parts of the region. The 1859 Merchants & Bankers Register data reveals that both North Carolina and South Carolina had only 2.9 banks for every 100 thousand people, while Georgia had 6.2 banks per 100 thousand, compared to a national average of 7.1 per 100 thousand.

For farmers, the supply of formal credit was even more restricted, since banks did not primarily serve rural and agricultural needs during this period, in particular in the South (Fite 1984; Jaremski and Rousseau 2012).[46] Instead, previous research has suggested that most of the funding in the agricultural sector was coming within-sector, with local, wealthier land owners providing credit for other farmers during bad times or between harvests (Rajan and Ramcharan 2008, 2011; Jaremski and Fishback 2016). For instance, Rajan and Ramcharan (2011) argues that before the Great Depression local land owning elites actively tried to restrict the development of a local banking sector to maintain monopoly power in the provision of credit to small farmers. While Jaremski and Fishback (2016) disagrees in part with some of the conclusions in Rajan and Ramcharan (2011), both papers highlight the importance of local land owning elites in the provision of credit for farmers. As we discuss later, this difference across agricultural and manufacturing sector has relevant implications for our analysis.

Furthermore, the banking sector in the South was deeply impaired by the war and slow to recover to even these meager antebellum levels (James 1981). The bank registries indicate that as of 1864, no state- or nationally-chartered bank existed in Georgia, North Carolina,

[46] According to Fite (1984, p. 27), the southern banking system in this period "was entirely inadequate to meet rural needs."

or South Carolina. The Comptroller of the Currency's 1864 Report to the US Treasury department reports the same.[47] The first postbellum banks did not open until 1866 in Georgia, North Carolina, and South Carolina. By 1870, Georgia still had only 9 banks; North Carolina 6; and South Carolina a mere 3. There were far fewer banks in these states relative to any Northern state. Moreover, as Atack and Passell (1994) notes, this modest "growth in the number of banks after the war masks a sharp reduction in total bank assets from prewar levels." So scarce were bank assets that most lending was done by local general stores. Even those, however, "made frequent errors of judgment ... and failed and exited the business" (Atack and Passell 1994, p. 393). Therefore, financing may have been difficult to obtain in the postbellum South. Figure 6 suggests that also the access to formal credit was negatively impacted by the Sherman's march. Furthermore, unlike the other destruction settings previously cited, this underdeveloped financial sector was not compensated by large public reconstruction programs, as Reconstruction focused primarily on helping freed slaves transition out of slavery, rather than rebuilding public or private infrastructure. Lastly, the overall weakness in credit was also exacerbated by the slave emancipation—which removed one important source of collateral for landowners (González, Marshall, and Naidu 2016; Martin 2010, 2016)—and the default of the Confederate States on their obligation.

While the weakness of the Southern financial sector in the post-war period is apparent, its importance for the recovery process cannot be taken for granted. In fact, this is not the only possible explanation for our results. The remainder of this section provides three pieces of empirical evidence suggesting that credit markets played an important role in delaying and weakening the relative recovery. First, we show that the two leading alternative channels affecting the relative recovery—a demographic shift after the war and the destruction of public infrastructure—are not confirmed by data. Second, we provide direct evidence that the lack of credit was an important element in explaining the relative growth rates of the

[47]The Southern banking sector collapsed as a whole during the war: according to Jaremski (2013), 170 of 223 banks closed in 1863 and 1864.

manufacturing sectors in the years immediately after the war.[48] Third, we show that also in the agricultural sector frictions in the credit market are relevant in explaining the recovery. In particular, because the formal banking sector played little role in financing agriculture in this period in the South, we show that the postbellum agricultural recovery was slower in counties with fewer large landholders---an important source of credit in the underdeveloped south---and land concentration increased in Sherman counties. We now turn to discuss more in details the interpretation and implementation of these tests.

## 6.1 Alternative channels: demographic shift and infrastructures

The effects of capital destruction may be magnified if the shock also affects the demographic structure of the population, reducing the labor supply of white and newly-freed blacks. Ransom and Sutch (2001) argue that changes in labor supply help explain the postbellum decline in economic activity in the South as a whole compared to the North. For the enslaved populations of Georgia and the Carolinas, the arrival of Union troops signaled freedom. Catton (1988, vol. 3, p. 415-416) estimates that more than 10,000 slaves were freed during the march. Moreover, Sherman not only freed the slaves in his path, but he also signed Field Order No. 15, which allowed the freed slaves to settle outside the march path in abandoned coastal plantations (Trudeau 2008, p. 521). Ransom and Sutch (2001) estimate high rates of out-migration among freedpeople, but we will investigate whether that out-migration differed between march counties and non-march counties.

In addition to potentially divergent postwar demographic patterns, the rebuilding and development of new public infrastructure in the postbellum period could have been different between march and non-march counties. We know that wartime destruction of infrastructure varied between the march and non-march counties because Sherman explicitly targeted the railroads and telegraph lines in his path. Prior to the march, Georgia, North Carolina, and

[48] We do not examine the effects of the lack of bank credit on agricultural outcomes because the formal banking sector played little role in financing agriculture in the antebellum and postbellum periods in the South.

South Carolina had more than 2,700 miles of railroad track. Sherman laid siege to this track by assigning a large share of his men the specific job of destroying the tracks and nearby depots, warehouses, station buildings, and bridges (Carr 2015, p. 69). His soldiers sent home vivid letters describing how they would lift up track in concert, soften the steel with bonfires, wrap the tracks around trees, and bend it into bows known as "Sherman's neckties" (Carr 2015, p. 70).[49] Between Atlanta and Savannah alone, Sherman claimed to have destroyed 310 miles of track (Trudeau 2008, p. 533). These claims may be exaggerations, as much of the destruction was incomplete and his men concentrated more on pulling up rails and breaking ties than on fully destroying rail paths and grounds. This made postwar re-laying of track fairly fast (Trudeau 2008, p. 92). Nevertheless, the potential for differential infrastructure across march and non-march counties following Sherman's march could also help explain the observed economic differences.

Using county level data on demographic structure and infrastructure, we find that neither channel is particularly useful in explaining our results in either the short-term or the long-term. Table 9 shows the results of estimating equation 1 on the demographic and infrastructure outcomes. Columns 1 and 2 indicate that there were not systematically different postwar in- or out-migration rates overall; columns 3 and 4 indicate no differences for migration of newly freed African Americans across the march and non-march counties.[50] Demographics do not appear to explain much of the economic effects of the march. We only find some very weak effects on population, but this effect is specification-dependent, small, and not consistent over time. Our results echo many histories of the postbellum South: if newly freed slaves "showed a reluctance to leave the places where they had lived and worked" (Glass Campbell 2006, p. 49) that reluctance was not differential across counties decimated by Sherman and not. Similarly, the last four columns show that differences in infrastructure, as measured by county railroad miles, were also small.[51] This is consistent

[49]Barrett (1956) describes in detail the Union army process of destroying a railroad, including the need to bend the wrap into a twisted doughnut shape, known as a "Lincoln gimlet" (Barrett 1956, p. 51).

[50]We find similar results on a battery of other demographic outcomes such as sex ratio.

[51]Since railroads are often zero in counties, we report this result both as a normal log-transformation and

with the historical record: Atack and Passell (1994, p. 378-379) notes that while rail and telegraph lines were "destroyed with great vigor by the Union," the "repairs were immediate." According to Rubin (2014, p. 154), many travelers remarked on the speed with which the Georgia Central Railroad was rebuilt in the few years after the war. The telegraph repair was even more rapid: as soon as December 13, 1864, while Sherman was still sieging Savannah, the Southern Telegraph Company had already repaired many of the cut wires, quickly reestablishing communication between Macon and Augusta. Given these rapid repairs and the exaggerated reports of railroad destruction by Sherman, it is perhaps unsurprising that postwar infrastructure was not different across march and non-march counties.

[Table 9 about here.]

These results suggest that differences in either demographic composition or infrastructure cannot explain the Sherman effects. Importantly, this is true both in the long and short-run, since we do not find any significant effects on these outcomes even in 1870, six years after the starting of the events.

## 6.2 Credit in the Manufacturing Recovery

After excluding the previous channels, in this section and the next we provide some direct evidence on the importance of the financial channel in explaining the relative recovery from the Sherman destruction. We begin by exploring the role of credit in the manufacturing recovery; in the next section, we show how access to credit blunted the persistent, negative effects of wartime destruction.

Jaremski (2014) documents the important role the formal banking sector in this period played in encouraging the growth of manufacturing. Banks and credit were both scarce in the postbellum period. However, for some areas of the south, this scarcity was not a new

adding one to the log-transformation to avoid having missing values in the analysis. In both cases, we find no effect of the march. The use of alternative outcomes (miles of railroads without transformation, an indicator for counties with any railroads) produce similar results.

phenomenon: banking coverage throughout Georgia and the Carolinas was quite variable in the antebellum period as well. Therefore, if a weak banking sector made the recovery more difficult, we would expect to find larger negative effects in counties where the reduction in bank credit was a change from the antebellum era.

To test this hypothesis, we collect county level data on the number of banks in 1859 and the number of firms receiving a credit rating from Dun, Boyd, & Company in 1860. Using these data, we define as more dependent on credit markets those counties that are located closer to a bank in 1859 or that have firms which appear to have credit extended according to the 1860 Dun, Boyd, & Company report. This sorting identifies places where credit markets were more active before the war, and therefore, because all 1859 banks were destroyed by 1864 (Figure 6), where the contraction of credit caused by the march was more costly. If access to credit helps explain the postbellum manufacturing recovery, we expect that counties more dependent on credit should suffer more for a given level of destruction.

We find that the negative effect caused by the march is much stronger for those counties that were ex-ante more dependent on finance (Table 10, top panel). Formally, we first divide the sample into counties that were above or below the median distance to a bank in 1859 bank. We consider counties below the median distance as counties that experienced significant wartime credit disruption.[52] We then estimate the Sherman manufacturing change regression from equation 2, interacting the march treatment with the indicator of finance access. We find that the Sherman's damage on manufacturing was stronger in counties that at the same time experience the disappearance of a local banking network. [53]

[52]In 1859, 51 of the 248 counties in Georgia, North Carolina, and South Carolina contained a bank. The median county centroid distance to an 1859 bank was 23.35 miles. Counties with a bank are considered 0 miles from a bank. Atack and Passell (1994, p. 392) suggest that trips to banks out of county or farther, taking two days, could have been prohibitively costly for small farmers who had "neither the time nor the skills" to negotiate with bankers out of town. Further, these bankers would know little of the small farmers' credit risk or land and might be hesitant to lend.

[53]In Table A.10, we show that the results are robust to an alternative measure of the credit shock. In particular, we calculate the growth rate of banks from 1859 to 1870 and split the sample into counties with above and below the median growth rate. This measure captures more directly the heterogeneity across counties in banking drop after the war. However, as also suggested by Figure 6, this measure is endogenous to the March itself, since post-1864 banking reconstruction will be a function of the reconstruction in manufacturing. Therefore, we prefer our sort based on 1859 banks as main specification.

[Figure 6 about here.]

The Dun, Boyd, & Company data tell a similar story. March counties with Dun-tracked firms in 1860 were more adversely affected by the march than march counties without Dun-tracked firms, as shown in the bottom panel of Table 10. This regression also demonstrates that when places with more credit relationships external to the firm—in this case to Dun lenders rather than banks—were damaged, recovery was slower. Hence, whether the access to credit came from banks or non-bank sources, the credit channel played an important role in the postbellum rebuilding and can help explain the divergent economic results across march and non-march counties.

[Table 10 about here.]

Our investigation of the mechanisms driving our differential economic results across march and non-march counties indicates that access to credit played an important role, while demographic and infrastructure differences were less crucial. In particular, counties that were more dependent on financing before the war experienced a more difficult recovery, as the war also led to a severe disruption in credit markets. These findings are consistent with the historical literature showing the rapid rebuilding of infrastructure in the post-war period (Atack and Passell 1994) and the importance of credit for manufacturing growth later in American history (Nanda and Nicholas 2014; Ziebarth 2013; Lee and Mezzanotti 2014).

To the extent that Sherman's march directly impaired financial intermediaries, our main estimates may partially capture the negative effect of this direct effect. However, when we examine heterogeneity in Sherman's effects, our results do not rely on an assumption that Sherman had a differential effect on the banking sector because we use antebellum access to banking and credit as our measure of treatment intensity. While, it may be the case that banks in Sherman counties recovered slower, as Figure 6 shows, any differential recovery in banking activity across Sherman and non-Sherman counties is second-order compared to the overall drop in banking activity in the South during and after the Civil War, a decline experienced similarly across all counties in our sample.

However, the postbellum southern economy was more agrarian than industrial and banks had a limited role in the agricultural sector. Instead, credit for farmers often came from local large landowners. In the next section, we investigate this type of credit in the Sherman's march recovery.

## 6.3 Agricultural Recovery and Credit

In order to provide evidence of the importance of credit markets imperfection for the agricultural sector, we present two results that exploit the institutional characteristics of this sector around the Civil War.

As previously discussed, the agricultural sector was not particularly dependent on banks during this period (Fite 1984; Jaremski and Rousseau 2012). Instead funding in this area was mostly provided within the sector (Rajan and Ramcharan 2011; Jaremski and Fishback 2016). In this setting, large local landowners played a very important role in the economy. First, these farmers were less in need of external financial resources, either because they had more non-farm wealth or because the scale of their businesses made internal funding of reconstruction less difficult. In line with this idea, large land ownership also strongly predicts large non-farm wealth in the aftermath of the Civil War. For instance, we find that in 1870 individuals in the top 10% of real estate wealth—a proxy for land ownership—have a 68% chance of being in the top 10% in personal wealth as well.[54] Second, the presence of local large land owners generated positive externalities, serving as an alternative source of funding for smaller farmers in the absence of accessible formal financial institutions. Therefore, either directly or by providing funding to others, large wealthy landowners could facilitate the funding of reconstruction and reduce the costs related to the lack of external credit. To provide evidence which would be consistent with the importance of credit markets imperfections in explaining the recovery, we bring this mechanism to the data.

[54]The overlap between the top of the real estate and personal wealth distributions are similar for other thresholds of wealth, including top 5% or 1%. We construct these numbers using the IPUMS 1% sample of the 1870 Census for white men in GA, NC, and SC.

We start by drawing on the 1860 agricultural census and count the number of farms larger than 1000 acres. This threshold—1000 acres—is the largest farm size categorization in the Census of Agriculture and allows us to identify the share of large land farmers in the overall population of farmers. We define high wealth counties to be those where the share of large land owners is on the top quartile of the distribution in 1860. The validity of this measure is confirmed by the fact that real estate wealth is also a strong predictor of overall wealth. Based on the previous discussion, our hypothesis is that, if financial frictions mattered in the recovery, places with a high share of large land owners should enjoy a better recovery after the large shock to capital of Sherman's march. In order to test this idea, we augment our standard regression model interacting our treatment dummy and time dummy with the high-wealth variable. Since the main coefficients of interest will be on a triple interaction, we simplify the time dummies to before and after the march indicators, reporting in the main result only the average effect after destruction in Table 11.[55] In the Appendix Table A.9, we show the full interaction with decade dummies, which replicates more closely the rest of the paper.

In line with our hypothesis, we find that counties in Sherman's path with a large share of wealthy, large land owners experience a lower decline in land prices following the destruction. For agricultural investments, the effect is not statistically significant despite being of the right sign and of similar magnitude. Furthermore, when looking at the effect by decades, it is clear that this effect is not driven by any differential trend in this group of high wealth counties within Sherman, but this effect is the response of these counties to the economic shock. These differences are also relatively large in magnitude, suggesting that this mechanism can explain a large part of the variation in the Sherman's effects.

[Table 11 about here.]

[55]Since we are collapsing the time dimension to only pre vs. post, this model is estimated only using 1850-1880. In other words, we want to make sure the estimates does capture only variation that is reasonably around the shock. However, this decision does not affect our result, which would have been the same using the full sample. This is very clear by exploring the results by decade as we do in Table A.9.

Next, we explore the effects of the march on land concentration. If farmers are financially constrained, a shock to capital—and the costs of rebuilding afterwards—should trigger a redistribution of land from cash-strapped to cash-rich farmers, therefore increasing the overall land concentration in the area. This increase in concentration is magnified if large land owners are already less cash-constrained ex-ante or if they have better access to external financing. Importantly, this "fire sale" behavior (Shleifer and Vishny 1993) should not be relevant if credit markets are well-functioning and rebuilding does not present large economy of scale. This test builds on the ideas discussed in Rajan and Ramcharan (2011), which explores the role of agriculture elites in early 20th century in restricting financial development as a way to generate more economic rents. In their analysis, they highlight how the lack of formal credit markets helps large land owners creating a monopoly on financing, for instance allowing them to "buy land cheaply when small farmers [are] hit by adversity" (Rajan and Ramcharan 2011). While disagreeing on some of the conclusions of the paper, this general framework is confirmed by Jaremski and Fishback (2016), which also look at an earlier period overlapping to the time of out main analysis.

To examine this theory, we compare changes in land concentration around the Civil War across march and non-march counties, as in equation 1. To measure land concentration, we construct an index of land ownership inequality as in Nunn (2008). This index is a Gini coefficient based on the distribution of land ownership by acreage.[56] As we discuss later, a limitation of this measure is that data on land ownership by acreage is only available since 1860, and therefore this analysis is carried out over the period 1860-1920.

[Table 12 about here.]

We find that land inequality increases substantially after Sherman's march in march counties relative to non-march counties (Table 12). Like the agricultural differences, this

[56]Farm size is categorized in seven bins. The farm size acre bins are 0 to 9, 10 to 19, 20 to 49, 50 to 99, 100 to 499, 500 to 999, and over 1,000. We construct two Gini coefficients based on this data, one setting each farm to the median of each bin and another setting each farm to the minimum of each bin. For the largest bin size, we use 1000 in both cases.

difference persists through 1920. Compared to the 1860 difference in inequality across march and non-march counties, the 1870-1920 differences were between 5% and 15% larger. This confirms that land ownership experienced an economically significant increase in response to the capital destruction caused by the war. This is consistent with the idea that credit market imperfections played an important role in post-war agricultural finance.

Though we do not have information on land ownership in 1850, we are able to construct a different proxy for inequality in the prebellum period and show that there are no differential pre-trends across Sherman and non-Sherman counties. We construct a slave-holding Gini index, which should still capture variation in wealth that is related to land ownership activity, from data collected in both 1850 and 1860. Consistent with this claim, the residualized (for population, latitude and longitude, county size, and state fixed effects) correlation between the two measures in 1860, the only year in which both exist, is 0.34, which suggests that the latter is a reasonable proxy measure of the former in 1850.[57] In the fifth and sixth columns of Table 12 we show that the slave-holding measure indicates that inequality was not trending differentially prior to the march across march and non-march counties. This effect is both small in magnitude and statistically non-significant.

Overall, this section has provided evidence for the importance of a well-functioning financial sector in the recovery process. If financial markets are not perfect, the reconstruction effort is also affected by financial constraints, therefore weakening the overall recovery. This may increase the size of the effect of a shock in the short run and slow down the reversal in the long run. Consistent with this hypothesis, we find that financial markets were not highly developed in the South in nineteenth century, and deteriorated further after the Civil War. Then, in order to confirm this hypothesis, we carried out three main tests. First, we have shown that alternative leading explanations for a lack of recovery in the short- and

[57]The slave-holding Gini is constructed similarly using 21 bins counting the number of slaveholdings of each certain size in terms of slaves. The slave-holding bins are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 to 14, 15 to 19, 20 to 29, 30 to 39, 40 to 49, 50 to 69, 70 to 99, 100 to 199, 200 to 299, 300 to 499, 500 to 999, and over 1,000. In 1850, the slave-holding data are from a full-sample of the 1850 Slave Census that we constructed. In 1860, we draw the slave-holding data from Haines (2010).

long-term—a demographic shift or lack of infrastructure—do not appear to be confirmed by data. Second, we have provided direct evidence of the importance of credit for the recovery in manufacturing. In particular, we have shown that growth in manufacturing was particularly affected by Sherman's march in places where credit was more extensive prior to the Civil War. Lastly, we have shown that the agricultural recovery was much weaker in counties without access to credit from larger local land owners and that land ownership patterns in the postbellum period are consistent with the presence of fire sales after the destruction of the march. While none of these tests is perfect, combined these analyses provide convincing evidence that credit market imperfections are responsible for part of the weak relative recovery from the march.

# 7 Conclusion

When General William Sherman began his march in Atlanta in August 1864, he sought to "make old and young, rich and poor, feel the hard hand of war." He and his men foraged for 300 miles through Georgia, North Carolina, and South Carolina and "enforce[d] devastation" on the rebel states, "aveng[ing] the national wrong [Southerners had committed by] dragging [the] country into civil war."[58]

By the time Sherman received the surrender of Confederate General Joseph E. Johnston at Bennett Place in North Carolina in April 1865, the Union general and his soldiers had wreaked significant economic damage on parts of the Confederacy. Nor did this damage end at the conclusion of the war. Both agricultural and manufacturing outcomes fell significantly in march counties relative to nearby, non-march counties in 1870. Moreover, agriculture production and values remained persistently lower in counties destroyed by Sherman for more than a half-century. We have argued that the lack of credit in the post-war American South explains part of the strength of the effects in the short run and the persistence of the agricultural effects in the long run.

[58]Letter from Sherman to Halleck, December 24, 1864 in US War Department (1901).

Capital destruction caused by war or natural disaster is a frequent event in human history. It is important to understand its consequences—in both the short- and long-run—and the factors which affect the recovery. This paper has shown that the economic costs of large property and infrastructure destruction can be substantial and persistent. Furthermore, we have highlighted the importance of a developed financial sector to reduce such effects. Examining whether these effects are confined to total war, infrastructure-focused campaigns like Sherman's or could be the consequence of more traditional military-centered battles is an area for future research. Similarly, it may be that the non-economic long-term effect of total war campaigns—on outcomes like political beliefs or trust—is large and persistent. Lastly, future research can explore various policies that can be put in place to create a more effective and efficient reconstruction.

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# Table 1: Sherman Target County Characteristics in 1860

| | Counties Means | | |
|---|---|---|---|
| | March Counties | Non March Counties | Difference |
| **Demographics** | | | |
| Population (000s) | 13.26 | 10.73 | 2.53** |
| | (7.68) | (7.87) | (1.20) |
| Slaves Population (000s) | 7.18 | 4.27 | 2.91*** |
| | (6.22) | (4.68) | (0.78) |
| Slave Percent | 49.78 | 35.25 | 14.53*** |
| | (15.22) | (19.84) | (2.88) |
| Free Black Percent | 1.03 | 1.26 | -0.23 |
| | (1.56) | (1.92) | (0.28) |
| Average Age | 18.31 | 18.22 | 0.09 |
| | (0.78) | (1.13) | (0.16) |
| Percent of Population Urban | 1.98 | 2.09 | -0.11 |
| | (8.74) | (9.51) | (1.43) |
| Land Concentration (Gini Coefficient) | 0.42 | 0.45 | -0.03*** |
| | (0.06) | (0.06) | (0.01) |
| **Agriculture** | | | |
| Farm Value ($ M) | 2.58 | 1.68 | 0.90*** |
| | (2.15) | (1.41) | (0.25) |
| Agricultural Output per sq mile | 1517.89 | 1285.30 | 232.60* |
| | (736.37) | (834.58) | (124.48) |
| Percent Improved Farm Land | 32.75 | 28.97 | 3.78* |
| | (14.95) | (13.36) | (2.12) |
| Cotton Suitability | 733.16 | 606.05 | 127.12*** |
| | (69.99) | (171.58) | (23.39) |
| Ginned Cotton (pounds) per sq mile | 5996.99 | 3526.51 | 2470.48*** |
| | (4101.13) | (4950.60) | (729.17) |
| Indian corn (bushels) per sq mile | 603.92 | 662.27 | -58.35 |
| | (251.98) | (377.85) | (53.77) |
| Wheat (bushels) per sq mile | 50.71 | 88.20 | -37.48*** |
| | (47.34) | (100.17) | (13.78) |
| Sweet potatoes (bushels) per sq mile | 150.32 | 116.71 | 33.60*** |
| | (72.56) | (79.97) | (12.00) |
| Horses per sq mile | 2.87 | 2.99 | -0.12 |
| | (1.03) | (1.62) | (0.23) |
| Mules per sq mile | 2.15 | 1.68 | 0.48** |
| | (1.34) | (1.32) | (0.20) |
| Oxen per sq mile | 1.28 | 1.31 | -0.02 |
| | (0.93) | (0.86) | (0.13) |
| Pigs per sq mile | 41.00 | 38.21 | 2.79 |
| | (13.50) | (16.37) | (2.41) |
| **Manufacturing** | | | |
| Manufacturing Value Added (000s) | 66.96 | 68.51 | -1.54 |
| | (98.49) | (110.83) | (16.55) |
| Manufacturing Establishments | 36.81 | 26.40 | 10.40 |
| | (74.86) | (38.22) | (7.69) |
| Total Employment in Manufacturing | 135.84 | 135.63 | 0.21 |
| | (204.57) | (184.78) | (29.17) |
| **Infrastructure** | | | |
| County close to canal or river | 0.70 | 0.58 | 0.12 |
| | (0.46) | (0.49) | (0.07) |
| Railways Miles per 100 Square Mile | 3.06 | 1.76 | 1.30*** |
| | (3.17) | (2.54) | (0.42) |
| Observations | 57 | 166 | 223 |

Notes: Agricultural data from the US Census of Agriculture, 1860. Manufacturing data from the US Census of Manufactures, 1860. Demographic data are from the US Census of Population, 1860. Slave percent and free black percent as measured per capita, where the population includes all free and enslaved people. All agricultural output and livestock data are measured per square mile in each county.

Table 2: Differences in Agricultural Outcomes Relative to 1860 Difference, by Sherman March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Value of Farms | | Log Value of Livestock | | Log Value of Farmland | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | 0.062 | 0.064 | 0.014 | 0.009 | 0.030 | 0.025 | −0.073 | −0.110 |
| | (0.045) | (0.047) | (0.057) | (0.053) | (0.034) | (0.035) | (0.078) | (0.078) |
| Sherman x 1870 | −0.153** | −0.144** | −0.213*** | −0.223*** | −0.145*** | −0.158*** | −0.167** | −0.162** |
| | (0.062) | (0.061) | (0.076) | (0.072) | (0.050) | (0.053) | (0.077) | (0.078) |
| Sherman x 1880 | −0.139*** | −0.130*** | −0.060 | −0.045 | −0.041 | −0.018 | 0.066 | 0.063 |
| | (0.046) | (0.042) | (0.056) | (0.048) | (0.036) | (0.028) | (0.060) | (0.059) |
| Sherman x 1890 | −0.167*** | −0.160*** | −0.108 | −0.115* | −0.112** | −0.088** | 0.027 | 0.009 |
| | (0.048) | (0.041) | (0.069) | (0.064) | (0.045) | (0.040) | (0.073) | (0.068) |
| Sherman x 1900 | −0.196*** | −0.183*** | −0.142* | −0.148** | −0.151*** | −0.116*** | 0.033 | −0.006 |
| | (0.066) | (0.049) | (0.077) | (0.070) | (0.055) | (0.042) | (0.076) | (0.073) |
| Sherman x 1910 | −0.200*** | −0.202*** | −0.085 | −0.120 | −0.070 | −0.062 | 0.109 | 0.025 |
| | (0.075) | (0.054) | (0.101) | (0.085) | (0.064) | (0.051) | (0.100) | (0.087) |
| Sherman x 1920 | −0.200** | −0.194*** | −0.049 | −0.075 | −0.056 | −0.037 | 0.162 | 0.071 |
| | (0.088) | (0.061) | (0.108) | (0.091) | (0.072) | (0.055) | (0.112) | (0.095) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1779 | 1779 | 1779 | 1779 | 1779 | 1779 | 1765 | 1765 |
| Clusters | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 |
| Adjusted $R^2$ | 0.027 | 0.316 | 0.018 | 0.021 | 0.024 | 0.036 | 0.109 | 0.129 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within five miles of Sherman's march, interacted with the displayed decade indicators, plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march and all decades, 1850-1920. Standard errors are clustered at the county level. A small number of counties are missing farmland values in 1850 or 1870 which slightly reduces the number of observations in columns 7 and 8.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table 3: Differences in Agricultural Outcomes Relative to 1860 Difference, by Sherman March Exposure, 1850-1880

| | Log Employment | | Log Capital | | Log Establishments | | Log Value of Production | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | 0.123 | 0.069 | 0.097 | −0.009 | 0.000 | 0.000 | 0.188 | 0.144 |
| | (0.174) | (0.172) | (0.196) | (0.198) | (.) | (.) | (0.214) | (0.211) |
| Sherman x 1870 | −0.228 | −0.195 | −0.340** | −0.353** | −0.117 | −0.043 | −0.216 | −0.177 |
| | (0.141) | (0.150) | (0.146) | (0.150) | (0.174) | (0.181) | (0.170) | (0.170) |
| Sherman x 1880 | −0.031 | −0.018 | −0.235 | −0.212 | −0.064 | 0.006 | −0.151 | −0.087 |
| | (0.179) | (0.186) | (0.160) | (0.163) | (0.171) | (0.176) | (0.180) | (0.176) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 838 | 838 | 837 | 837 | 635 | 635 | 837 | 837 |
| Clusters | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 |
| Adjusted $R^2$ | 0.037 | 0.000 | 0.012 | 0.002 | 0.032 | 0.036 | 0.000 | 0.006 |

Each column is a separate county-year level regression of the indicated manufacturing outcome on an indicator equal to one if the county is within five miles of Sherman's march, interacted with the displayed decade indicators, plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march and all decades, 1850-1880. Standard errors are clustered at the county level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Change in Manufacturing Outcomes, by Sherman March Exposure, 1860-1880

| | Change in Manufacturing Outcomes from 1860 to 1870 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Value Added | | Employment | | Capital | | Establishments | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.853*** | -0.725** | -0.466** | -0.370* | -1.035*** | -0.953** | -0.452*** | -0.395*** |
| | (0.313) | (0.347) | (0.199) | (0.205) | (0.385) | (0.456) | (0.139) | (0.143) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Adjusted $R^2$ | 0.002 | 0.024 | 0.005 | 0.035 | 0.004 | 0.032 | 0.007 | 0.033 |
| | Change in Manufacturing Outcomes from 1860 to 1880 | | | | | | | |
| | Value Added | | Employment | | Capital | | Establishments | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.079 | 0.192 | 0.401 | 0.728** | 0.101 | 0.461 | -0.002 | 0.185 |
| | (0.323) | (0.289) | (0.374) | (0.316) | (0.527) | (0.488) | (0.172) | (0.149) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Adjusted $R^2$ | 0.026 | 0.046 | 0.033 | 0.056 | 0.015 | 0.033 | 0.089 | 0.113 |

Each column is a separate county-industry level regression of the percentage change between 1860 and 1870 in the column indicated manufacturing outcome on an indicator equal to one if the county is within five miles of Sherman's march plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all reported industries in all counties within 100 miles of the march. The sample is unbalanced because not all industries are present in all counties. Standard errors are clustered at the county level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: IV: Agricultural Outcomes, by Sherman March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Value of Farms | | Log Value of Livestock | | Log Value of Farmland | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | -0.006 | 0.013 | -0.077 | -0.039 | -0.031 | -0.022 | -0.130 | -0.144 |
| | (0.055) | (0.061) | (0.069) | (0.072) | (0.043) | (0.044) | (0.097) | (0.103) |
| Sherman x 1870 | -0.156** | -0.160** | -0.214** | -0.182* | -0.143** | -0.158** | -0.096 | -0.081 |
| | (0.074) | (0.074) | (0.097) | (0.093) | (0.064) | (0.068) | (0.099) | (0.095) |
| Sherman x 1880 | -0.108* | -0.103* | -0.057 | -0.006 | 0.008 | 0.016 | 0.042 | 0.055 |
| | (0.058) | (0.058) | (0.072) | (0.067) | (0.046) | (0.040) | (0.074) | (0.075) |
| Sherman x 1890 | -0.155*** | -0.155*** | -0.088 | -0.066 | -0.091 | -0.080 | 0.059 | 0.055 |
| | (0.059) | (0.056) | (0.093) | (0.088) | (0.055) | (0.052) | (0.096) | (0.090) |
| Sherman x 1900 | -0.135 | -0.153** | -0.098 | -0.091 | -0.085 | -0.075 | 0.083 | 0.045 |
| | (0.083) | (0.066) | (0.102) | (0.094) | (0.067) | (0.054) | (0.102) | (0.096) |
| Sherman x 1910 | -0.132 | -0.175** | -0.001 | -0.027 | 0.003 | -0.012 | 0.216 | 0.119 |
| | (0.096) | (0.071) | (0.135) | (0.114) | (0.081) | (0.065) | (0.137) | (0.118) |
| Sherman x 1920 | -0.112 | -0.162** | 0.097 | 0.077 | 0.059 | 0.048 | 0.350** | 0.236* |
| | (0.113) | (0.079) | (0.142) | (0.127) | (0.092) | (0.075) | (0.153) | (0.135) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1779 | 1779 | 1779 | 1779 | 1779 | 1779 | 1765 | 1765 |
| Clusters | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within five miles of Sherman's march interacted with decadal indicators, plus the noted fixed effects and controls, where the Sherman's march indicator is instrumented with an indicator for within 15 miles of a straight-line path between the four march vertices: Atlanta, GA, Savannah, GA, Columbia, SC, and Goldsboro, NC. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march. Standard errors are clustered at the county level. A small number of counties are missing farmland values in 1850 or 1870 which slightly reduces the number of observations in columns 7 and 8.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: IV: Change in Manufacturing Outcomes from 1860 to 1870, by Sherman March Exposure

| | Growth, 1860-1870 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Establishments | | Capital | | Employment | | Value Added | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.979*** | -1.034** | -0.495** | -0.480* | -1.017** | -1.161* | -0.481*** | -0.468*** |
| | (0.375) | (0.482) | (0.241) | (0.281) | (0.431) | (0.626) | (0.153) | (0.178) |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

Each column is a separate county-industry level regression of the indicated manufacturing outcome on an indicator equal to one if the county is within five miles of Sherman's march plus the noted fixed effects, where the Sherman's march indicator is instrumented with an indicator for within 15 miles of a straight-line path between four march vertices: Atlanta, GA, Savannah, GA, Columbia, SC, and Goldsboro, NC. The sample is all counties within 100 miles of the march. Standard errors are clustered at the county level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Agricultural Outcomes, by Placebo March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Value of Farms | | Log Value of Livestock | | Log Value of Farmland | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Placebo x 1850 | 0.004 | −0.044 | 0.088 | 0.008 | 0.005 | −0.015 | 0.091 | 0.040 |
| | (0.062) | (0.067) | (0.067) | (0.063) | (0.054) | (0.055) | (0.101) | (0.101) |
| Placebo x 1870 | −0.145 | −0.154 | 0.042 | 0.001 | −0.139 | −0.138 | 0.070 | 0.038 |
| | (0.103) | (0.100) | (0.101) | (0.100) | (0.085) | (0.100) | (0.081) | (0.082) |
| Placebo x 1880 | −0.016 | −0.014 | 0.127* | 0.070 | 0.035 | 0.053 | 0.176** | 0.118* |
| | (0.061) | (0.064) | (0.070) | (0.065) | (0.048) | (0.048) | (0.068) | (0.065) |
| Placebo x 1890 | −0.021 | −0.016 | 0.058 | 0.004 | 0.025 | 0.038 | 0.148 | 0.011 |
| | (0.061) | (0.060) | (0.084) | (0.075) | (0.061) | (0.059) | (0.103) | (0.077) |
| Placebo x 1900 | −0.081 | −0.071 | 0.067 | 0.023 | 0.000 | 0.012 | 0.151 | 0.064 |
| | (0.080) | (0.072) | (0.094) | (0.087) | (0.067) | (0.060) | (0.095) | (0.085) |
| Placebo x 1910 | −0.064 | −0.047 | 0.215* | 0.167 | 0.092 | 0.096 | 0.321*** | 0.230** |
| | (0.081) | (0.067) | (0.123) | (0.102) | (0.078) | (0.066) | (0.122) | (0.102) |
| Placebo x 1920 | −0.062 | −0.031 | 0.300** | 0.266** | 0.146* | 0.158** | 0.419*** | 0.352*** |
| | (0.086) | (0.071) | (0.138) | (0.114) | (0.084) | (0.067) | (0.141) | (0.119) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Treatment Control | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1075 | 1075 | 1075 | 1075 | 1075 | 1075 | 1071 | 1071 |
| Clusters | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 |
| Adjusted $R^2$ | 0.161 | 0.402 | 0.021 | 0.013 | 0.008 | 0.012 | 0.163 | 0.135 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within fifteen miles of the placebo Sherman march, interacted with the displayed decade indicators, plus the noted fixed effects, the usual controls and the treatment variables. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the placebo march and all decades, 1850-1920. Standard errors are clustered at the county level. A small number of counties are missing farmland values in 1850 or 1870 which slightly reduces the number of observations in columns 7 and 8.

Table 8: Change in Manufacturing Outcomes from 1860 to 1870, by Placebo March Exposure

| | Growth Rates | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Value Added | | Employment | | Capital | | Establishments | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Placebo | -0.260 | -0.360 | -0.222 | -0.599 | -1.354 | -2.325 | -0.038 | -0.168 |
| | (1.662) | (1.973) | (1.147) | (1.362) | (1.497) | (1.591) | (0.514) | (0.611) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Treatment Control | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 |
| Clusters | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
| Adjusted $R^2$ | 0.045 | 0.041 | 0.078 | 0.071 | 0.083 | 0.078 | 0.117 | 0.108 |

Each column is a separate county-industry level regression of the percentage change between 1860 and 1870 in the column indicated manufacturing outcome on an indicator equal to one if the county is within fifteen miles of the placebo Sherman march plus the noted fixed effects, the usual controls and the treatment variables. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all reported industries in all counties within 100 miles of the placebo march. The sample is unbalanced because not all industries are present in all counties. Standard errors are clustered at the county level.

Table 9: Demographic and Infrastructure Outcomes, by Sherman March Exposure, 1850-1920

| | Population | | Black Share | | Log Railroad Miles | | Log Railroad Miles + 1 | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | 0.047 | 0.042 | 0.046 | 0.049 | 0.320 | 0.487 | 0.005* | 0.007** |
| | (0.030) | (0.030) | (0.046) | (0.047) | (0.242) | (0.305) | (0.003) | (0.003) |
| Sherman x 1870 | -0.026 | -0.035* | -0.006 | -0.024 | 0.025 | 0.008 | -0.001 | 0.000 |
| | (0.019) | (0.020) | (0.032) | (0.035) | (0.178) | (0.162) | (0.002) | (0.002) |
| Sherman x 1880 | 0.015 | 0.007 | 0.049 | 0.033 | -0.004 | -0.014 | 0.000 | 0.002 |
| | (0.023) | (0.023) | (0.040) | (0.043) | (0.196) | (0.187) | (0.004) | (0.004) |
| Sherman x 1890 | -0.059 | -0.068* | -0.050 | -0.081 | -0.082 | -0.102 | -0.004 | -0.001 |
| | (0.041) | (0.040) | (0.061) | (0.062) | (0.220) | (0.220) | (0.005) | (0.005) |
| Sherman x 1900 | -0.072 | -0.082 | -0.027 | -0.070 | 0.049 | -0.034 | 0.006 | 0.007 |
| | (0.055) | (0.050) | (0.076) | (0.074) | (0.232) | (0.231) | (0.006) | (0.006) |
| Sherman x 1910 | -0.076 | -0.085 | 0.020 | -0.040 | 0.027 | -0.066 | 0.006 | 0.006 |
| | (0.066) | (0.061) | (0.089) | (0.085) | (0.239) | (0.235) | (0.007) | (0.008) |
| Sherman x 1920 | -0.050 | -0.058 | 0.089 | 0.019 | 0.041 | -0.057 | 0.009 | 0.008 |
| | (0.074) | (0.069) | (0.099) | (0.093) | (0.240) | (0.235) | (0.008) | (0.008) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1779 | 1779 | 1777 | 1777 | 1319 | 1319 | 1779 | 1779 |
| Clusters | 223 | 223 | 223 | 223 | 218 | 218 | 223 | 223 |
| Adjusted $R^2$ | 0.013 | 0.000 | 0.009 | 0.008 | 0.129 | 0.081 | 0.222 | 0.230 |

Each column is a separate county-year level regression of the indicated demographic or infrastructure outcome on an indicator equal to one if the county is within five miles of Sherman's march interacted with decadal indicators plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march. Standard errors are clustered at the county level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Change in Manufacturing Outcomes from 1860 to 1870, by Sherman March Exposure and Finance Access

| | Bank Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Value Added | | Employment | | Capital | | Establishments | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | 0.131 | -0.076 | 0.157 | 0.089 | 0.151 | -0.204 | -0.072 | -0.121 |
| | (0.350) | (0.469) | (0.223) | (0.288) | (0.377) | (0.631) | (0.088) | (0.136) |
| Bank County | 1.731*** | 1.438** | 0.967*** | 0.696** | 1.857** | 1.483 | 0.870*** | 0.703*** |
| | (0.613) | (0.637) | (0.326) | (0.330) | (0.889) | (0.917) | (0.243) | (0.241) |
| Sherman x Bank | -1.752*** | -1.282** | -1.106*** | -0.868** | -2.106*** | -1.459** | -0.679*** | -0.552** |
| | (0.588) | (0.601) | (0.350) | (0.374) | (0.732) | (0.711) | (0.238) | (0.238) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Adjusted $R^2$ | 0.015 | 0.031 | 0.018 | 0.040 | 0.015 | 0.038 | 0.026 | 0.043 |
| | Dun, Boyd, and Company Status | | | | | | | |
| | Value Added | | Employment | | Capital | | Establishments | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.479* | -0.664** | -0.273* | -0.368* | -0.445 | -0.785** | -0.291** | -0.394*** |
| | (0.274) | (0.306) | (0.164) | (0.188) | (0.300) | (0.378) | (0.112) | (0.127) |
| Any DB firms | 5.152** | 5.008** | 3.132*** | 2.892*** | 6.979** | 6.951* | 2.604*** | 2.535*** |
| | (2.241) | (2.360) | (1.061) | (1.102) | (3.479) | (3.684) | (0.793) | (0.844) |
| Sherman x Any DB firms | -3.743 | -3.280 | -1.919* | -1.595 | -5.933* | -5.283* | -1.604* | -1.394* |
| | (2.297) | (2.086) | (1.109) | (1.020) | (3.503) | (3.174) | (0.820) | (0.773) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Adjusted $R^2$ | 0.053 | 0.062 | 0.066 | 0.076 | 0.070 | 0.085 | 0.081 | 0.089 |

Each column is a separate county-industry-year level regression of the change from 1860 to 1870 in the indicated manufacturing outcome on the displayed interaction terms, fixed effects, and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. DB firms refers to the number of Dun, Boyd, and Company-tracked firms in the county as of 1860. The sample is all counties within 100 miles of the march. Standard errors are clustered at the county level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Agricultural Outcomes, by Land Wealth and Sherman March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Farm Value | | Log Livestock Value | | Log Farmland Value | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x Post | -0.193*** | -0.198*** | -0.230*** | -0.242*** | -0.136*** | -0.142*** | -0.051 | -0.056 |
| | (0.042) | (0.043) | (0.063) | (0.064) | (0.043) | (0.044) | (0.079) | (0.080) |
| High Land Wealth x Post x Sherman | 0.167 | 0.140 | 0.355*** | 0.356*** | 0.161* | 0.138* | 0.225** | 0.238** |
| | (0.120) | (0.116) | (0.104) | (0.097) | (0.085) | (0.081) | (0.109) | (0.106) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| High Wealth X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 891 | 891 | 891 | 891 | 891 | 891 | 877 | 877 |
| Clusters | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 |
| Adjusted $R^2$ | 0.003 | 0.090 | 0.120 | 0.084 | 0.136 | 0.121 | 0.072 | 0.106 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within five miles of Sherman's march, interacted with an indicators for post 1860 decades and a dummy for High Land Wealth, plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march and all decades, 1850-1880, as discussed in the paper. The dummy for High Land Wealth is equal to one for those counties that are in the top quarter in terms of share of farms that are more than 1000 acres. The Standard errors are clustered at the county level. A small number of counties are missing farmland values in 1850 or 1870 which slightly reduces the number of observations in columns 7 and 8.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Wealth Concentration by Sherman March Exposure, 1850-1920

| | Farm Size Gini | | | | Slave Holding Gini | |
|---|---|---|---|---|---|---|
| | Median Bin | | Minimum Bin | | Median Bin | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Sherman x 1850 | | | | | -0.007 | -0.002 |
| | | | | | (0.008) | (0.009) |
| Sherman x 1870 | 0.060** | 0.058** | 0.090*** | 0.081*** | | |
| | (0.027) | (0.025) | (0.032) | (0.031) | | |
| Sherman x 1880 | 0.144*** | 0.111*** | 0.199*** | 0.157*** | | |
| | (0.031) | (0.024) | (0.046) | (0.033) | | |
| Sherman x 1890 | 0.130*** | 0.100*** | 0.181*** | 0.139*** | | |
| | (0.030) | (0.024) | (0.044) | (0.033) | | |
| Sherman x 1900 | 0.076*** | 0.059*** | 0.128*** | 0.098*** | | |
| | (0.024) | (0.020) | (0.035) | (0.027) | | |
| Sherman x 1910 | 0.071*** | 0.049** | 0.122*** | 0.087*** | | |
| | (0.023) | (0.020) | (0.033) | (0.027) | | |
| Sherman x 1920 | 0.068*** | 0.045** | 0.120*** | 0.085*** | | |
| | (0.023) | (0.020) | (0.034) | (0.028) | | |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | No | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes |
| Observations | 1557 | 1557 | 1557 | 1557 | 408 | 408 |
| Clusters | 223 | 223 | 223 | 223 | 223 | 223 |
| Adjusted $R^2$ | 0.31 | 0.55 | 0.14 | 0.49 | 0.01 | 0.01 |

Each column is a separate county-year level regression of the indicated inequality measure on an indicator equal to one if the county is within five miles of Sherman's march interacted with decadal indicators, plus the noted fixed effects and controls. The sample is all counties within 100 miles of the march. The gini measure in columns 1 to 4 is constructed following Nunn (2008) and uses farm size data from the Census of Agriculture, 1850-1920. The gini measure in columns 5 and 6 is constructed using the same procedure, except using slaveholdings rather than farm size. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.


Figure 1: Sherman's March, War Department Map

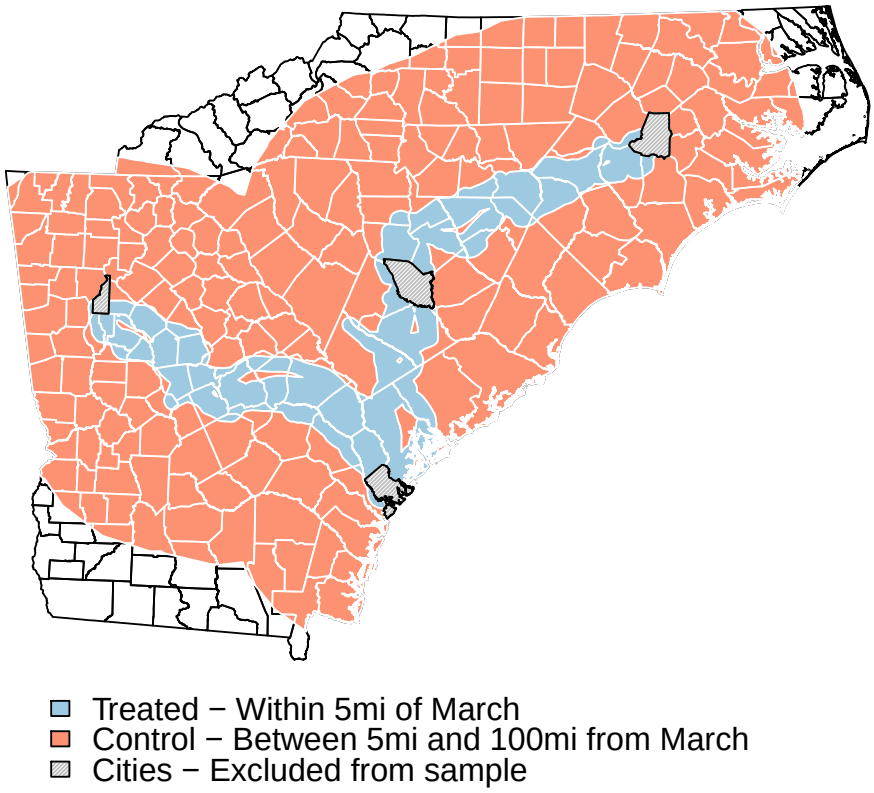
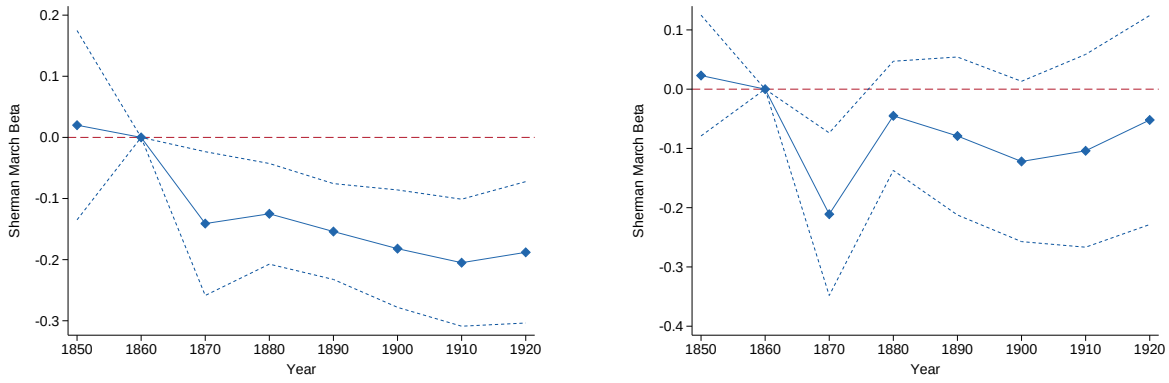



Figure 2: Sherman's March and 1860 County Boundaries. Based on the War Department Map in Figure 1. The vertex cities on the march are excluded from our analysis: Atlanta (captured September 2, 1864), Savannah, GA (December 10, 1864), Columbia, SC (February 17, 1865), and Goldsboro, NC (March 23, 1865).




(a) Log Improved Acre Share

(b) Log Value of Farms

Figure 3: Difference in Log Improved Acre Share and Value of Farms, by Sherman March Exposure, 1850-1920

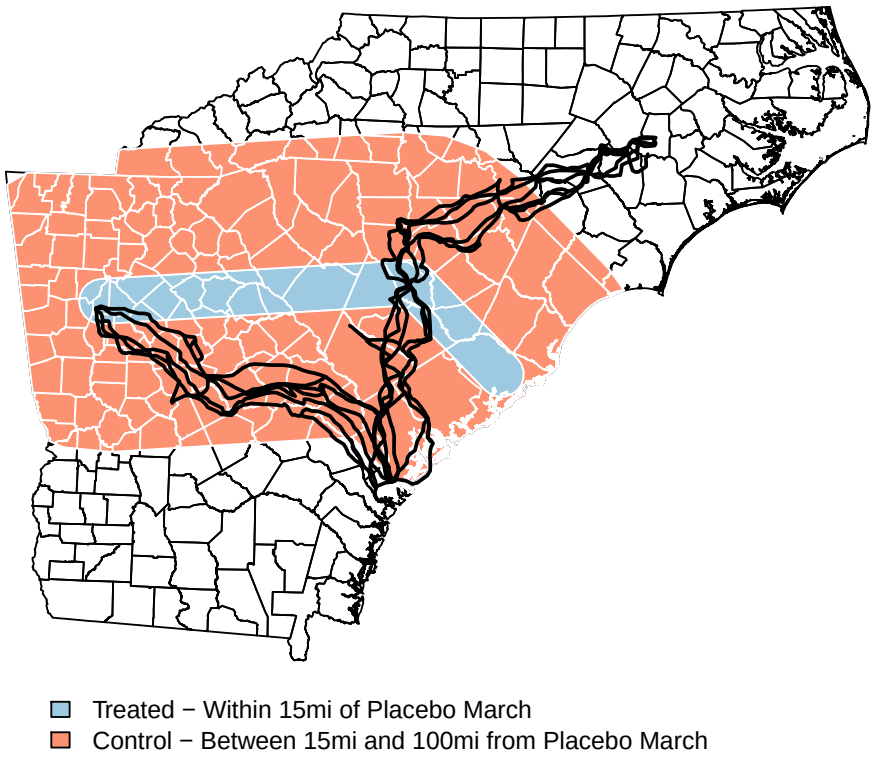
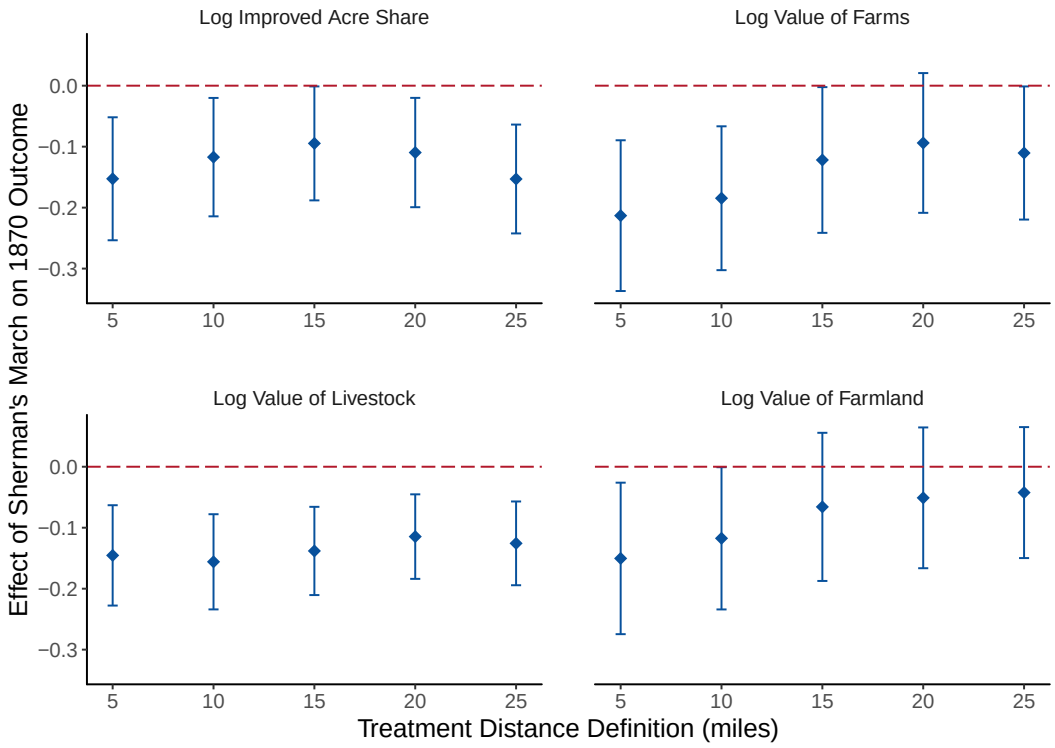
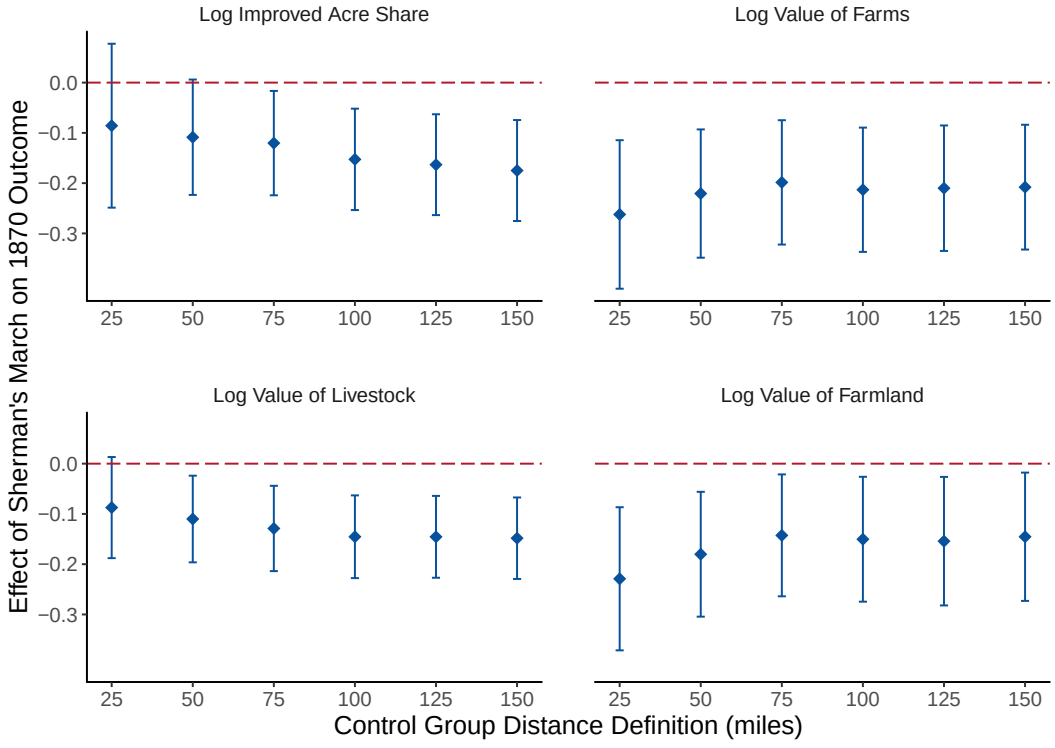



Figure 4: A Placebo March from Atlanta, GA to Columbia, SC, to Charleston , SC.




(a) Sherman's effect across alternative treatment definitions




(b) Sherman's effect across alternative control definitions

Figure 5: Alternative treatment and control definitions

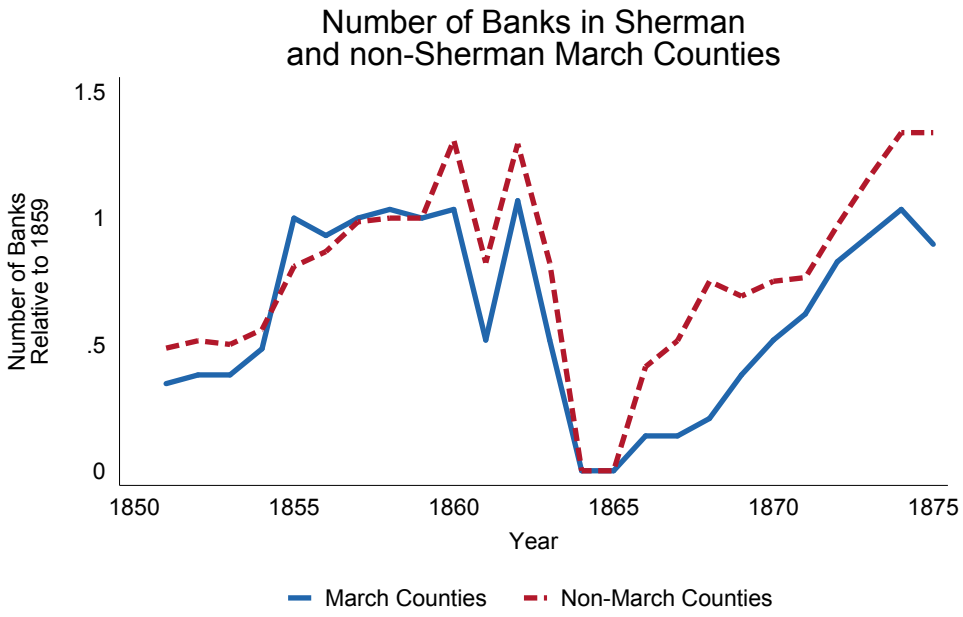



Figure 6: The number of banks in Sherman's march and non-march counties was comparable before the Civil War. After the war, banks may have recovered slightly faster in non-march counties.

Table A.1: Link Rate from Marriages to 1870 Census (%)

| | March Counties | Non March Counties | Difference |
|---|---|---|---|
| Georgia | 37.80 | 39.10 | -1.30 |
| | | | (2.28) |
| North Carolina | 38.91 | 38.66 | 0.26 |
| | | | (8.99) |
| Total | 37.92 | 39.13 | -1.21 |
| | | | (2.28) |

Notes: Lists of the names of grooms in Georgia and North Carolina were collected from state marriage records between 1868 and 1872. The grooms were then matched by first and last name to the complete 1870 census schedule. The link rate reports the share of grooms successfully matched using a variant of the automated linking procedure described in Feigenbaum (2016). Match rates are comparable to other linking projects using census data in this era. The Georgia and North Carolina Marriage Records are from FamilySearch.org.

# A Appendix

## A.1 Additional Tables

Table A.2: Differences in 1850-1860 Changes in County Outcomes, by Sherman March Exposure

| | Differences in 1850-1860 Changes in County Agricultural Outcomes | | |
|---|---|---|---|
| | Means | | |
| | March Counties | Non-March Counties | Difference |
| Population | 0.10 | 0.16 | -0.06 |
| | | | (0.04) |
| Farm Value | 0.53 | 0.60 | -0.07 |
| | | | (0.07) |
| Livestock Value | 0.43 | 0.48 | -0.05 |
| | | | (0.04) |
| Farmland Value | 0.72 | 0.70 | 0.03 |
| | | | (0.08) |
| Share of Improved Acres | -0.91 | -1.06 | 0.15 |
| | | | (0.11) |
| Black Share | 0.02 | 0.02 | 0.00 |
| | | | (0.03) |
| Agricultural Output | 0.23 | 0.31 | -0.09 |
| | | | (0.06) |
| Wheat | 0.47 | 0.59 | -0.12 |
| | | | (0.14) |
| Rye | 0.80 | 0.87 | -0.07 |
| | | | (0.19) |
| Indian Corn | 0.03 | 0.09 | -0.06 |
| | | | (0.06) |
| Oats | -0.90 | -0.82 | -0.09 |
| | | | (0.15) |
| Ginned Cotton | 0.38 | 0.56 | -0.18 |
| | | | (0.21) |
| Wool | -0.23 | -0.14 | -0.09 |
| | | | (0.09) |
| Peas and Bean | 0.48 | 0.57 | -0.09 |
| | | | (0.16) |
| Sweet Potato | -0.06 | 0.03 | -0.09 |
| | | | (0.06) |
| Butter | 0.13 | 0.08 | 0.05 |
| | | | (0.07) |
| Horses | -0.15 | -0.05 | -0.09 |
| | | | (0.04) |
| Mules | 0.50 | 0.76 | -0.26 |
| | | | (0.07) |
| Oxen | 0.07 | 0.21 | -0.14 |
| | | | (0.07) |
| Pigs | -0.03 | -0.04 | 0.01 |
| | | | (0.04) |
| | Differences in 1850-1860 Changes in County Manufacturing Outcomes | | |
| | Means | | |
| | March Counties | Non-March Counties | Difference |
| Value Production | 0.63 | 0.88 | -0.25 |
| | | | (0.20) |
| Employment | 0.16 | 0.29 | -0.13 |
| | | | (0.18) |

Notes: Each column reflects the average 1850 to 1860 difference in logs of the indicated outcome across counties in the indicated group. Data are from the US Census of Agriculture, 1850 and 1860. Data on establishments and capital were not available in 1850. Data are from the US Census of Manufactures, 1850 and 1860.

Table A.3: Change in Lumber Manufacturing Outcomes from 1860 to 1870, by Sherman March Exposure

| | Lumber Industry | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Value Added | | Employment | | Capital | | Establishments | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.498 | -0.498 | -0.369 | -0.369 | -0.474* | -0.474* | -0.421 | -0.421 |
| | (0.809) | (0.809) | (0.394) | (0.394) | (0.284) | (0.284) | (0.267) | (0.267) |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 |
| Clusters | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 |
| Adjusted $R^2$ | 0.020 | 0.020 | 0.007 | 0.007 | 0.013 | 0.013 | 0.022 | 0.022 |

Each column is a separate county level regression of the percentage change between 1860 and 1870 in the column indicated lumber manufacturing outcome on an indicator equal to one if the county is within five miles of Sherman's march plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all lumber industries in counties within 100 miles of the march. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.4: Other Agricultural Outcomes, by Sherman March Exposure, 1850-1880

| | Agricultural Products | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cotton | Corn | Wheat | Sweet Potato | Rice | Butter | Oats | Hay | Tobacco |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Sherman x 1850 | 0.139 | 0.062 | 0.141 | 0.125** | 0.469 | -0.078 | -0.103 | -0.584 | 0.050 |
| | (0.136) | (0.068) | (0.157) | (0.059) | (0.325) | (0.082) | (0.126) | (0.671) | (0.433) |
| Sherman x 1870 | 0.048 | -0.093** | 0.185 | -0.034 | 1.112 | -0.356** | -0.321* | -0.716 | -0.003 |
| | (0.129) | (0.042) | (0.128) | (0.100) | (0.875) | (0.137) | (0.170) | (0.647) | (0.475) |
| Sherman x 1880 | 0.067 | 0.138*** | 0.143 | 0.059 | -0.789 | -0.184** | -0.175** | -0.478 | -0.033 |
| | (0.146) | (0.028) | (0.110) | (0.071) | (0.824) | (0.073) | (0.077) | (0.396) | (0.544) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 847 | 1557 | 1457 | 1557 | 907 | 886 | 1554 | 857 | 976 |
| Clusters | 221 | 223 | 221 | 223 | 212 | 223 | 223 | 221 | 220 |
| Adjusted $R^2$ | 0.227 | 0.640 | 0.021 | 0.773 | 0.190 | 0.002 | 0.248 | 0.155 | 0.305 |

| | Livestock | | | | | | |
|---|---|---|---|---|---|---|---|
| | Horses | Mules | Oxen | Pigs | Sheep | Cows | Other Cattle |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Sherman x 1850 | 0.148*** | 0.258*** | 0.110 | -0.003 | 0.563*** | 0.015 | 0.080 |
| | (0.043) | (0.074) | (0.071) | (0.051) | (0.125) | (0.039) | (0.062) |
| Sherman x 1870 | -0.024 | -0.073* | 0.048 | -0.139** | 0.084 | -0.095** | -0.140*** |
| | (0.041) | (0.044) | (0.093) | (0.060) | (0.126) | (0.042) | (0.052) |
| Sherman x 1880 | 0.030 | 0.003 | -0.025 | 0.045 | 0.085 | -0.097*** | -0.072** |
| | (0.029) | (0.033) | (0.101) | (0.040) | (0.083) | (0.034) | (0.034) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1335 | 1335 | 891 | 1335 | 1331 | 891 | 891 |
| Clusters | 223 | 223 | 223 | 223 | 223 | 223 | 223 |
| Adjusted $R^2$ | 0.370 | 0.055 | 0.045 | 0.151 | 0.196 | 0.022 | 0.226 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within five miles of Sherman's march, interacted with the displayed decade indicators, plus the noted fixed effects and controls. The sample is all counties within 100 miles of the march and all decades, 1850-1880. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.5: Robustness, 10 mile treatment: Agricultural Outcomes, by Sherman March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Value of Farms | | Log Value of Livestock | | Log Value of Farmland | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | 0.038 | 0.040 | 0.017 | 0.003 | 0.003 | −0.001 | −0.083 | −0.110 |
| | (0.046) | (0.047) | (0.058) | (0.054) | (0.034) | (0.034) | (0.077) | (0.077) |
| Sherman x 1870 | −0.081 | −0.066 | −0.170** | −0.192*** | −0.139*** | −0.142*** | −0.137* | −0.127* |
| | (0.062) | (0.063) | (0.073) | (0.071) | (0.050) | (0.053) | (0.072) | (0.070) |
| Sherman x 1880 | −0.125*** | −0.106** | −0.064 | −0.038 | −0.047 | −0.009 | 0.077 | 0.080 |
| | (0.047) | (0.044) | (0.057) | (0.050) | (0.038) | (0.031) | (0.057) | (0.055) |
| Sherman x 1890 | −0.153*** | −0.132*** | −0.117* | −0.105* | −0.115** | −0.079* | 0.014 | −0.004 |
| | (0.050) | (0.044) | (0.070) | (0.062) | (0.046) | (0.040) | (0.072) | (0.063) |
| Sherman x 1900 | −0.187*** | −0.150*** | −0.165** | −0.139** | −0.161*** | −0.109** | 0.042 | 0.017 |
| | (0.066) | (0.051) | (0.079) | (0.068) | (0.055) | (0.042) | (0.076) | (0.068) |
| Sherman x 1910 | −0.202*** | −0.172*** | −0.119 | −0.106 | −0.096 | −0.065 | 0.092 | 0.042 |
| | (0.077) | (0.059) | (0.103) | (0.084) | (0.063) | (0.051) | (0.103) | (0.085) |
| Sherman x 1920 | −0.201** | −0.156** | −0.076 | −0.050 | −0.076 | −0.030 | 0.151 | 0.104 |
| | (0.089) | (0.064) | (0.111) | (0.094) | (0.072) | (0.057) | (0.116) | (0.098) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1531 | 1531 | 1531 | 1531 | 1531 | 1531 | 1517 | 1517 |
| Clusters | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 |
| Adjusted $R^2$ | 0.024 | 0.293 | 0.015 | 0.018 | 0.018 | 0.029 | 0.123 | 0.127 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within ten miles of Sherman's march, interacted with the displayed decade indicators, plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march and all decades, 1850-1920. Standard errors are clustered at the county level.
* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.6: Robustness, 75 mile Bandwidth: Agricultural Outcomes, by Sherman March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Value of Farms | | Log Value of Livestock | | Log Value of Farmland | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | 0.033 | 0.040 | −0.008 | −0.010 | 0.013 | 0.009 | −0.135* | −0.157* |
| | (0.044) | (0.046) | (0.057) | (0.054) | (0.034) | (0.033) | (0.078) | (0.080) |
| Sherman x 1870 | −0.120* | −0.117* | −0.198*** | −0.205*** | −0.129** | −0.144*** | −0.162** | −0.147* |
| | (0.064) | (0.063) | (0.076) | (0.073) | (0.052) | (0.054) | (0.075) | (0.075) |
| Sherman x 1880 | −0.116** | −0.112** | −0.081 | −0.065 | −0.036 | −0.022 | 0.035 | 0.039 |
| | (0.047) | (0.044) | (0.057) | (0.049) | (0.037) | (0.030) | (0.060) | (0.059) |
| Sherman x 1890 | −0.143*** | −0.141*** | −0.109 | −0.121* | −0.093** | −0.080* | 0.008 | −0.001 |
| | (0.049) | (0.043) | (0.071) | (0.066) | (0.046) | (0.041) | (0.075) | (0.068) |
| Sherman x 1900 | −0.162** | −0.161*** | −0.137* | −0.151** | −0.130** | −0.108** | 0.026 | −0.011 |
| | (0.067) | (0.051) | (0.080) | (0.071) | (0.056) | (0.042) | (0.079) | (0.073) |
| Sherman x 1910 | −0.169** | −0.184*** | −0.085 | −0.129 | −0.064 | −0.066 | 0.097 | 0.012 |
| | (0.077) | (0.056) | (0.104) | (0.088) | (0.064) | (0.052) | (0.105) | (0.090) |
| Sherman x 1920 | −0.166* | −0.179*** | −0.061 | −0.098 | −0.048 | −0.042 | 0.139 | 0.046 |
| | (0.089) | (0.063) | (0.110) | (0.094) | (0.071) | (0.056) | (0.116) | (0.100) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1531 | 1531 | 1531 | 1531 | 1531 | 1531 | 1517 | 1517 |
| Clusters | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 |
| Adjusted $R^2$ | 0.027 | 0.290 | 0.016 | 0.017 | 0.019 | 0.029 | 0.123 | 0.126 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within five miles of Sherman's march, interacted with the displayed decade indicators, plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 75 miles of the march and all decades, 1850-1920. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.7: Robustness, 75 mile bandwidth: Change in Manufacturing Outcomes from 1860 to 1870, by Sherman March Exposure

| | Value Added | | Employment | | Capital | | Establishments | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.930*** | -0.724* | -0.515** | -0.345 | -1.106** | -0.905* | -0.500*** | -0.395** |
| | (0.352) | (0.384) | (0.217) | (0.221) | (0.440) | (0.500) | (0.155) | (0.156) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1210 | 1210 | 1210 | 1210 | 1210 | 1210 | 1210 | 1210 |
| Clusters | 172 | 172 | 172 | 172 | 172 | 172 | 172 | 172 |
| Adjusted $R^2$ | 0.002 | 0.024 | 0.004 | 0.037 | 0.006 | 0.036 | 0.007 | 0.033 |

Each column is a separate county-industry level regression of the percentage change between 1860 and 1870 in the column indicated manufacturing outcome on an indicator equal to one if the county is within five miles of Sherman's march plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all reported industries in all counties within 75 miles of the march. The sample is unbalanced because not all industries are present in all counties. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.8: Robustness, 10 mile treatment: Change in Manufacturing Outcomes from 1860 to 1870, by Sherman March Exposure

| | Value Added | | Employment | | Capital | | Establishments | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.772** | -0.851** | -0.298 | -0.354 | -0.880* | -1.058* | -0.340** | -0.400** |
| | (0.342) | (0.380) | (0.232) | (0.251) | (0.452) | (0.539) | (0.161) | (0.173) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Adjusted $R^2$ | 0.001 | 0.025 | 0.003 | 0.035 | 0.003 | 0.033 | 0.005 | 0.033 |

Each column is a separate county-industry level regression of the percentage change between 1860 and 1870 in the column indicated manufacturing outcome on an indicator equal to one if the county is within ten miles of Sherman's march plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all reported industries in all counties within 100 miles of the march. The sample is unbalanced because not all industries are present in all counties. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.9: Agricultural Outcomes, by Land Wealth and Sherman March Exposure, 1850-1920

| | Log Improved Acre Share | | Log Farm Value | | Log Livestock Value | | Log Farmland Value | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman x 1850 | 0.056 | 0.048 | 0.013 | 0.006 | 0.005 | 0.001 | -0.104 | -0.128 |
| | (0.054) | (0.055) | (0.067) | (0.064) | (0.042) | (0.042) | (0.089) | (0.092) |
| Sherman x 1870 | -0.155*** | -0.165*** | -0.360*** | -0.369*** | -0.199** | -0.215*** | -0.284*** | -0.284*** |
| | (0.051) | (0.054) | (0.100) | (0.092) | (0.077) | (0.081) | (0.101) | (0.098) |
| Sherman x 1880 | -0.161*** | -0.171*** | -0.068 | -0.093 | -0.052 | -0.052 | 0.080 | 0.047 |
| | (0.042) | (0.043) | (0.062) | (0.060) | (0.038) | (0.034) | (0.073) | (0.074) |
| Sherman x 1890 | -0.193*** | -0.211*** | -0.171** | -0.216*** | -0.168*** | -0.170*** | 0.021 | -0.039 |
| | (0.049) | (0.046) | (0.083) | (0.082) | (0.055) | (0.052) | (0.086) | (0.092) |
| Sherman x 1900 | -0.199*** | -0.223*** | -0.175* | -0.227*** | -0.168*** | -0.173*** | 0.043 | -0.035 |
| | (0.067) | (0.054) | (0.090) | (0.087) | (0.060) | (0.052) | (0.092) | (0.094) |
| Sherman x 1910 | -0.224*** | -0.262*** | -0.097 | -0.177* | -0.077 | -0.101 | 0.126 | 0.010 |
| | (0.078) | (0.060) | (0.113) | (0.104) | (0.072) | (0.062) | (0.117) | (0.107) |
| Sherman x 1920 | -0.190* | -0.225*** | -0.036 | -0.109 | -0.041 | -0.060 | 0.208 | 0.081 |
| | (0.097) | (0.069) | (0.119) | (0.109) | (0.078) | (0.066) | (0.130) | (0.115) |
| Sherman x High Land Wealth x 1850 | 0.040 | 0.048 | -0.017 | -0.005 | 0.066 | 0.058 | 0.002 | -0.003 |
| | (0.100) | (0.097) | (0.120) | (0.104) | (0.077) | (0.075) | (0.163) | (0.155) |
| Sherman x High Land Wealth x 1870 | 0.134 | 0.121 | 0.456*** | 0.476*** | 0.225* | 0.196 | 0.372*** | 0.380*** |
| | (0.157) | (0.152) | (0.136) | (0.122) | (0.126) | (0.129) | (0.134) | (0.123) |
| Sherman x High Land Wealth x 1880 | 0.224** | 0.195** | 0.218** | 0.217** | 0.149** | 0.126** | 0.075 | 0.092 |
| | (0.098) | (0.096) | (0.108) | (0.087) | (0.075) | (0.060) | (0.116) | (0.104) |
| Sherman x High Land Wealth x 1890 | 0.262*** | 0.229** | 0.415*** | 0.380*** | 0.303*** | 0.280*** | 0.135 | 0.174 |
| | (0.100) | (0.094) | (0.135) | (0.112) | (0.088) | (0.074) | (0.159) | (0.119) |
| Sherman x High Land Wealth x 1900 | 0.263** | 0.205* | 0.377*** | 0.318*** | 0.242** | 0.213*** | 0.152 | 0.142 |
| | (0.123) | (0.108) | (0.138) | (0.120) | (0.105) | (0.080) | (0.144) | (0.123) |
| Sherman x High Land Wealth x 1910 | 0.354** | 0.277** | 0.370** | 0.270* | 0.200* | 0.158 | 0.186 | 0.117 |
| | (0.140) | (0.120) | (0.182) | (0.156) | (0.120) | (0.098) | (0.187) | (0.159) |
| Sherman x High Land Wealth x 1920 | 0.285* | 0.189 | 0.299 | 0.197 | 0.162 | 0.112 | 0.128 | 0.048 |
| | (0.152) | (0.126) | (0.194) | (0.170) | (0.133) | (0.104) | (0.203) | (0.179) |
| County Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| High Wealth X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State X Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls X Year | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1779 | 1779 | 1779 | 1779 | 1779 | 1779 | 1765 | 1765 |
| Clusters | 223 | 223 | 223 | 223 | 223 | 223 | 223 | 223 |
| Adjusted $R^2$ | 0.038 | 0.384 | 0.055 | 0.133 | 0.049 | 0.124 | 0.169 | 0.239 |

Each column is a separate county-year level regression of the indicated agricultural outcome on an indicator equal to one if the county is within five miles of Sherman's march, interacted with decades dummy and a dummy for High Land Wealth, plus the noted fixed effects and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. The sample is all counties within 100 miles of the march and all decades, 1850-1920, as discussed in the paper. The dummy for High Land Wealth is equal to one for those counties that are in the top quarter in terms of share of farms that are more than 1000 acres. The Standard errors are clustered at the county level. 11 counties are missing farmland values in 1850 or 1870 which slightly reduces the number of observations in columns 7 and 8.

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.10: Change in Manufacturing Outcomes from 1860 to 1870, by Sherman March Exposure and Financial Access

| | Value Added | | Employment | | Capital | | Establishments | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Sherman | -0.112 | -0.237 | 0.005 | -0.042 | -0.087 | -0.354 | -0.110 | -0.142 |
| | (0.318) | (0.379) | (0.184) | (0.228) | (0.341) | (0.466) | (0.081) | (0.113) |
| High Bank Drop | 2.751** | 2.230* | 1.769*** | 1.342** | 3.508** | 2.833* | 1.606*** | 1.413*** |
| | (1.112) | (1.136) | (0.574) | (0.575) | (1.694) | (1.680) | (0.438) | (0.456) |
| Sherman x High Bank Drop | -2.978*** | -2.282** | -1.898*** | -1.465*** | -3.808** | -2.837** | -1.480*** | -1.291*** |
| | (1.143) | (1.006) | (0.600) | (0.543) | (1.718) | (1.433) | (0.455) | (0.429) |
| Industry Group Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 1860 County Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 | 1394 |
| Clusters | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Adjusted $R^2$ | 0.029 | 0.036 | 0.040 | 0.050 | 0.036 | 0.047 | 0.059 | 0.063 |

Each column is a separate county-industry-year level regression of the change from 1860 to 1870 in the indicated manufacturing outcome on the displayed interaction terms, fixed effects, and controls. The 1860 county controls include land area in square miles, population, value of farmland, and cotton production. High Bank Drop is a dummy which is equal to one for counties in the bottom half in terms of bank growth over 1859-1870. The sample is all counties within 100 miles of the march. Standard errors are clustered at the county level.

* p < 0.1, ** p < 0.05, *** p < 0.01.