The Macroeconomic Impact of the American Civil War

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RESULTS ARE PRELIMINARY
DATA SERIES ARE INCOMPLETE

Abstract

The Civil War is widely regarded as the seminal event of the nineteenth century in the United States, yet there is little empirical evidence on the effects of the conflict on economic production in the North and South. We construct new annual indices of Northern and Southern industrial production and agriculture from 1840-1900 by supplementing the components of the Davis (2004) U.S. industrial production index with annual commerce reports from leading cities in the United States. Collectively, the new series cover more than 40 industries and represent more than 90 percent of the value-added based on the 1860 census. Our preliminary results suggest that the Civil War reduced industrial production in the South by more than 50 percent while having little impact on the North. Structural break tests show that Southern capital intensive industries grew much faster than Southern non-capital intensive sector as well as Northern capital intensive industries following the end of Reconstruction. We interpret our results as consistent with the hypothesis that the end of Reconstruction improved property rights for wealthy Southerners to invest in capital intensive industries.

The Macroeconomic Impact of the American Civil War

The American Civil War is one of the defining economic and political events in US history. The war led to the abolition of slavery and the destruction of the peculiar institution that formed the basis of the Southern economy. Many studies of the American Civil War have analyzed the economic impact of this seminal event on long-term US economic performance. Hacker and Beard (1927), for example, argued that the Civil War was instrumental in bringing about a Second American revolution that led to the industrialization of the United States. The Republican-majority Congress passed important legislation during the Civil War including the National Banking Act, labor legislation, and the Land Grant College Act. These initiatives established new institutions that promoted American industrialization in the late nineteenth century.[1]

Many studies have challenged various aspects of the Hacker-Beard thesis. Cochran (1961) and Engerman (1966), for example, noted that Hacker and Beard's hypothesis that the Civil War was a turning point in American industrialization was based on qualitative rather than quantitative evidence. Engerman (1966) finds little evidence that US economic activity experienced a take-off during or after the war using Gallman's nineteenth century GNP estimates that are based on decadal benchmarks. Ransom and Sutch (2001) argue that although the industrial sector of the South rebounded quickly after the war, it took a much longer time for the agricultural sector to recover due to the transition from slavery. Goldin and Lewis (1975, 1978) estimate the direct and indirect costs of the Civil War. They measure the economic cost of the war in terms of lost output

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[1] Andreano, 1962.

and even account for lost productivity from wounded veterans. They estimate that the war cost an estimated 1.1 billion in 1860 dollars.

One limitation of previous studies is the absence of a high-quality and high-frequency output series to analyze the long-run economic effects of the Civil War. This is especially true for the Southern region of the United States. We address this deficiency by constructing new annual indices of Northern and Southern industrial production from 1840-1900. Specifically, we decompose the Davis (2004) U.S. industrial production (IP) index into 2 series: a Southern IP series that represents the 11 Confederate states, and a Northern series that represents industrial production in all other states. In addition, we supplement these series with additional data on a host of industries using annual commerce reports from leading cities in the United States, particularly those in the South.

Seven of the largest and most important commercial centers in the South during the nineteenth century including Charleston, Galveston, Mobile, New Orleans, Richmond, Savannah, and Wilmington published annual data on commercial activity in local newspapers before and after the Civil War.[2] Charleston, New Orleans, and Richmond even published economic data during the war. We use local newspaper reports of economic activity along with largely forgotten internal commerce reports of the United States government to construct an annual industrial production index for the South for the period 1840-1900. The new index accounts for more than 95 percent of value added (based on the 1860 census) and covers more than 50 different industries.

We then compare the Southern and Northern IP indices to analyze the economic impact of the American Civil War. The empirical analysis offers new insight into both

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[2] Richmond and New Orleans, for example. accounted for more than 50 percent of the South's industrial production based on the 1860 census.

the short-run and long-run economic effects of the Civil War on the North and the South, the relative pace of industrialization between the two regions, and how these effects varied across industries (food, metals, textiles, etc.). The new industrial production indices also allow us to isolate the impact of the American Civil War (1861-1865) and Reconstruction (1865-1879) on Northern and Southern economic production.

Our analysis reveals that the Civil War's impact on the South's industrial base was both profound and permanent. Indeed, the war reduced industrial production in the South by more than 50 percent <u>during</u> the conflict, and the Southern manufacturing sector remained severely depressed for years after the Civil War had ended. Indeed, the former Confederate states did not permanently surpass their 1860 levels of production until the early 1870s. Although industrial production in the South grew nearly nine percent per year in the postbellum period, the analysis shows that many of the region's most capital intensive industries - including iron manufacturing, textile production, shipbuilding, and machinery - did not recover to their 1860 levels until the early 1880s. In addition, preliminary analysis suggests that those Southern industries most directly tied to the South's agricultural sector (i.e., foodstuffs and alcohol products) also took decades to recover, a pattern consistent with the documented pace of Southern postbellum agricultural output. This is consistent with the interpretation that it took the South decades to transition from a slave to a free market economy. As a result, the South's share of U.S. industrial production did not return to its 1860 level until the mid-to-late 1890s despite a booming Northern industrial sector. One possible explanation is that investment in capital intensive industries did not begin to take place until property rights became more secure in the South following the end of Reconstruction. Another possible

explanation is capital intensive industries found it more difficult to obtain credit in the postbellum period given that the South's banking system was basically destroyed by the war (Bodenhorn and Rockoff, 1992; Schweikert, 1987).

The empirical analysis for the North portrays a very different picture. We find little evidence that the Civil War increased the level of industrial production or led to an acceleration of economic production (in terms of inducing a structural break in the level or trend of industrial production). This suggests that the Civil War was not a second American Revolution in the sense that it promoted the industrialization of the US economy. Rather, we find that growth rates in the North were quite similar in the antebellum and postbellum periods. Overall, we interpret our results as evidence that the economic impact of the Civil War was largely a Southern phenomenon that was undoubtedly an important factor in explaining long-run economic growth performance in the former Confederate states.

The remainder of the paper proceeds as follows. We begin our analysis with a discussion of nineteenth century data on US economic activity. This is followed by an empirical analysis of the IP series and its components. We then conclude with a discussion of the implication of the results for the history of American industrialization.

II. Nineteenth Century Production Data

A. The original Davis (2004) U.S. industrial production index

To investigate the Civil War's potential impact on America's pace of industrialization requires an annual real output series that consistently spans the antebellum and postbellum periods. As a basis for our empirical investigation, we employ Davis' (2002,

2004) and Davis and Weidenmier's new annual U.S. industrial production index for the North and South.

Using a methodology similar to the Federal Reserve Board's present-day industrial production index, the Davis (2004) U.S. IP index assembles 43 annual components in the manufacturing and mining industries that are consistently defined from 1790 until 1915. The Davis index of industrial production compares conceptually to the Federal Reserve's monthly index available since 1919. Both indexes attempt to measure the same fundamentals, namely the level of physical production in the nation's manufacturing and mining industries. Overall, the Davis (2004) IP index is a comprehensive industrial output measure in the sense that its components indirectly represent close to 90 percent of the value added produced by the U.S. industrial sector during the nineteenth century.

The relative importance of the 43 components in the Davis index changes over time by using two separate base years (1850 and 1880) and linking the overlapping series in chronological segments. The relative importance of the index components were conventionally defined by their value added, which Davis (2002, 2004) derived from Gallman (1956) and other sources related to the 1850 and 1880 U.S. Census records. The attribution of annual fluctuations in the aggregate index to any single component series may vary from year to year based upon additional factors, such as the emergence of new products.

The strongest attribute of the Davis index is that its components are expressed entirely in physical quantities. The Davis index places primacy on long-span data to reasonably ensure index consistency and comparability over time. Despite such rigorous selection criteria, the new annual index is not subject to considerable survivorship bias,

nor is it over-represented by basic commodities. On the contrary, three-fourths of the Davis index components measure genuine production, a higher percentage than that found in the other postbellum manufacturing indexes and even in the Federal Reserve Board's present-day industrial production release. This is accomplished by incorporating previously unavailable real output series across a broad spectrum of consumer goods and industrial machinery.[3]

We have chosen the Davis index as the basis for our construction of North and South IP indices on the grounds of reliability, consistency, and breadth of coverage. As discussed in Davis (2002, 2004) and Rhode (2002), two alternative antebellum U.S. output series - Robert Gallman's unpublished annual real GNP estimates for the 1834–1859 period (compiled largely in the 1960s), and Berry's (1988) real GNP series from 1789 – suffer from serious shortcomings.[4] As Rhode (2002) describes in detail, Gallman was never sufficiently confident of the reliability of his annual GNP estimates to publish them, and chastised researchers who attempted to use them in business-cycle analysis.[5] A key reason is that Gallman originally derived the annual antebellum series as simply a

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[3] The Davis index introduces annual output statistics for apparel items, textile dyes, die-sinking, milled flour, fire engines, naval vessels, firearms, salt, musical and scientific instruments, lumber shipments, and pocket watches, among other finished manufactured products. Furthermore, the index's component data sets for locomotives, merchant ships, and pig iron extend or refine the conventional series.

[4] For instance, Berry employed regression analysis on a hodge-podge of industrial, financial, and price data in order to estimate annual real GDP for the 1789–1889 period. However, historians have long dismissed Berry's series as far removed from reality because Berry's GNP data are an ad hoc average of select extrapolations drawn from hundreds of overlapping regression back-casts that ultimately rest on a sparse set of price indexes and nominal aggregates. Gallman followed a more sound methodology to estimate real GNP from actual U.S. census returns, making the trend in Gallman's GNP series superior to Berry's estimates. Gallman produced census-year estimates of real GNP for the 1834-1859 period, and calendar-year estimates for the years 1869-1909. Balke and Gordon (1989) and Romer (1989) have both since revised the cyclical movements in Gallman's postbellum series.

[5] See Rhode (2002) for Gallman's data. Rhode (p. 12) points out that a 1963 mimeograph from Robert Gallman containing the annual data circulated with the following disclaimer: "NOTE: These figures should not be regarded as reliable, annual estimates. They were derived for the purpose of computing decade averages and are supplied to interested technicians for testing, not for analysis as annual series."

"check" on his benchmark census-based GNP data presented in his 1960 and 1966 NBER volumes.[6]

For the purpose of our study, the Davis index trumps Gallman's annual GNP data in terms of (1) reliability, (2) consistency over the antebellum period, and (3) comparability between the antebellum and postbellum eras. Moreover, Gallman was unable to derive annual estimates for the 1860s, a critical gap for any analysis involving the Civil War.

B. The new Northern and Southern IP indexes

We construct new annual indices of Northern and Southern industrial production from 1840-1900. Specifically, we decompose the Davis (2004) U.S. industrial production (IP) index into 2 series: a Southern IP series that represents the 11 Confederate states, and a Northern series that represents industrial production in all other states. For several components, the time series on Northern and Southern output were derived simply by summing the data Davis (2002) originally collected at the product-level (i.e., ships) or state-level (i.e., pig iron production and coal mining).

Importantly, we supplement these series with additional data on a host of industries using annual commerce reports from leading cities in the United States, particularly those in the South. Specifically, we have collected annual shipment and production data that were reported in various trade reports and local newspapers on the largest Southern cities in the nineteenth century: Charleston, Galveston, Mobile, New Orleans, Richmond, Savannah, and Wilmington. To the best of our knowledge, these data

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[6] Gallman (1956, 1960, 1966) derived the benchmark GNP data for the census years 1839, 1849, and 1859 from U.S. Census records. Gallman formed other "minor" benchmark figures for the years 1834, 1836, 1844, and 1854 from a small subset of state censuses, mostly from the New England states.

sources have been largely overlooked in previous research on the Civil War and the broader nineteenth-century economy.

We do so for two related reasons. First, the underlying components in the Davis U.S. IP index have less-than-representative coverage of key Southern industries, including lumber, naval stores, flour milling, and leather production. The series that represented these industries in the Davis U.S. IP index were mostly derived from regions in the North (i.e., New York, Boston, Philadelphia, and Baltimore) or the present-day Midwest (i.e., Cincinnati and Chicago). Second, the original Davis IP index specified that data coverage for established antebellum industries had to begin as early as the late 1820s for inclusion into the broad index (in order to guard against changes in index reliability over time). Here, we have specified the cutoff to be 1840 as we are most interested in measuring the effects centered on the Civil War. In doing so, we are able to include more than a dozen additional series (i.e., soap, candles, rope, bagging, fertilizers, chewing tobacco) that were excluded in the Davis (2004) U.S. IP index. Unfortunately, several components in the Davis U.S. IP index, most notably agricultural implements, had to be excluded from the North-South IP indices since sufficient data on Southern production could not be obtained.

To produce the final IP indices for the North and the South, we assign the relative importance for the various individual IP component series based on 1860 value-added weights. The relative importance of the component series in the Northern and Southern IP series are given in Appendix Table 1. The individual components are then aggregated to form a final IP index based upon these value-added weights.

III. Empirical Analysis

A. Industrial Production

      To examine the economic effects of the American Civil War, we analyze the Northern and Southern industrial production indices from 1840-1900. The two industrial production series are plotted in Figure 1. Northern industrial production trends upward for most of the sample including the Civil War period. As shown in Table 1, the growth rate of industrial production averaged approximately 6 percent over the entire sample period. The Northern industrial production index increased nearly 34 percent between 1840 and the outbreak of the war with an average growth rate of 6.62 percent per annum in the antebellum period. The growth rate of industrial production declined to three and a half percent during the war, however, as production shifted to the production of military goods. In the post-bellum period, industrial production in the North quickly recovered to a rate that was about half the same as the antebellum growth rate. During the period of Reconstruction (1865-1877) when the United States army occupied the former Confederate states, industrial production averaged 5.16 percent. Between 1865 and 1900, the Northern industrial production index increased from a value of 120 to more than 815 by the end of the century with an average growth rate of almost 6 percent. The only periods of decline in the Northern industrial production index coincide with the economic downturns of the 1870s, 1880s, and 1893.

      For the South, industrial production increased from an index value of 51 to more than 920 between 1840 and 1900 for an annual growth rate of five and three-quarters percent. During the antebellum period, Southern industrial production almost doubled

between 1840 and 1860. Industrial production grew slightly less than four percent in the twenty-year period before the outbreak of the Civil War. The conflict dramatically reduced industrial production in the South with the quantity production index declining from a value of 100 in 1859/1860 to less than 48 in 1865. The growth rate of Southern industrial production averaged minus 11.69 percent per annum during the Civil War. The former-Confederate states reached their 1859/1860 antebellum level of industrial production in the early 1870. During the period of Reconstruction, Southern industrial production grew at approximately the same rate as the antebellum period (5.75 versus 5.73 percent. Following the removal of United States armies, the growth rate of industrial production in the South accelerated to more than 10 percent. The index value of Southern industrial production increased from a value of 102 in 1877 to more than 920 in 1900.

Figure 2 shows the ratio of industrial production in the South to the North with 1859-60 as the base year. During the antebellum period, the ratio of Southern to Northern industrial production declined approximately 70 percent from a level of 1.7 in 1840 to one in the base year of 1859/60. The ratio of Southern to Northern industrial production then fell 60 percent to .4 by the end of the Civil War. The large decline reflects two factors: (1) the North slightly increased its industrial base during the war and (2) the Southern economy dramatically contracted as the war resulted in the destruction of a large portion of the Southern capital stock. Figure 2 shows that the South's relative share of industrial production did not return to its pre-war levels until the mid-to-late 1890s. By 1900, the ratio of Southern to Northern industrial production was slightly less than 1.2.

We begin the empirical analysis by testing the Northern and Southern industrial production as well as the ratio of the two series for a unit root using the Dickey Fuller-

GLS test. The Dickey-Fuller-GLS is a two-step test that has been shown to have significant better power properties than the standard Augmented Dickey-Fuller test. The degree of augmentation (i.e., the number of lagged differences included to account for serial correlation) is selected on the basis of the Ng-Perron criterion. As shown in Table 2, the null hypothesis of a unit root cannot be rejected at either the five percent level of significance for the Northern or Southern industrial production indices or the capital and non-capital intensive indices. The test statistic for the unit root test for the North is -2.54and -1.021 for the South, respectively.[7] The test statistics for the ratio of Southern to Northern industrial production is -0.745. The analysis suggests that shocks to both the Northern and Southern industrial production had permanent effects on output during the period 1840 to 1913.

Another possibility is that the Civil War led to a structural break in Northern and/or Southern industrial production. Indeed, Hacker and Beard have suggested that the American Civil War permanently increased the rate of trend growth in Northern industrial activity. This suggests that shocks to the Northern industrial production may have been transitory around a linear trend and constant except for the Civil War "shock" that permanently increased the rate of trend growth in industrial production. For the South, we might expect that Civil War to lead a drop in the level of industrial activity. The trend rate of growth in the post-bellum period may have also increased in the South because the marginal productivity of capital with the destruction of a large portion of the physical capital stock in the former Confederate states. By abolishing slavery, the South had to dramatically change and transform its economy that involved significant

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[7] As a robustness check, we tested all industrial production series for a unit root using lagged differences of 1 to 8 lags. For all tests, we are unable to reject the null hypothesis of a unit root at the five percent level of significance.

transactions costs. Finally, we might expect that the war led to a structural break in the ratio of Southern to Northern industrial production.

To test formally for a structural break, we employ the methodology developed by Zivot-Andrews (1992). This test allows us to examine whether the Civil War increased (or lowered) the level, trend, or level and trend of industrial production in the North and South. The Zivot-Andrews procedure does not specify a breakpoint, *a priori*, given that the pre-selection of a change point biases the results towards finding a structural break (Christiano, 1992). The null hypothesis of the structural break model is that the Northern and Southern industrial production series are a nonstationary process.

The three different alternative hypotheses, $H_1^{2,3,4}$, can be written as follows:

(1)　$\Delta y_t = \mu + \beta t + \theta DU_t + \alpha y_{t-1} + \sum_{j=1}^{k} c_j \Delta y_{t-j} + e_t$

(2)　$\Delta y_t = \mu + \beta t + \gamma DT_t + \alpha y_{t-1} + \sum_{j=1}^{k} c_j \Delta y_{t-j} + e_t$

(3)　$\Delta y_t = \mu + \beta t + \theta DU_t + \gamma DT_t + \alpha y_{t-1} + \sum_{j=1}^{k} c_j \Delta y_{t-j} + e_t$

Equation (1) is a "crash" model that allows for a one-time change in the level of IP at a break date denoted by TB. This specification would capture a large decline (or increase) in the level of industrial production. Equation (2) is used to test for stationarity around a broken trend at TB. This specification allows for a change in the trend rate of growth in industrial production. This specification would be consistent with the Hacker-Beard hypothesis that the Civil War permanently increased the rate of growth in industrial production. Equation (3) is the most general specification that allows for a change in the level and growth rate of industrial production at TB. DU_t is a dummy

variable that captures the shift in the intercept and takes a value of 1 if t>TB. DT_t is another indicator variable that represents the shift in the deterministic trend at time TB. DT_t is equal to (t-TB) if (t>TB) and zero otherwise. To control for serial correlation, we also included lagged differences of the dependent variable as covariates in the three models. The number of lagged differences employed in the break tests is selected on the basis of the Akaike Information Criteria (AIC). In each of the three alternative hypotheses, y_t is assumed to be a stationary process with one structural break. The null hypothesis is rejected if the α coefficient is significantly different from zero. The empirical results of the structural break tests are presented in Table 2 for the North and Table 3 for the South.

Table 2 shows that the null hypothesis of a unit root cannot be rejected in the three structural break tests at the five percent level of significant. This suggests that the Civil War did not increase the level of industrial production, the trend growth rate of industrial production, or the trend and level of industrial production. Indeed, the Civil War does not appear to have been a "watershed" event in the sense that it was a one-time event that permanently altered the level or rate trend growth in Northern industrialization (that otherwise could be classified as a stationary time series) over the period 1840-1900.

We find very different results for the South, however. As shown in Table 3, the null hypothesis of a unit root can be rejected for the structural break model that allows for a break in the trend and intercept at the 5 percent level of significance (but not a break in only the level or trend of industrial production). The Zivot-Andrews methodology estimates the structural break to occur in 1863, the year widely regarded as the turning point in the Civil War when the South lost critical battles at Gettysburg and Vicksburg.

This result is consistent with the simple summary statistics which find that Southern

industrial production declined by more than 50 percent during the Civil War with a

growth rate of -11 percent per annum. The growth rate of Southern industrial increased

from less than four percent in the antebellum period to more than eight percent in the

postbellum period. The large increase in the growth rate of industrial production probably

reflects an increase in the marginal productivity of capital given that a large portion of the

South's capital stock was destroyed so that the region started from a low base in the

postwar period.

We also test the ratio of Southern to Northern industrial production for a

structural break. The results appear in Table 4. The null hypothesis of a unit root can be

rejected in favor of a structural break in both the trend and level of the ratio of Southern

to Northern industrial production. Consistent with the result for the Southern industrial

production series, the Zivot-Andrews procedure again selects the structural break in the

year 1863. Overall, the analysis of the industrial production series suggests that the Civil

War dramatically reduced the level and trend growth rate of industrial production in the

South.

B. Capital and Non-Capital Intensive Industries

We next divide the Northern and Southern industrial production index into capital

and non-capital intensive industries. We define capital intensity as the ratio of capital to

output according to the 1860 U.S. Census. The capital-to-output ratios are presented in Appendix Table 2. We segmented the eight series into two sets of four industries: a capital-intensive IP series, and a non-capital intensive IP series. As in the other IP series, the component indexes were aggregated by their relative importance as defined by their value-added weights.

The capital intensive sector consists of annual production data on 4 industrial sectors: *chemicals, lumber, metals, and textile production*. The non-capital intensive sector includes from the *food, leather, machine, and the newspaper industry*. We split the index into these two groups to determine the extent to which the large decline in Southern industrial production during the war was driven by a reduction in its capital stocks given that investment is an important factor in driving short and long-run growth rates in standard economic models.

Table 5 reports descriptive statistics for the Northern capital and non-capital intensive industries. Over the entire sample period, capital intensive industries grew at the rate of 6.74 percent while non-capital intensive industries grew at the rate of 5.73 percent. The growth rate of capital and non-capital intensive industries was higher during the antebellum period, especially for capital intensive industries. Following the outbreak of the Civil War, the growth rate of capital intensive industries declined to minus one percent while the growth rate of non-capital intensive industries increased to more than eight percent. Capital intensive industries expanded at the rate of nearly nine percent compared to only two percent for non-capital intensive industries during Reconstruction. During the post-Reconstruction period, capital intensive industries increased more than 6.15 percent versus non-capital industries that increased slightly less than seven percent.

Overall, capital and non-capital intensive industries grew slightly slower during the postbellum period than before the Civil War. Figure 3 suggests that this was indeed the case as capital and non-capital intensive display a positive trend over the entire sample period. The ratio of Northern capital intensive to non-capital intensive industries, reported in Figure 4.

Table 6 shows that capital intensive industries in the South grew at annual rate of 6.92 percent per annum while non-capital intensive industries grew at a rate of 5.2 percent per year. During the antebellum period, capital intensive grew at a rate of 2.58 percent per year versus 5.88 percent for the non-capital industries. Figure 5 shows that the two industrial production series track one another reasonable well before the Civil War. Consistent with the industrial production index, capital intensive industries experienced a minus 16 percent growth rate during the war. Non-capital intensive industries contracted at a rate of nearly seven percent per year. In the post-war period, Table 2 shows that the growth rate for capital and non-capital intensive industries exceeded 12 and 4 percent, respectively, during Reconstruction. Figure 5 shows that the capital intensive sector began to diverge from the non-capital intensive sector following the removal of US troops from the South in the late 1870s as well as the 1880s. The high growth rates in the capital intensive sector probably reflect the fact that the South's industrial base was starting from a very low base following the Civil War given that a large portion of the region's capital stock had been destroyed.[8] Indeed, the 12.9 percent growth rate experienced during Reconstruction is driven by growth in capital intensive

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[8] For a discussion of the economic impact of the Civil War on capital intensity and labor productivity, see Hutchinson and Margo (2004).

industries in 1865 and 1866. When these two years are taken out of the analysis, the growth rate falls to 6 percent during the period of Reconstruction.

The South's industrial base increased dramatically in the Post-Reconstruction period. As shown in Table 7, the growth rate of the capital intensive sector is 12.59 percent while the growth rate of the non-capital sector increased to more than seven percent. Figure 6 shows that the ratio of Southern capital intensive industries to non-capital intensive industries experiences a "take-off" right after the end of Reconstruction. The ratio of Southern capital to non-capital intensive industries rises from an index value of approximately one in 1876 to more than 5 in 1897. The large increase in the ratio suggests that the end of Reconstruction and the removal of United States troops in the South increased led to greater security of Southern property rights. The Southern propertied classes that held most of the wealth in the South were now less concerned about the possibility of expropriation risk by US military forces that governed the former Confederate states. Given that the peculiar institution had been abolished, the Southern property classes felt that they could invest their capital in new ventures (as opposed to slaves) without the risk of confiscation by Union forces.

To gain some additional insight into the "take-off" experienced by the Southern capital intensive sector after Reconstruction, we compare the ratio of the Southern capital intensive sector to the Northern capital intensive sector. This comparison should help isolate the impact of global and nationwide shocks (like a recession) on Northern and Southern capital intensive economic activity. As shown in Figure 6, the ratio begins the sample at a value of nearly three in 1840 that gradually falls to one by the outbreak of the Civil War. After the war, the capital ratio between the two regions fluctuates around the

value of one-half until the end of Reconstruction. The ratio of the Southern capital intensive index to the Northern capital intensive index then experiences a dramatic rise, increasing from a value of less than one-half in 1877 to nearly 1.7 by the end of the sample period.

As an additional check, we compare the ratio of the Southern non-capital intensive industries to the Northern non-capital intensive sector. The non-capital intensive sector should be less susceptible to secure property rights given that these types of firms typically employ less fixed capital such as a factory or big machine. Figure 8 shows that the ratio of Southern non-capital intensive to Northern non-capital intensive industries fluctuates between .2 and .4 for most of the post-Reconstruction period. We interpret this evidence consistent wit the interpretation that increased security of Southern property rights in the South in the post-Reconstruction period encouraged fixed capital investment by properties Southern as well as attracting greater investment from Northern entrepreneurs seeking a higher return on their investment.

C. Agriculture

One potential shortcoming of the analysis of Southern industrial production is that prior to the Civil War, the South's industrial sector accounted for anywhere from 10 to 30% of Southern economic activity, depending upon how one classifies agricultural-related activities such as cotton ginning, rice cleaning, and sugar refining.[9] In the decade leading up to the Civil War, the South's share of U.S. industrial production averaged about one – although a fraction of the North's – was growing quickly.

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[9] Bateman and Weiss (1981).

To address this issue we collected data on US cotton production for the period 1840-1900. Since this was the most important cash crops in the South and was primarily produced in the former Confederate states, we believe that the time series provides insight into the economic impact of the Civil War on the Southern economy. [10] Figure 9 shows the natural log of US cotton production from 1840-1900. Production generally displays an upward trend with a break in cotton production that coincides with the outbreak of the Civil War. Cotton production grew at the annual rate of almost seven percent in the antebellum period. Production declined by -38 percent during the Civil War. The Union blockade of Southern ports basically meant that the Confederacy shipped very little cotton to Europe during most of the war. The exception was the first year of the war when the Confederacy imposed a cotton embargo that was designed to deprive the Lancashire mills of cotton and bring England into the war. Following the war, cotton production gradually recovered over a period of years. Cotton production grew at the rate of nearly 8.9 percent during Reconstruction. Despite the rapid growth rate, cotton production did not reach 1859/1860 levels of cotton production until 1875. The growth rate of cotton slowed slightly more than five percent in the postbellum period as the South began to diversify its agricultural sector and develop its manufacturing base.

Figure 9 suggests that the war dramatically decreased the level of cotton production in the South and that it took a long time for the South to transition from a slave economy. We test cotton production for a structural break using the Zivot-Andrews methodology. The results of the Zivot-Andrews tests are reported in Table 7. The empirical analysis suggests that the Civil War reduced the level of cotton production. The crash test can reject the null hypothesis of a unit root in favor of a decline in the level of

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[10] In the future, we plan to assemble agricultural output indices for tobacco, rice, and sugar.

production at the one percent level of significance. We do not find evidence that the war altered the rate of trend growth in cotton production, however. The general empirical specification that allows for both a drop in the level of production as well as a change in the trend growth rate can reject the null hypothesis of a unit root at the 5 percent level of significant. The empirical analysis of cotton production suggests that the primary impact of the Civil War was to permanently reduce the level of cotton production. There is some empirical evidence that the conflict also reduced the trend growth rate in cotton production. The result is consistent with the interpretation that the war and the abolition of slavery was a difficult and costly transition for the Southern economy that was based on slavery.

D. Interpretation of Empirical Results

Although the empirical results suggest that the North did not experience a take-off in industrial production as a result of the Civil War, this does not rule out the possibility that the war had some positive effects on American industrialization. One important element of the Hacker-Beard hypothesis is that the Civil War led to the passage of new legislation such as the National Banking Act and tariffs. The National Banking Act improved the nation's financial system by establishing a set of basic regulations. Tariffs protected infant American industries from foreign competition allowing infant American industries to grow and develop new technologies. Although these institutions may have promoted industrialization, it is possible that the economics effects of these measures were not immediately felt in the economy. Another possibility is that increased savings

by the United States government in the years after the Civil War spurred economic development (Williamson, 1974; James, 1984). A larger supply of loanable funds may have increased investment that promoted American industrialization.

For the South, the empirical analysis suggests that industrial production in the region was decimated by the war. The destruction of the industrial sector appears to have been much larger than previous studies have suggested based on an analysis of decadal benchmarks (Lerner, 1962). The empirical analysis suggests that the South returned to its 1860 levels of industrial production by 1870-71. The South's share of industrial production did not return to its 1860 levels until the mid-to-late 1890s. The take-off in Southern industrial production appears to have largely taken place for many capital intensive industries after the end of Reconstruction and the removal of Northern forces from the South. The end of Reconstruction probably reduced uncertainty regarding the security of property rights for wealthy landowners in the South who began to invest in capital intensive industries.

IV. Conclusion

What was the long-run economic impact of the Civil War? How did the Civil War impact the economies of the North and South? We provide some insight into these questions using new indices of Northern and Southern industrial production before, during, and after the Civil War (as opposed to an analysis based on census benchmarks). Our empirical results suggest that the Civil War had little economic impact on the level or growth rate of industrial production in the North –as shown by the absence of a

structural break in the empirical analysis. The growth rate of industrial production in the North was approximately the same in the antebellum and postbellum period.

The Civil War appears to have had a dramatic impact on the level and growth rate of industrial production in the South. We find that industrial production in the South declined more than 50 percent during the Civil War. Although the growth rate of Southern industrial production accelerated to more than 10 percent in the post-war period following the end of Reconstruction, the high growth rate probably reflects two factors. Reconstruction marked the end of Union military occupation in the South. This reduced uncertainty regarding property rights for wealthy Southerners who began to invest in capital intensive industries.

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Wilmington Daily Journal, various issues.

APPENDIX 1: NORTH AND SOUTH IP INDEX COMPONENTS

General notes

This appendix briefly describes (by major industry group) the series underlying the new industrial production indices for both the North and the South. Unless stated otherwise, the construction of—and sources for—the North and South component series are identical to those used to construct the broader U.S. IP index component in Davis (2002) and Davis (2004a). In those instances, the reader is referred to the unpublished companion Technical Data Appendix (Davis [2004b]) that is available on the NBER website at http://www.nber.org/data/industrial-production-index/ for more copious details and a complete list of citations. Unless noted below, both the North and South IP component series span the 1840-1915 sample period. In all cases, overlapping or separate data sources were checked for consistency, revisions, and transcription errors. Occasional annual gaps in Southern data coverage were interpolated.

Additional supplementary sources for Southern industrial production statistics included regular Southern city commerce reports, especially those for Charleston, Galveston, Mobile, New Orleans, Richmond, Savannah, and Wilmington, North Carolina. We obtained commerce statistics from the *Mobile Board of Trade Annual Report, Savannah Board of Trade Annual Report*, and the *Texas Almanac*, as well as from the following Southern newspapers: *Charleson Mercury*, *Charleston News and Courier, Commercial and Merchant's Magazine, DeBow's Review, Flake's Bulletin, Galveston Tri-Weekly News, Galveston Weekly News, Mobile Daily Register, New Orleans Commercial Bulletin, New Orleans Times Picayune, Savannah Morning News, Savannah Republican,* and *Wilmington Daily Journal*.

We also collected shipment data from annual reports from several Southern railroad companies, including the Richmond and Petersburg Railroad, the Richmond and Danville Railroad, the Petersburg Railroad, the South Carolina and Georgia Railroad, the Virginia and Tennessee Railroad, and the Virginia Central Railroad. Finally, we collected shipment data along two Virginia canals—the James River & Kanawha Canal, and the Dismal Swamp Canal—from consulting various issues of the *Annual Report of the Board of Public Works of Virginia*, and various issues of the *Annual Report of the Railroad Commissioner of the State of Virginia*.

Transportation Equipment and Machinery

Ships, merchant vessels
Northern series: Gross tonnage constructed annually in the North of all types of merchant rigs, including the four major specialty classes (clippers, packets, steamers, and whalers), tabulated ship-by-ship from published and unpublished U.S. government records, historical society archives, and published ship registries.
Southern series: Gross tonnage constructed annually in the Southern states of all types of merchant rigs, including the four major specialty classes (clippers, packets, steamers, and whalers), tabulated ship-by-ship from published and unpublished U.S. government records, historical society archives, and published ship registries.

Ships, naval vessels
Northern series: Displacement tonnage of U.S. Navy vessels constructed annually at both private and government yards in the North.
Southern series: Displacement tonnage of U.S. Navy vessels constructed annually at both private and government yards in the Southern states, as well as Confederate vessels constructed in Southern ports during the Civil War.

Locomotives
Northern series: Annual number of locomotives manufactured by all Northern firms and railroad company shops. This comprehensive database totals more than 110,000 engines produced by Northern firms between the years 1840 and 1915.
Southern series: Annual number of locomotives manufactured by all Southern firms and railroad company shops. This comprehensive database totals more than 4,000 engines produced by Southern firms between the years 1840 and 1915.

Fire engines, hand-powered
Northern series: Annual number of fire engines constructed by Northern firms, as derived from various builder lists, historical society records, fire museum archives, and fire department histories. The series captures the "death" of the domestic industry in 1914, and an estimated two-thirds of nineteenth-century domestic production..
Southern series: Southern output between the years 1840 and 1915 was zero according to both Census records and our database.

Fire engines, steam-powered
Northern series: Annual number of steam-powered fire engines constructed by Northern firms, as derived from various builder lists, historical society records, fire museum archives, and fire department histories. The series captures the "death" of the domestic industry in 1914, and an estimated two-thirds of nineteenth-century domestic production..
Southern series: Southern output between the years 1840 and 1915 was zero according to both Census records and our database.

Initial Coverage: 1790 (Product first commercially produced in the U.S. in 1852; earlier observations are recorded, by definition, as zero in the index; component receives only 1880 value-added weight in the index).
Details: Direct measure. Units delivered, expressed in engine capacity of gallons per minute. I obtained construction and specification information have been obtained on over 4,000 engines from builder and fire department records. The series is comprehensive, and captures the birth and death of the domestic industry.

NOTE: Series names below should match exactly the names in the IP VA-w table…

Series 1: **Anthracite coal**
Sample period: 1840–1900 (full coverage)
Details: Northern output is directly measured by the production of Pennsylvania anthracite coal, in net tons. Coverage is comprehensive. The Northern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE). Southern output is zero, as anthracite coal was only produced in the North.

Series 3: **Beef cattle receipts**
Initial Coverage: 1827
Details: Indirect measure. Head of beef cattle received during the calendar year at Brighton market and at Chicago stockyards. Author's tabulations from contemporary newspapers, trade journals, and published research.

Series x: **Bituminous coal and coke**
Sample period: 1840–1900 (full coverage)
Details: Northern and Southern production was constructed from state-level output series. Coverage is comprehensive. The sum of the Northern and Southern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE).

Series 6: **Copper consumption**
Initial Coverage: 1806
Details: Indirect measure. Domestic smelter output, plus imports of all unwrought copper exported from all British ports, in long tons. Author's tabulations from British and U.S. government records.

Series 7: **Copper smelting**
Initial Coverage: 1790 (Product first commercially mined in the U.S. on a large scale in 1845; earlier observations are recorded, by definition, as zero in the index).
Details: Direct measure. Smelter production, recoverable content, in short tons, obtained from U.S. government publications. Complete industry coverage.

Series x: **Cotton textiles**
Sample period: 1840–1900 (full coverage)
Details: As in Davis (2002, 2004a), the production of cotton textiles and apparel items is quantified conventionally through the consumption of raw cotton and linters over the twelve-month period ending in August when the cotton crop was predominantly marketed. Quantities are expressed in equivalent five-hundred-pound bales (gross weight) as reported by the U.S. Census Bureau, and account for cotton consumed at textile mills and by households under the putting-out contract system. The Northern (Southern) series was derived from the annual estimates of cotton "taken by Northern (Southern) mills and spinners" that were regularly reported in various issues of the *New York Shipping List* and the annual reports of the New York Chamber of Commerce.

Series 9: **Crude tin imports**
Initial Coverage: 1815
Details: Indirect measure. Unwrought tin from mines of the United Kingdom, British colonies, and foreign countries, exported to U.S. by all vessels from all British ports, in long tons, from the *Sessional Papers*.

Series 10: **Die-sinking**
Initial Coverage: 1793
Details: Direct measure. U.S. coin production of all denominations, in grams (weight; not face value). Author's tabulations from price guides, based on U.S. government records and private research.

Series 11: **Dyeing chemicals**
Initial Coverage: 1790 (Product first commercially produced in the U.S. in 1834; earlier observations are recorded, by definition, as zero in the index).

Details: Direct measure. Pounds of prussiate of potash (potassium ferrocyanide) made by Carter & Scattergood and Henry Bower Chemical Manufacturing Company. Author's tabulations from firm archives. The Philadelphia chemical firm of Carter & Scattergood was the first and largest American manufacturer of yellow and red prussiate of potash, which were industrial dyeing agents utilized in calico printing, fabric-making, blueprinting, etc. Series possesses survivorship bias.

Series 13:   Firearms
Initial Coverage: 1790 (Product first commercially produced in the U.S. in 1793; earlier observations are recorded, by definition, as zero in the index).
Details: Direct measure. Military and commercial small arms made (all models), by federal and state armories, contractors, and private firms. Author's tabulations from published and unpublished U.S. government records, firm archives, and published firm studies. Gunsmiths and firearm manufacturers represented in the component series account for approximately one-half of total U.S. firearm production.

Series 14:   Fish curing
Initial Coverage: 1804
Details: Direct measure. Salted mackerel barrels inspected in Massachusetts (until 1877) and New England (thereafter), as reported in U.S. government publications. Nearly complete industry coverage.

Series 15:   Gold mining
Initial Coverage: 1804
Details: Direct measure. Mined output at refinery stage, in fine ounces, as reported in U.S. government publications. Complete industry coverage.

Series 16:   Gunpowder
Initial Coverage: 1804
Details: Direct measure. Pounds of gunpowder and explosives produced by interests of E.I. du Pont de Nemours Powder Company, tabulated from firm archives. Series overstate the secular industry growth and possess survivorship bias.

Series 18:   Hide receipts
Initial Coverage: 1827
Details: Indirect proxy for leather tanning and curing. Receipts of domestic and foreign dried & green hides at New York City and Chicago, the premiere leather-tanning centers of the nineteenth century. Author's tabulations from contemporary newspapers and trade journals.

Series 19:   Hog packing
Details: Direct measure. Quantities of hogs packed in Cincinnati, Chicago, Indianapolis, and Omaha. Author's tabulations from contemporary newspapers, trade journals, and published research. Minor data adjustments were necessary.

Series 20:   Lead smelting
Initial Coverage: 1821
Details: Direct measure. Primary smelter production, in short tons until 1885; refined output thereafter, as reported in U.S. government publications. Complete industry coverage.

Series 22:   Lumber shipments
Initial Coverage: 1827
Details: Direct measure. Shipments in feet board measure (b.f.) from ten distinct river booms, seaside ports, and wholesale districts that represent virtually all of the principal lumber-producing regions of the nineteenth century. Author's tabulations from contemporary trade journals and various published studies.

Series 24:   **Milled wheat flour**
Initial Coverage: 1798
Details: Direct measure. Barrels received or manufactured in Baltimore, Buffalo, Chicago, and Minneapolis. Author's tabulations from contemporary trade journals and various published studies.

Newspaper publishing
Sample period: 1840–1900 (full coverage)
Details: As in Davis (2002, 2004a), newspaper circulation is indirectly measured by the number of daily newspapers in circulations. Coverage is comprehensive. The sum of the Northern and Southern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE).

Petroleum refining
Sample period: 1840–1900 (full coverage). Crude petroleum was first produced in the U.S. in 1859; earlier observations are recorded, by definition, as zero in the index.
Details: Production of crude petroleum is measured in 42-gallon barrels. Annual production figures in the Northern and Southern states were aggregated from state-level production data collected by the U.S. Geological Survey. Since crude oil was not produced in the South until the mid-1880s or later, the Southern series is not reflected in the South IP index.

Series 28:   **Pig iron production**
Initial Coverage: 1827
Details: Direct measure. Gross tons produced. Author's tabulations from various published and unpublished sources. For complete details, see Section D of the companion Technical Data Appendix.

Series 29:   **Pipe organs**
Initial Coverage: 1790
Details: Direct measure. Author's tabulations of more than 22,000 units constructed from various published and unpublished sources. Comprehensive industry coverage.

Series 30:   **Pocket watches**
Initial Coverage: 1790 (Product first commercially mined in the U.S. in 1851; earlier observations are recorded, by definition, as zero in the index; component receives only 1880 value-added weight in the index).
Details: Direct measure. Author's tabulations of more than 80 percent of movements produced from various unpublished historical society records and published studies.

Series 31:   **Raw silk imports**
Initial Coverage: 1814
Details: Indirect measure of silk consumption. Raw, thrown, and waste silk of U.K., British colonies, and foreign countries (including China and India), exported to U.S. by all vessels from all British ports, in pounds, from the *Sessional Papers*.

Series xx: **Rice cleaning and rice flour**
Sample period: 1840–1900 (full coverage)
Details: Southern production is measured as the cleaned rice equivalent of the rough rice crops, in pounds. Coverage is comprehensive. The Southern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE). Northern output is zero, as rice was almost exclusively cleaned and milled in the South.

Series 33:   **Salt production**
Initial Coverage: 1797
Details: Direct measure. Inspected 56-pound bushels of processed salt (all types), at all New York salt wells and reservations, and from all Michigan salt producers. Author's tabulations from state government records. New York and Michigan were the preeminent salt-producing states during the nineteenth century.

Series 34:   **Sole leather receipts**

Initial Coverage: 1827

Details: Direct measure. Inspected receipts of sole leather sides, including hemlock sole, union sole, and oak sole, in New York (prior to Boston consignment). Author's tabulations from contemporary reports and trade journals. New York City's receipts of domestic heavy sole leather offer a reasonable measure of the output of civilian shoes and other finished leather products because New York City was the largest leather market at this time, and because sole leather was the primary component in boots and shoes.

Series xx: **Sperm oil refining**

Sample period: 1840–1900 (full coverage)

Details: Northern output is measured in the barrels of sperm oil returned to Northern ports by the American whaling fleet. Coverage is nearly universal. The Northern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE). Southern output is zero, as sperm oil was exclusively processed in Northern (primarily New England) ports.

Series 37:   **Steel production**

Initial Coverage: 1790 (Product first commercially mined in the U.S. in 1866; earlier observations are recorded, by definition, as zero in the index; component receives only 1880 value-added weight in the index).

Details: Direct measure. Thousands of net tons produced through open-hearth and Bessemer processes, as reported in contemporary trade journals. Nearly universal industry coverage.

Series 38:   **Sugar refining**

Initial Coverage: 1790

Details: Indirect measure. Domestic production of refined sugar consumption, converted to pounds. Author's tabulations from U.S. government publications. Related series spliced in 1822. Nearly universal industry coverage.

Series 39:   **Telescopes**

Initial Coverage: 1790 (Product first commercially produced in the U.S. in 1830; earlier observations are recorded, by definition, as zero in the index).

Details: Direct measure. Refractors and reflectors, in inches of objective. Author's tabulations from published and unpublished records of historical societies and its members. Comprehensive industry coverage.

Series xx: **Whalebone**

Sample period: 1840–1900 (full coverage)

Details: Northern output is measured in pounds of processed baleen whalebone. Coverage is nearly universal. The Northern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE). Southern output is zero, as whalebone was only processed in Northern (primarily New England) ports.

Series xx: **Whale oil refining**

Sample period: 1840–1900 (full coverage)

Details: Northern output is measured in the barrels of whale oil returned to Northern ports by the American whaling fleet. Coverage is nearly universal. The Northern series is identical to the U.S. IP component in Davis (2002, 2004a??-QJE). Southern output is zero, as whale oil was exclusively processed in Northern (primarily New England) ports.

Series 42:   **Wool stockings**

Initial Coverage: 1808

Details: Direct measure. Pairs of woolen stockings and half stockings made. Author's tabulations from U.S. government archives. Fairly comprehensive industry coverage.

Series 43:   Zinc smelting

Initial Coverage: 1790 (Product first commercially mined in the U.S. in 1858; earlier observations are recorded, by definition, as zero in the index; component receives only 1880 value-added weight in the index).

Details: Direct measure. Primary smelter production, in short tons until 1906; mine recoverable content thereafter, as reported in U.S. government publications. Minor data corrections. Complete industry coverage.

Table 1
Northern and Southern Industrial Production
Growth Rates
(percent per annum)

Period	North	South
Whole Period (1840-1900)	6.02	5.75
Antebellum(1840-1860)	6.62	3.72
Civil War(1861-1865)	3.56	-11.69
Reconstruction(1865-1877)	5.16	5.73
Post-Reconstruction		
Postbellum(1865-1900)	5.96	8.85

Table 2
Zivot-Andrews Structural Break Tests for Northern Industrial Production

Break Test	Minimum T-Test	Break Date
Intercept	-3.612	1857
Trend	-3.468	1891
Intercept and Trend	-4.089	1855
Observations	61	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3
Zivot-Andrews Structural Break Tests for Southern Industrial Production

Break Test	Minimum T-Test	Break Date
Intercept	-3.268	1863
Trend	-3.598	1875
Intercept and Trend	-4.982**	1863
Observations	61	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4
Zivot-Andrews Structural Break Tests
for the Ratio of Southern to Northern Industrial Production

Break Test	Minimum T-Test	Break Date
Intercept	-3.477	1863
Trend	-3.595	1876
Intercept and Trend	-5.091**	1863
Observations	61	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5
Northern Capital and Non-Capital Intensive Industrial Production, 1840-1900
Growth Rates
(percent per annum)

Period	Capital Intensive	Non-Capital Intensive
Whole Period (1840-1900)	6.74	5.73
Antebellum (1840-1860)	8.04	5.80
Civil War (1861-1865)	-1.09	8.83
Reconstruction (1865-1877)	8.99	2.09
Post-Reconstruction (1877-1900)	6.15	6.92
Postbellum	6.19	5.26

Table 6
Southern Capital and Non-Capital Intensive Industrial Production, 1840-1900
Growth Rates
(percent per annum)

Period	Capital Intensive	Non-Capital Intensive
Whole Period (1840-1900)	6.92	5.20
Antebellum (1840-1860)	2.58	5.88
Civil War (1861-1865)	-16.09	-6.98
Reconstruction (1865-1877)	12.90	4.22
Post-Reconstruction (1877-1900)	12.59	7.77
Postbellum	12.70	6.56

Table 7
Zivot-Andrews Structural Break Tests
for the Ratio of Southern to Northern Industrial Production

Break Test	Minimum T-Test	Break Date
Intercept	-5.48***	1862
Trend	-4.00	1864
Intercept and Trend	-5.475**	1862
Observations	61	

* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1
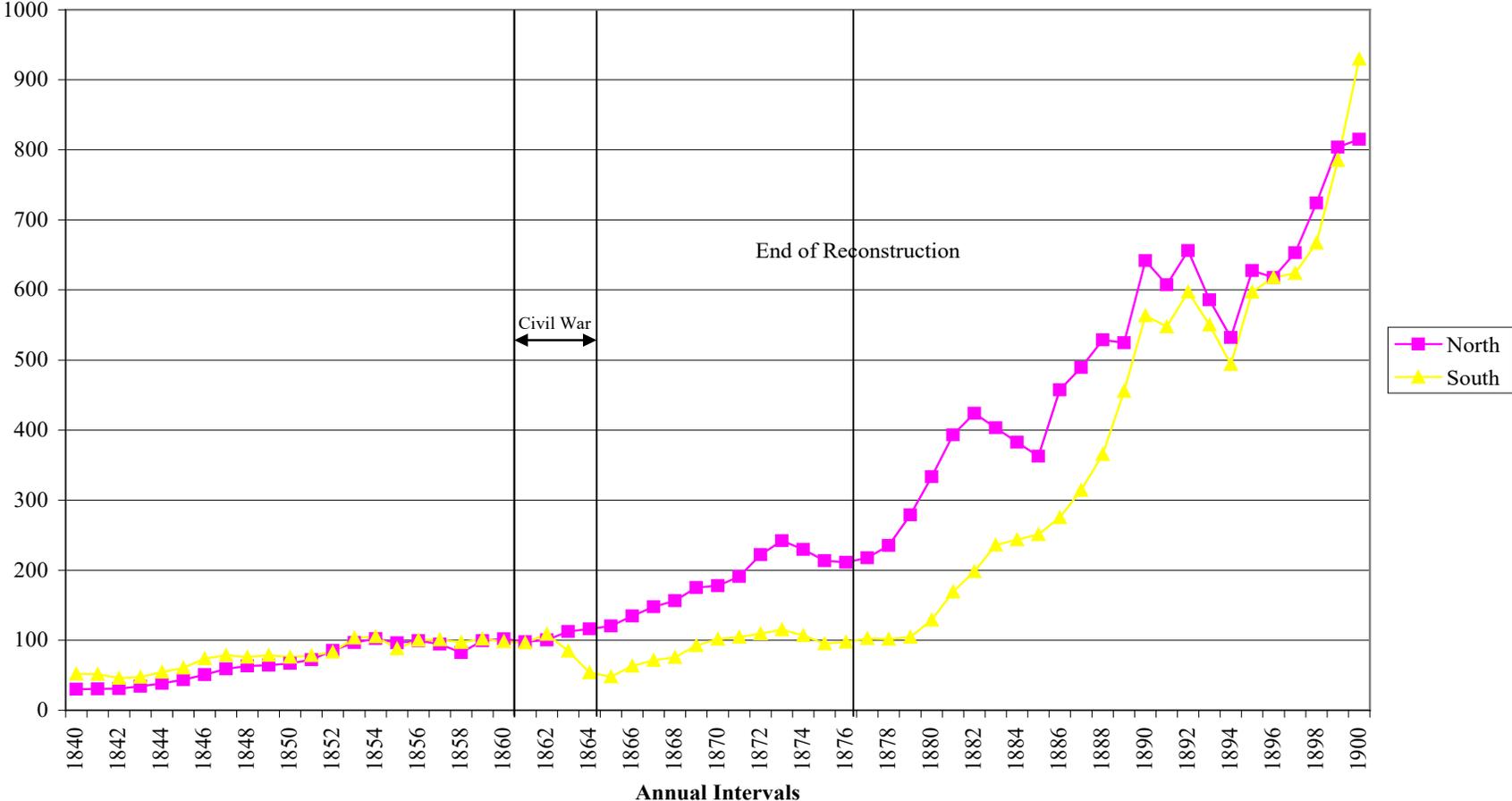## Northern and Southern Industrial Production, 1840-1900
(1859/60=100)

Figure 2
Ratio of Southern to Northern Industrial Production, 1840-1900
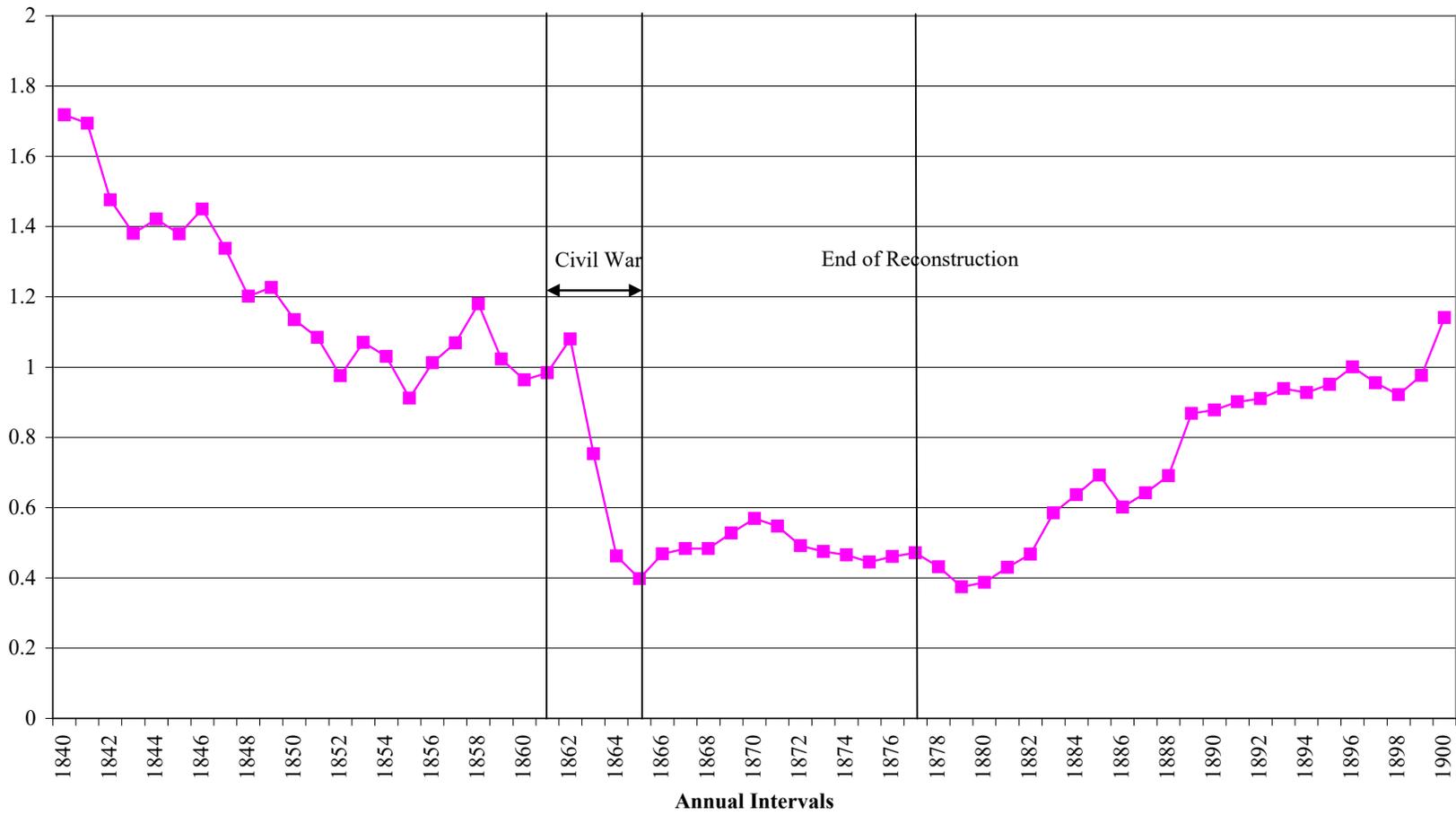**(1859/1860=100)**

Figure 3
Northern Capital and Non-Capital Intensive Industries
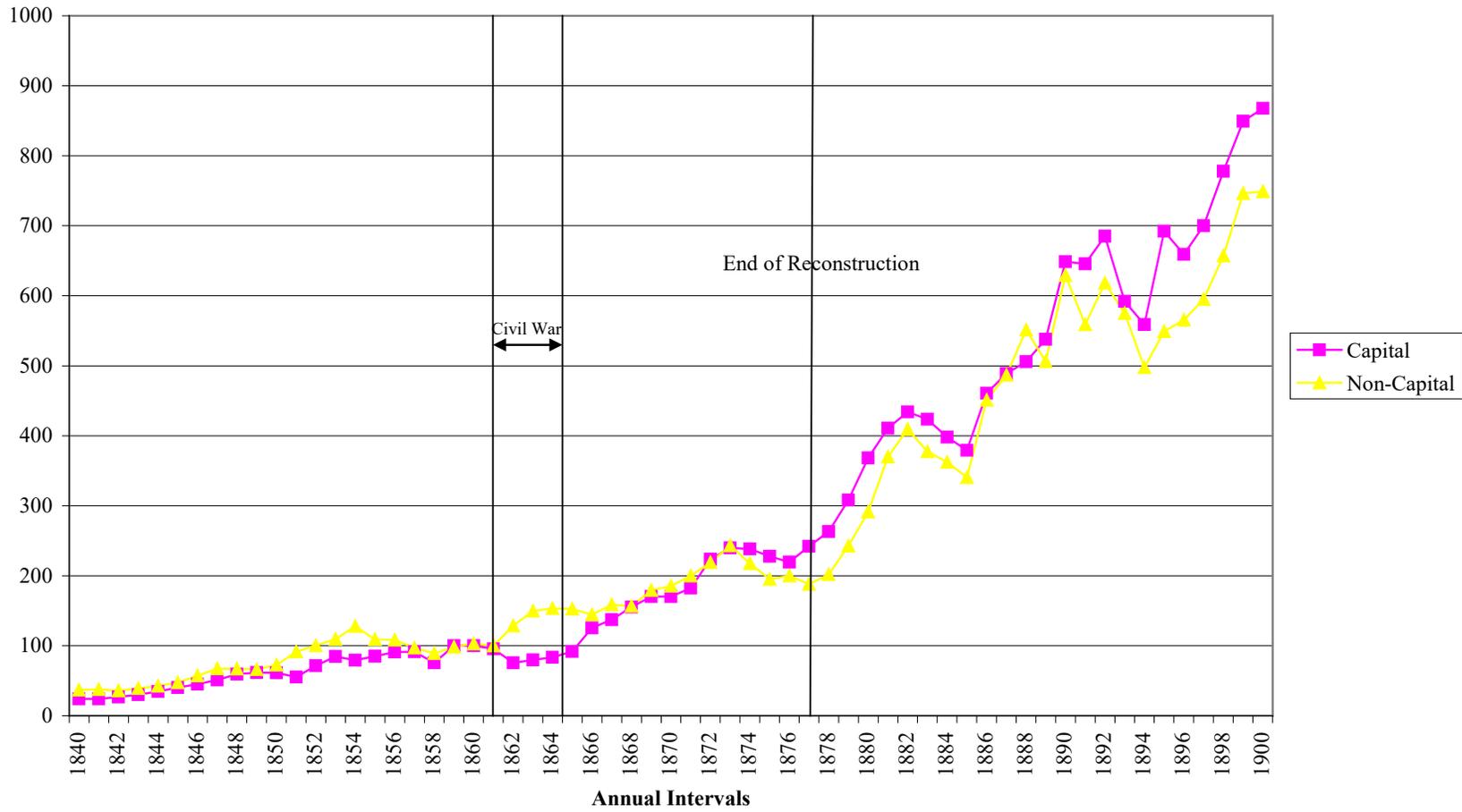**(1859/1860=100)**

Figure 4
Ratio of Northern Capital to Non-Capital Intensive Industries
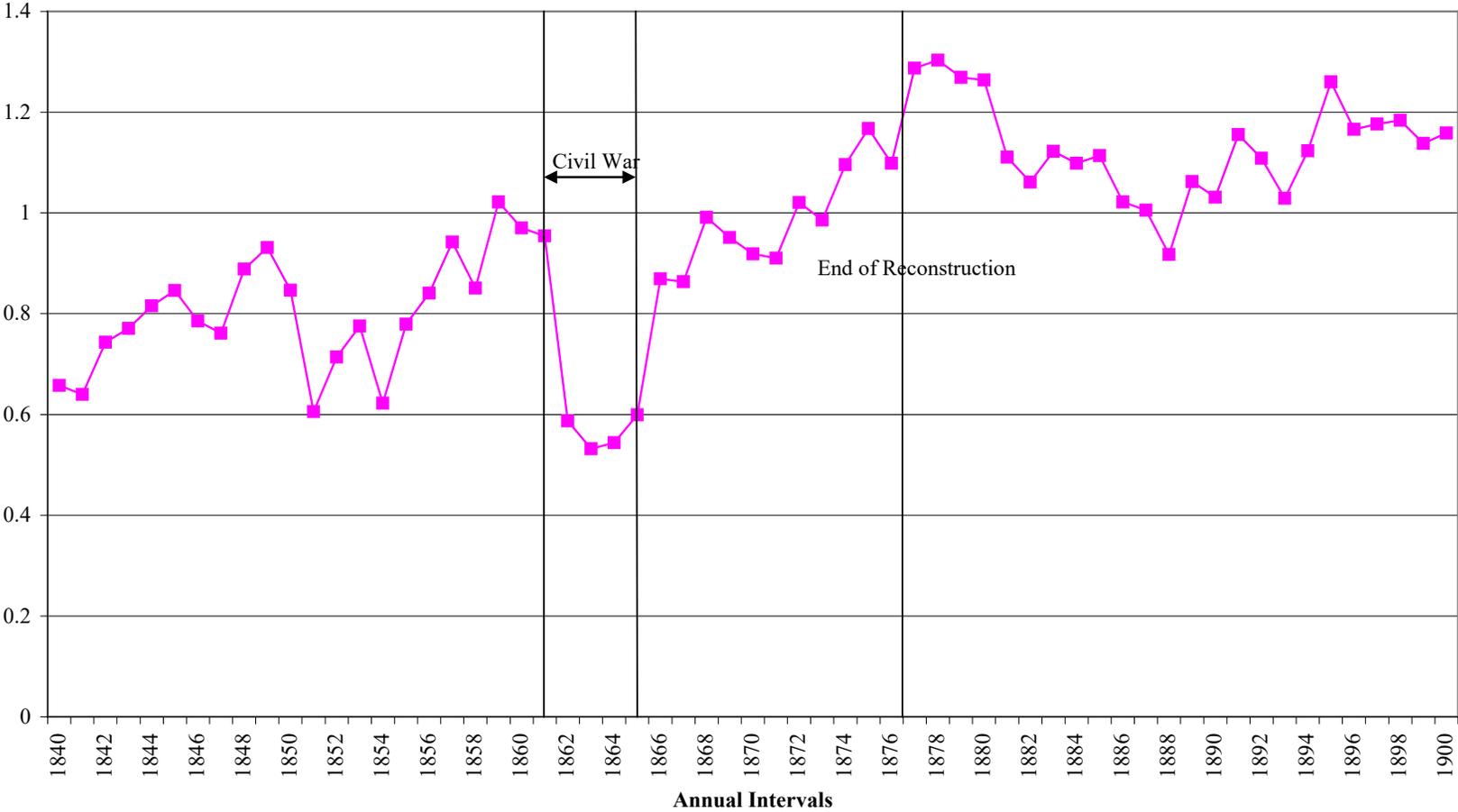**(1859/1860=100)**

Figure 5
Southern Capital and Non-Capital Intensive Industries
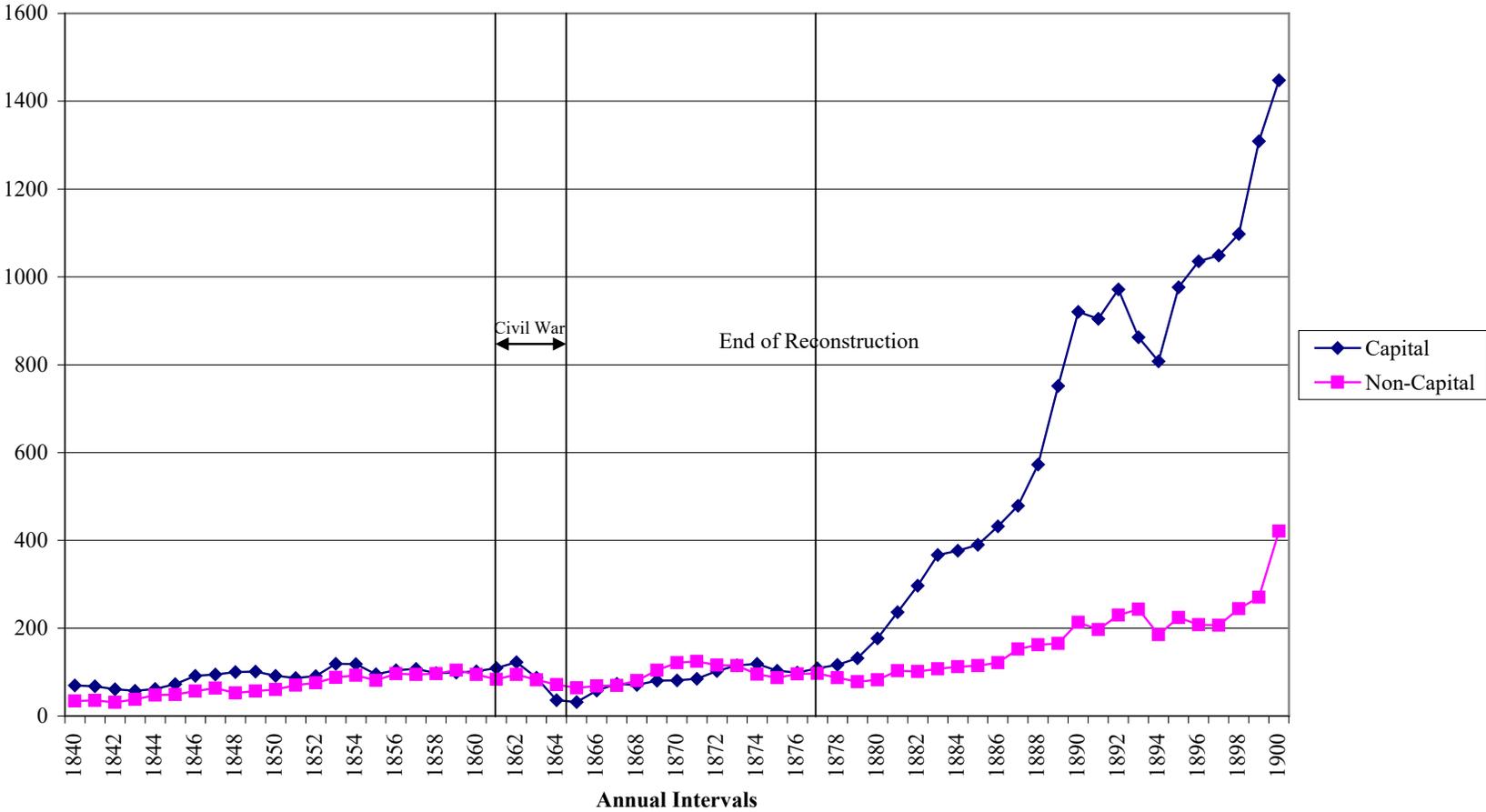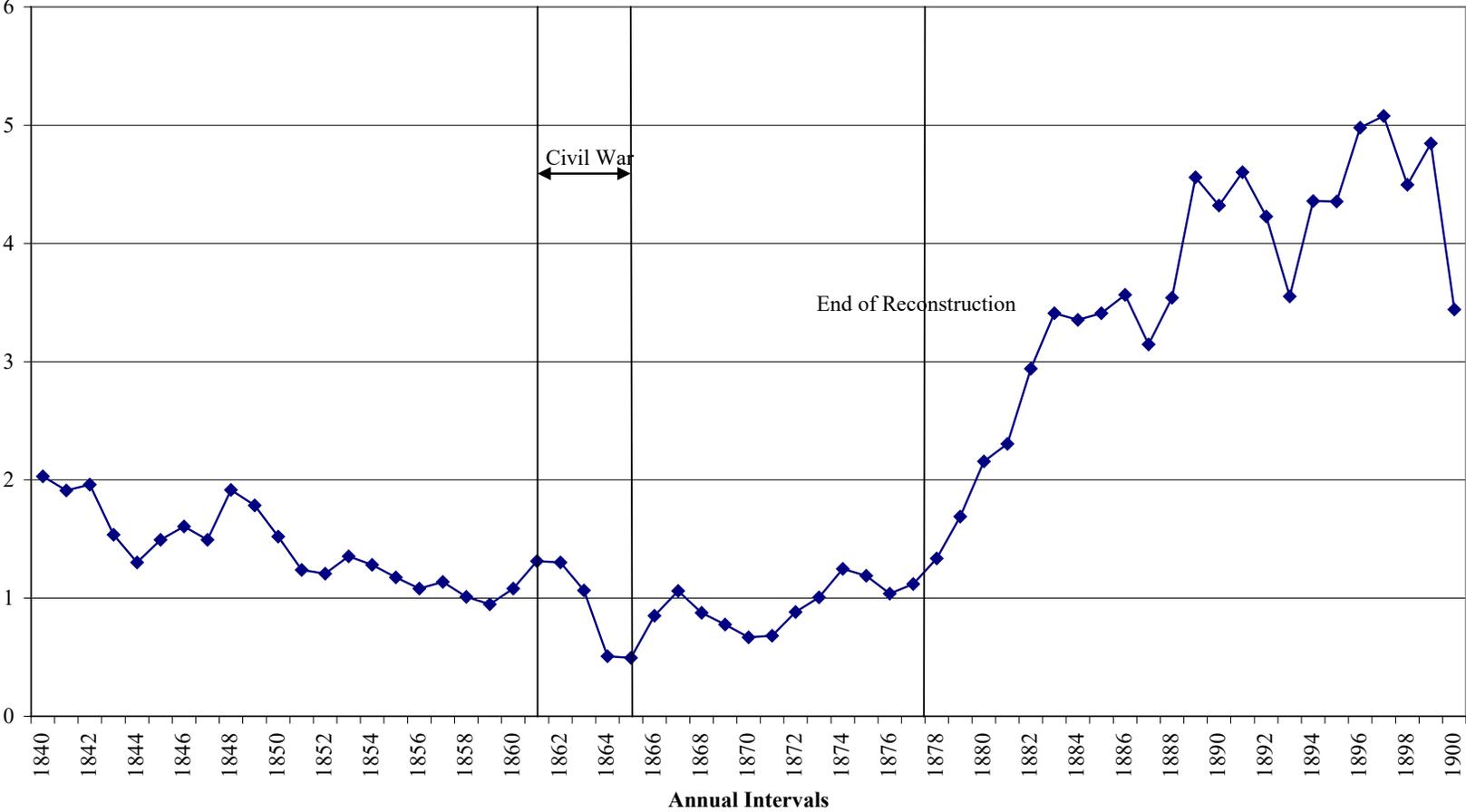**(1859/1860=100)**

Figure 6
Ratio of Southern Capital to Non-Capital Intensive Industries
(1859/1860=100)

Figure 7
Ratio of Southern Capital to Northern Capital Intensive Industries
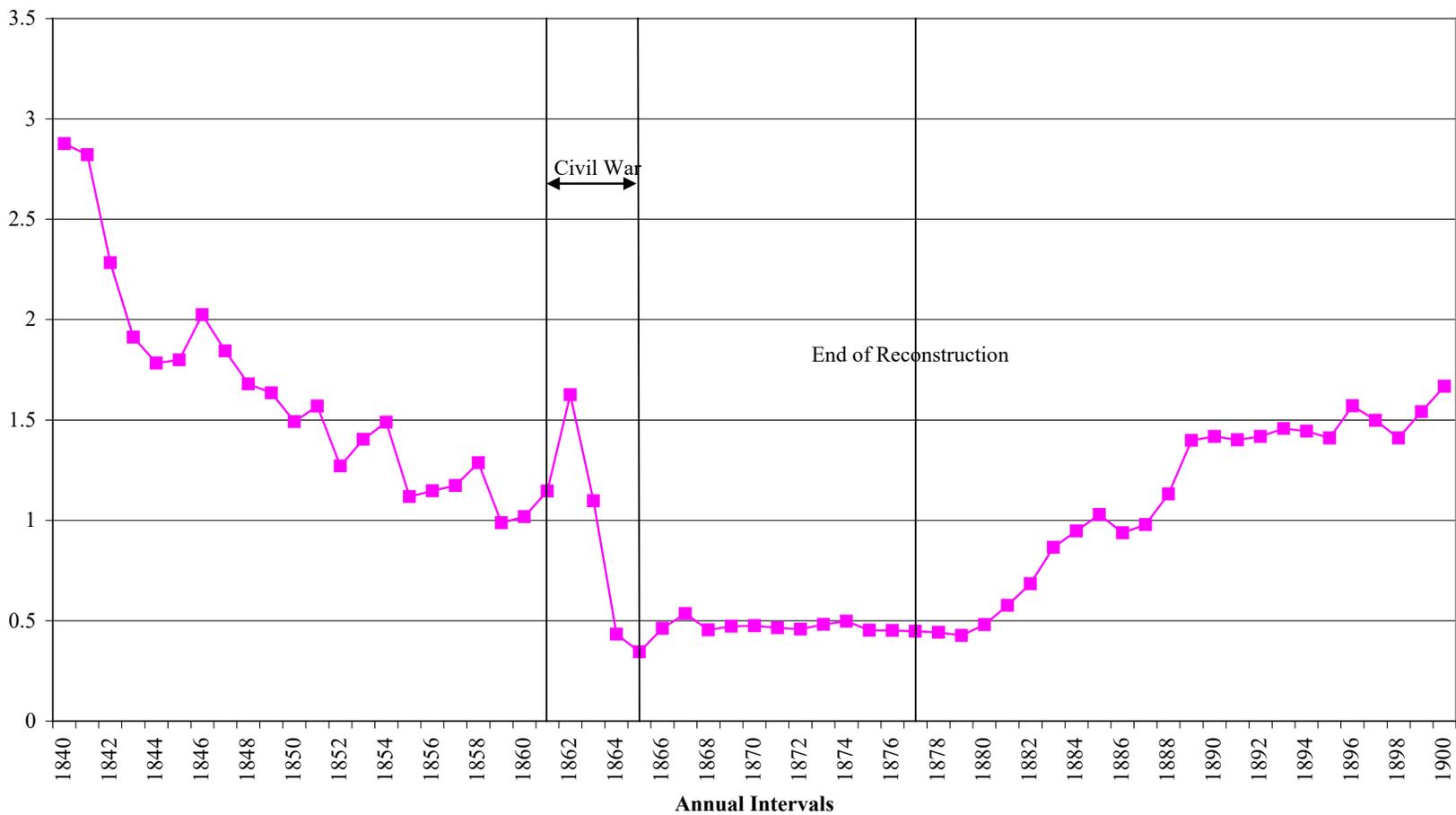**(1859/1860=100)**

Civil War

End of Reconstruction

Annual Intervals

*

Figure 8
Ratio of Southern Non-Capital to Northern Non-Capital Intensive Industries
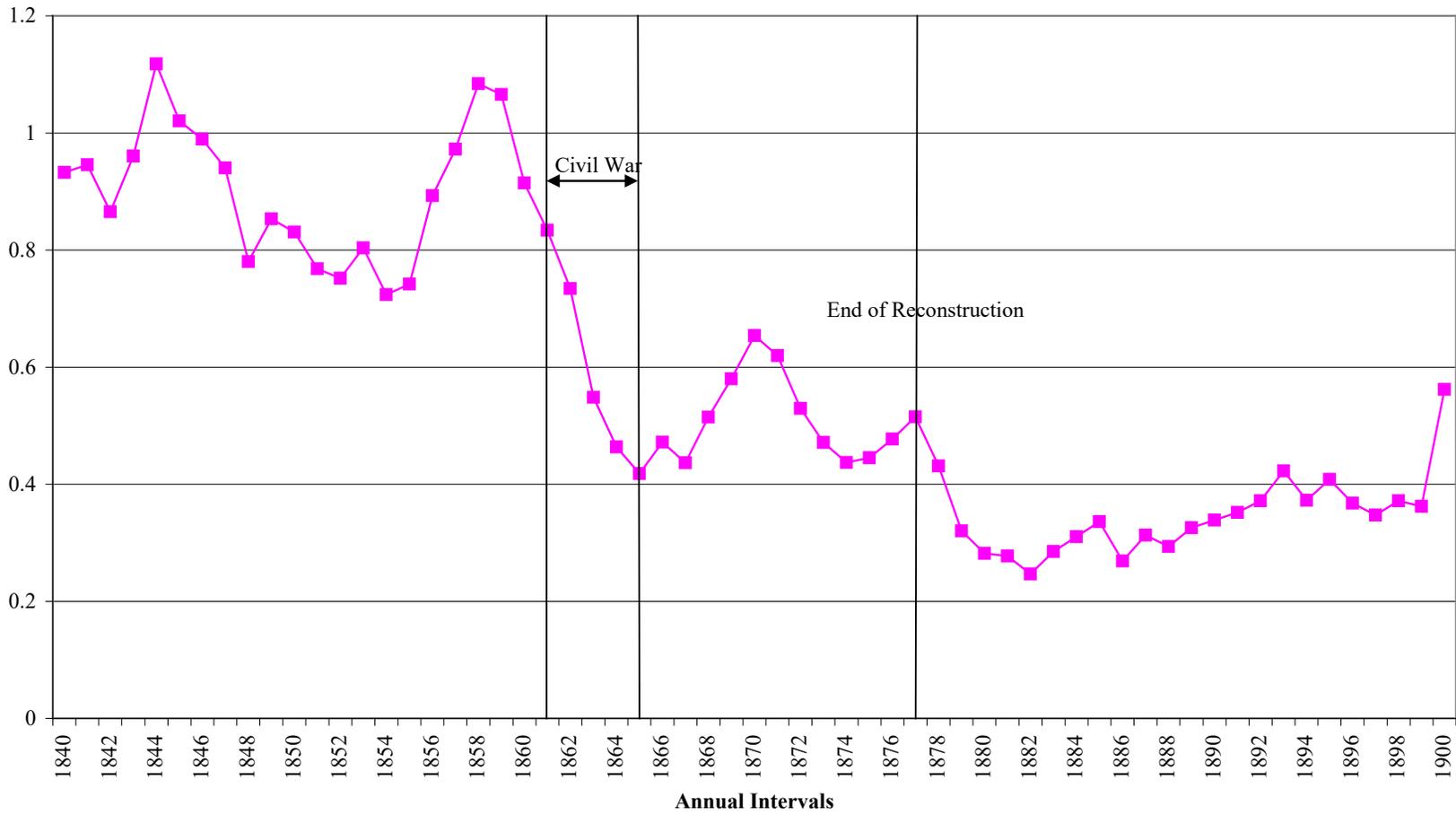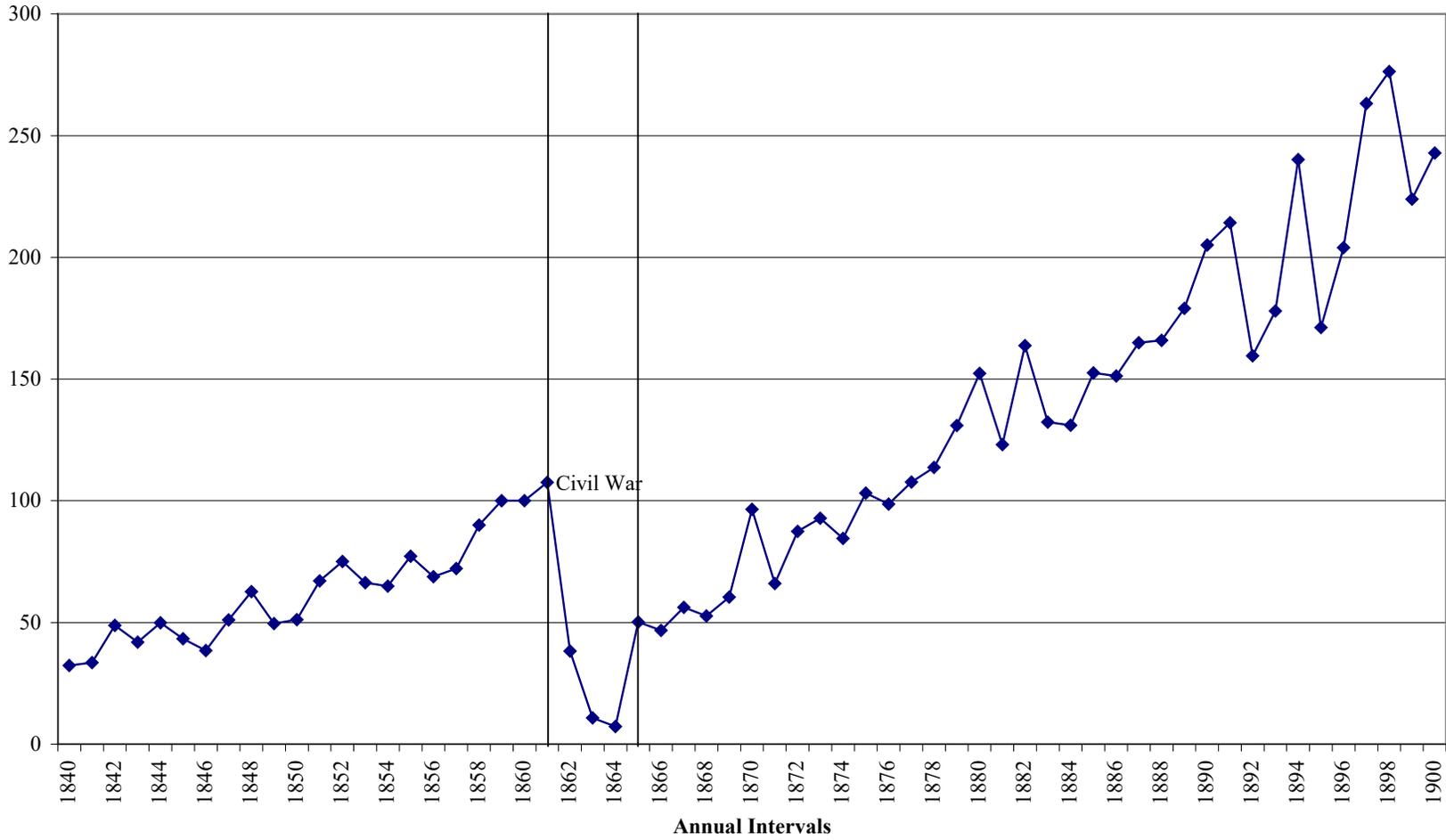**(1859/1860=100)**

Figure 9
US Cotton Production 1840-1900

Appendix Table 1
A LIST OF INDEX COMPONENTS & THEIR RELATIVE IMPORTANCE

1860 value-added weights for IP index, in percentage points

Major industry groups

Quantity-based index component	U.S.	North	South
Food & Kindred Products	***13.8%***	***12.7%***	***24.6%***
Wheat flour	6.7%	6.6%	8.5%
Whiskey (not yet included)	1.6%	1.7%	0.6%
Refined sugar consumption	1.5%	1.7%	0.4%
Hog packing (not yet included)	0.9%	0.7%	3.3%
Beef packing (not yet included)	0.4%	0.3%	1.5%
Bacon (not yet included)	0.5%	0.3%	1.6%
Salted mackerel	0.1%	0.1%	0.0%
Rice cleaning & rice flour	0.0%	0.0%	0.3%
Lard oil and tallow (not yet included)	0.1%	0.1%	0.0%
Cottonseed oil & oil cake (not yet included)	0.0%	0.0%	0.3%
Manufactured chewing tobacco (not yet included)	2.1%	1.3%	8.1%
Textiles & Textile Products	***21.2%***	***22.4%***	***9.3%***
Cotton textiles	20.3%	21.51%	9.0%
Bagging (not yet included)	0.1%	0.1%	0.1%
Cordage and rope (not yet included)	0.7%	0.8%	0.1%
Lumber & Wood Products	***11.7%***	***10.7%***	***22.1%***
Lumber shipments	11.7%	10.7%	22.1%
Printing & Publishing	***6.9%***	***7.2%***	***3.5%***
Newspaper publishing	6.9%	7.2%	3.5%
Chemical & Fuel Products	***8.2%***	***8.2%***	***8.5%***
Anthracite coal	2.5%	2.9%	0.0%
Bituminous coal & coke	2.4%	2.4%	2.5%
Whalebone	0.0%	0.0%	0.0%
Sperm oil refining	0.1%	0.1%	0.0%
Whale oil refining	0.1%	0.1%	0.0%
Petroleum refining	0.5%	0.6%	0.0%
Soap and candles	1.7%	1.9%	0.5%
Turpentine, crude	0.2%	0.0%	1.3%
Turpentine, distilled (spirits of)	0.5%	0.0%	3.8%
Tar and pitch	0.0%	0.0%	0.1%
Rosin	0.0%	0.0%	0.2%
Leather & Leather Products	***11.1%***	***11.5%***	***7.3%***
Sole leather receipts (not yet included)	7.6%	7.9%	4.6%
Dry and green hide receipts	3.5%	3.6%	2.7%
Metals & Metal Products	***12.1%***	***12.4%***	***9.7%***
Pig iron production	9.4%	9.5%	8.6%
Gold mining	1.6%	1.7%	0.3%
Coppersmithing (not yet included)	0.7%	0.7%	0.3%
Lead smelting (not yet included)	0.1%	0.1%	0.1%
Copper mining (not yet included)	0.4%	0.4%	0.5%
Transport Equipment & Machinery	***15.0%***	***15.0%***	***15.0%***
Shipbuilding, merchant vessels	5.7%	4.9%	6.3%
Shipbuilding, naval vessels	1.2%	1.0%	1.3%
Locomotives	5.4%	6.6%	7.4%
Fire engines, hand-powered	0.4%	0.4%	0.0%
Fire engines, steam-powered	0.9%	0.8%	0.0%
Musical pipe organs	0.4%	0.4%	0.0%
Pocket watches	0.7%	0.6%	0.0%
Telescopes	0.2%	0.2%	0.0%

<div align="center">

Appendix Table 2

List of capital-intensive and non-capital-intensive industries

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Industry classification	Ranked on U.S. Census 1860 K/Y ratio	1860 U.S. IP value-added %
Capital intensive industries		**53.2%**
Chemical & Fuel Products	0.707	8.2%
Metals & Metal Products	0.693	12.1%
Lumber & Wood Products	0.685	11.7%
Textiles & Textile Products	0.682	21.2%
Non-capital intensive industries		**46.8%**
Printing & Publishing	0.612	6.9%
Transport Equipment & Machinery	0.568	15.0%
Leather & Leather Products	0.379	11.1%
Food & Tobacco Products	0.353	13.8%