

World War II and the Industrialization of the American South*

Taylor Jaworski[†]

April 6, 2015

Abstract

Until the middle of the twentieth century, regional development in the United States was uneven, with the South lagging behind the rest of the country in terms of income per capita. Substantial investment in the southern economy during mobilization for World War II has led many scholars to conclude that the wars role in postwar industrialization was decisive. This paper reexamines the contribution of World War II-era investment to industrialization in the American South and finds that mobilization was less important than previously thought.

*I thank Briggs Depew, Price Fishback, Dan Fetter, Gautam Gowrisankaran, Theresa Gutberlet, Lila Jaworski, Carl Kitchens, Ashley Langer, Paul Rhode, Jason Taylor, Mo Xiao and seminar participants at Arizona, Michigan, Queen's, Simon Fraser, and Warwick for helpful comments. David Rose provided valuable research assistance. Support for this project was provided by Queen's University, National Science Foundation Grant #1155957, the John E. Rovensky Fellowship, and a Humane Studies Fellowship. All remaining errors are my own.

[†]Queen's University, Department of Economics (email: tjaworski@gmail.com).

1 Introduction

What is the role of the state in industrialization and regional development? For countries at or near the technological frontier, one view of the state’s role is to provide national defense, secure property rights, and facilitate contracting. However, a large theoretical literature studies how in the absence of institutions to coordinate investment or in the presence of barriers to technology adoption, private incentives may not maximize social welfare (North, 1981; Murphy, Shleifer, and Vishny, 1989; Olson, 2000; Acemoglu and Johnson, 2005). As a result, some industries or regions may lag behind and national governments may intervene to promote national growth, for example, through industrial policy, special economic zones, or infrastructure improvements.

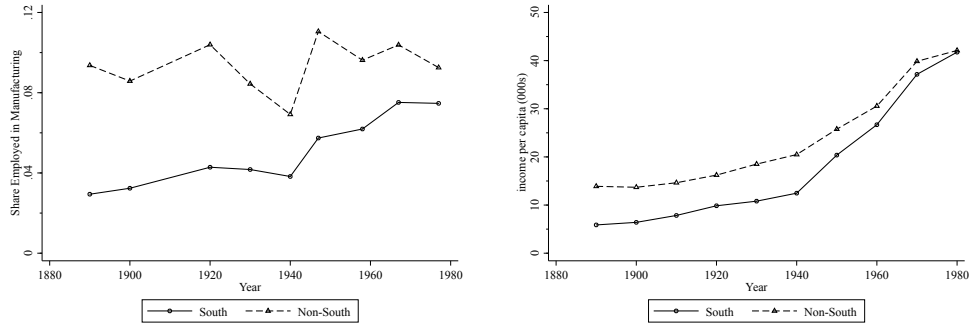
Throughout the first half of the twentieth century, regional development in the United States was uneven. Until 1940, the South lagged behind the rest of the country in terms of industrialization (Figure 1A) and income per capita (Figure 1B).¹ Starting in the 1930s, the federal government intervened in part to alleviate these regional disparities. During mobilization for World War II, the government made substantial investment in manufacturing, which resulted in a doubling of the South’s capital stock (Deming and Stein, 1949). This paper examines the contribution of this investment to changes in the region’s industrial structure after 1945.

Specifically, this paper quantifies the spillovers from new industrial facilities constructed during World War II to postwar growth of manufacturing and the reallocation of activity across sectors within the American South. In this period, over 1500 projects were completed with investment totaling nearly \$1.6 billion. These facilities were often more capital intensive, attracted skilled labor, and embodied new technology relative to the typical southern manufacturing establishment prior to 1940.² In the postwar period, the South did converge with the rest of the country in terms of industrial structure and income per worker (Barro and Sala-i-Martin, 1991, 1992; Kim, 1995, 1998; Mitchener and McLean, 1999, 2003). However, the specific contribution of World War II is not well understood.

¹The southern states are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, and Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Alaska and Hawaii are excluded from the “rest of the country.”

²For example, in shipbuilding, aircraft, and aluminum.

Figure 1: Manufacturing and Income Per Capita by Region



A. Manufacturing Share

B. Income Per Capita

Notes: In Panel A, share employed in manufacturing is calculated by taking the number of wage earners in manufacturing divided by the closest previous decennial census year. See footnote 1 for the states included in the “South” and “Non-South.”

Source: Data for the manufacturing share in Panel A are from Haines (2010) and for income per capita in Panel B are from Turner, Tamura, Mulholland, and Baier (2007).

The construction of new facilities during World War II may have created agglomeration economies that subsequently attracted manufacturing activity in the postwar period. This would have occurred if these facilities embodied new technology and forms of industrial organization or if war production helped develop thicker markets for intermediate inputs. Empirically, the key question is whether these benefits were outweighed by the costs of increased local input prices or if there were disamenities associated with war production.³

The empirical analysis in this paper compares manufacturing outcomes in southern counties that were more (or less) exposed to the construction of new manufacturing facilities as a result of mobilization for World War II. The specifications control for a county’s prewar suitability for war production by including variables for the Industrial Mobilization Plan⁴ as well as latitude and longitude to capture changes in southern agriculture that may have influenced industrial development. After conditioning on these variables, counties with different exposure to new facility construction exhibit similar prewar trends. The empirical analysis then quantifies the size of spillovers due to World War II.

³In some instances, migration to places experiencing the wartime boom strained access to housing, child care, schools, and hospitals.

⁴This was a plan that was devised throughout the late 1920s and 1930s, but never executed. In particular the plan surveyed the manufacturing capacity available for war production in the event of an emergency. Since this reflects manufacturing capacity already in place prior to the war, I use it as a control variable so that my estimates capture the effect new facilities construction due to actual mobilization.

The data for this paper draw on newly digitized information on the location of manufacturing facilities constructed in the South between 1940 and 1945. I merge these data with aggregate information on manufacturing as well as detailed establishment data by sector at the county level. These data have two advantages. First, investment in structures is identified separately from investment in equipment. This ensures that variation in the “proximity” to the war economy is due to facilities that potentially embodied new technology, and not equipment that could be redeployed elsewhere at the end of the war.⁵ Second, sector-level data on establishments links variation in the size of the war economy locally not only to changes in aggregate manufacturing, but also the reallocation of activity across sectors. This is useful in the context of southern manufacturing, which before World War II tended to have lower wages and value-added per worker due to its sectoral composition.⁶

Mobilization for World War II generated substantial economic activity in the southern economy between 1940 and 1945. The South accounted for 32.6 of total investment, despite receiving only 13.3 percent of spending on prime contracts and up only 14.0 percent of the nation’s manufacturing value-added in 1940. However, from the war’s end until 1960, the empirical results indicate no differential growth in aggregate manufacturing activity or in the wholesale sector due to World War II. In the postwar period, the retail sector (i.e., number of establishments, employment, and sales) expanded and total population increased in counties more exposed to mobilization for war.

Within manufacturing, I find some evidence for reallocation of activity across sectors. Immediately following the war the number of establishments in rubber goods, metals, machine tools, and transportation equipment was higher. However, these effects were short lived, which suggests that new facilities constructed during World War II played only a small role in changing the composition of industrialization in the postwar American South. The small magnitude is consistent with evidence that capital redeployed after World War II (White, 1980) and at the end of the Cold War (Ramey and Shapiro, 2001) sold at large discounts. Together, these results suggest that any positive spillovers generated by mobilization

⁵There is a literature that documents a positive relationship between equipment investment and growth across countries (e.g., De Long and Summers, 1991). Within the United States (across counties), equipment was potentially more footloose, which motivates my focus on investment in structures.

⁶In 1940, annual compensation for wage earners in the southern states was \$844 versus \$1,232 in the rest of country and value-added per worker was, respectively, \$2,238 versus \$2,946.

were temporary, small, and outweighed by disamenities.

This paper contributes to the literature on the economic impact of World War II (Higgs, 1989; Field, 2011; Rockoff, 2012). The focus of this literature has typically been on the implications of war spending for the size of the fiscal multiplier (e.g., Barro, 1981; Fishback and Cullen, 2013) or capital accumulation (e.g., Gordon, 1969). My contribution is to link spending on new facilities specifically to changes in local economic activity both within and across sectors. Also, my focus on a particular region (i.e., the South) and one type of capital (i.e., construction of new facilities) helps to ameliorate the problems that arise when treating war-related spending as homogenous. Later in the paper, informed by additional information on individual investment projects, I discuss how these issues impact the interpretation of the results.

In addition, another part of this literature focuses on the relationship between mobilization for war and regional development within the South.⁷ For example, Bateman, Ros, and Taylor (2009) use variation in spending on infrastructure (e.g., roads, schools, waterworks, power plants, dams, airfields, and hospitals) during World War II across states. In my empirical analysis, I exploit cross-county variation to investigate the impact of investment in new facilities. In this way, my work is related to recent papers that examine the effect of industrial-type policies on southern industrialization (Holmes, 1998; Kitchens, 2014; Kline and Moretti, 2014a).

2 Historical Background

2.1 *Southern Industrialization*

In the antebellum period, rapid economic growth in the South was not accompanied by large-scale industrialization. Manufacturing capital and output was less than one-fifth the value in the North by 1860 (Wright, 1978, p. 110), but southern per capita incomes grew faster than the national rate between 1840 and 1860 (Fogel and Engerman, 1974, p. 248). Many historians have proposed explanations for the South's failure to industrialize, e.g., the region's comparative advantage in export agriculture (e.g., cotton as well as sugar, rice and tobacco).

⁷There is also a literature on regional development in the West, particularly along the Pacific Coast (Nash, 1985, 1990; Rhode, 2000, 2003).

After 1880, the southern economy changed. A national market emerged to support a growing cotton textile sector, along with other industries closely linked to resource extraction. Attracted by local boosterism, mill villages sprang up across the South and rates of urbanization increased, although never to rates comparable with the North). Throughout this period, productivity remained low as did capital investment and rates of new technology adoption and a diversified industrial economy that could serve as the region's engine of growth did not emerge (Wright, 1986; Carlton and Coclanis, 2003).⁸

Continuing into the first half of the twentieth century, industrialization in the South lagged behind other regions. As in the antebellum period, the lack of access to capital remained a key constraint on the growth and diversification of industry. Textile mills were, for the most part, funded locally and usually in small amounts. In addition, the region's other large sector, lumber and wood products, contributed little to local economic development. As a result, the clusters of economic activity that stimulated demand for innovation and fueled the birth of new industries in the Northeast and across the Upper Midwest never emerged (Lamoreaux and Sokoloff, 2001).

In the 1930s, persistent regional inequalities attracted the attention of national policymakers. During the New Deal, legislation was passed to address the regional imbalances. For example, the Agricultural Adjustment Act sought to raise agricultural prices and encourage modernization on the farm and the Tennessee Valley Authority aimed to improve infrastructure and provide cheap access to fertilizer and electricity. Still, in 1938, the preface to the *Report on Economic Conditions* of the South declared the region, "the Nation's no. 1 economic problem" (US National Emergency Council, 1938) and on the eve of World War II many observers concluded the South faced fundamental obstacles to economic development.

2.2 *Mobilization for World War II*

By the time war broke out in Europe in 1939, the United States had acquired considerable capacity to mobilize, manage, and fight a modern war. Stemming from failures during World War I (e.g., overlapping demands for inputs, price inflation, unfilled contracts, wasted goods) the (National Defense Act, 1920, p. 764) laid the foundation for "the adequate provision of the mobilization of material and industrial organization essential for wartime

⁸For example, the South did not use labor-saving devices used in New England textile mills or the mechanized sawmills of the Pacific Northwest.

need”. The results were impressive. Between 1939 and 1945, American manufacturers produced over 300,000 aircraft, 6,000 military ships and merchant vessels, nearly 90,000 tanks and 350,000 trucks, as well as 6.5 million rifles and 40 billion bullets, to equip 16 million servicemen (Klein, 2013, pp. 515-516).

At first, mobilization proceeded slowly. For example, in 1939 and 1940, toolmakers were putting out fewer than 25,000 pieces of equipment per year and the rate of production actually decreased near the end of 1941 (Klein, 2013, pp. 65-66, 265).⁹ With the attack on Pearl Harbor the pace of mobilization accelerated and by the end of 1942 the majority of new war plants were built or construction was underway. Roughly half of the facilities producing war-related goods were located in the industrialized Northeast and Upper Midwest. However, for a variety of reasons, including patronage, security, congestion, weather, and the availability of labor, raw materials and land, other regions (e.g., the South and West) also received a substantial portion of spending on contracts and capital (Koistinen, 2004, p. 298).

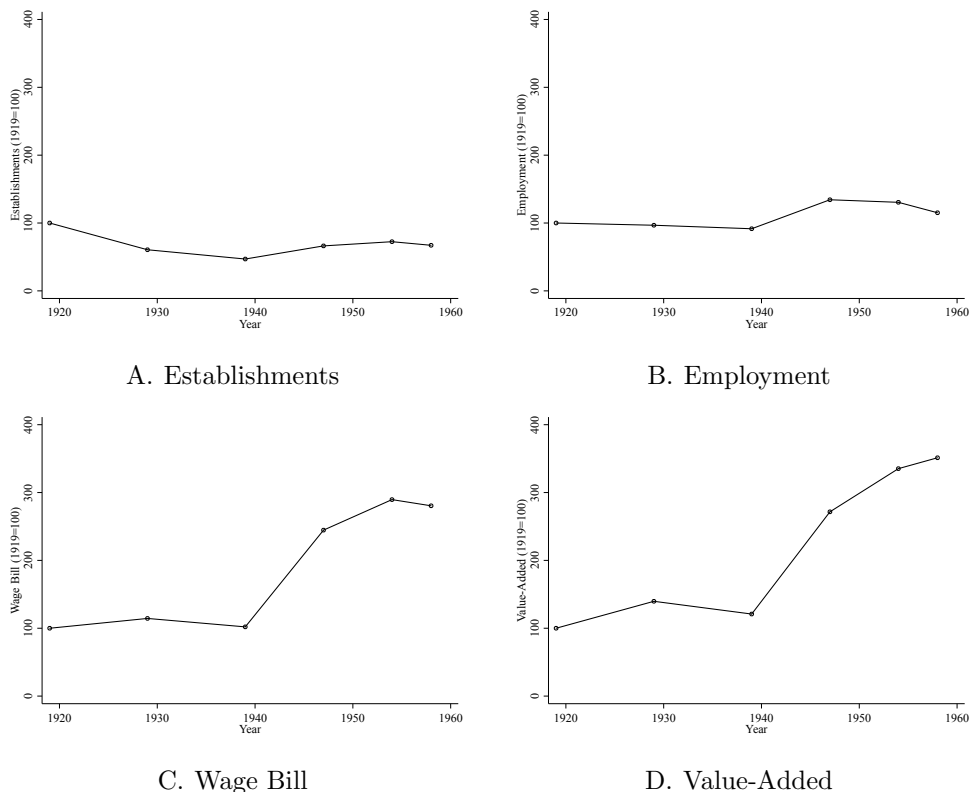
By the end of the war spending on supply contracts and investment in new facilities and equipment in the South was more than \$20 billion. Although the South as a whole received less than other regions and southern cities received a smaller share than Detroit, Buffalo, Chicago, and Los Angeles, the relative gains were substantial.¹⁰ The southern trade magazine, *Manufactures’ Record*, routinely boasted, “South’s expansion breaks all records” (quoted in Schulman, 1991, p. 95). Capital expenditures in the South, which made up roughly one-tenth of the national total in the prewar period, nearly doubled during the war. In total, the South accounted for 23.1 percent of wartime plant construction and 17.6 of expansions (US War Production Board, 1945; Deming and Stein, 1949).

In some industries the South enjoyed a particular boom. The region dominated synthetic rubber and developed new competencies in steel and non-ferrous metals. Combat in the Pacific had cut off most supplies of natural rubber; alcohol and petroleum were necessary inputs into synthetic rubber and both were available in the South. And although the

⁹To put the extent of the war-created demand in context, “two of three war factories built by the government and operated by Studebaker, for example, each required 3,488 pieces of equipment; the third needed 13,000 machines”.

¹⁰Figure A1 plots the share of value-added by manufacturing in 1940 against the share of wartime capital expenditures for counties in the South and elsewhere. On average, the figure shows that the South received a share of investment spending greater than what would be predicted by its prewar share of manufacturing activity.

Figure 2: Trends in Aggregate Manufacturing in the US South



Notes: Each panel shows the given variable relative to its value in 1919. The values in Panel C and Panel D are in 2014 dollars.

Source: Data are from Haines (2010).

iron and steel industry continued to concentrate in the cities of the Upper Midwest, new centers were established along the Gulf Coast. The war created at least temporary clusters in other industries as well (e.g., aircraft in Marietta, Georgia, shipbuilding in Panama City, Florida). In general, the wartime expansion accounted for a large portion of the newly available manufacturing capacity (Schulman, 1991; Combes, 2001; Colten, 2001).

The pace of industrial expansion during wartime led one observer to declare that by the end of the war, “The South, therefore, in January 1945 was no longer the nation’s No. 1 economic problem” (Rauber, 1946, p. 1). Indeed, the changes in southern manufacturing shown in Figure 2 indicate clear differences in terms of manufacturing establishments, employment, wage bill, and value-added. Still, the specific link between mobilization for World War II, increased economic activity during the war, and the growth of manufacturing in the South in the postwar period is an open question.

3 Theoretical Model

This section uses a simple theoretical model to illustrate the relationship between mobilization for World War II and postwar manufacturing.¹¹ The model has one manufacturing sector and firms in county c choose labor N_c , capital K_c , and land X_c , to solve the following problem:

$$\max_{N_c, K_c, X_c} f(\omega_c, N_c, K_c, X_c) - p_c^N N_c - p_c^K K_c - p_c^X X_c$$

where p_c^N , p_c^K , and p_c^X denote the price of labor, capital, and land, respectively. The ω_c term is a productivity shifter that is county-specific and, in part, depends on the number of new facilities constructed during mobilization for World War II. Manufacturing firms sell their output in international markets, which is normalized to one, and purchase capital services in international markets so p_c^K is exogenous to local demand. The supply of land is fixed in each county c .¹² The supply of labor to firms in c is determined by the number of workers residing in the county and the workers' indirect utility is a function of wages, the cost of housing, and the value of local amenities. Workers are freely mobile across counties.

During World War II, manufacturing productivity increased due to wartime investment embodying new technology and forms of industrial organization. After the war, capital-owned by the government was sold off to private firms, usually at a discount, and firms that received capital subsidies as a result of production for government contracts redirected inputs toward output for consumer markets. In the absence of consumption disamenities or agglomeration spillovers, the increase in productivity due to mobilization for World War II increases [CHECK tense] labor demand and, correspondingly, wages and housing costs. However, the war may have led to a deterioration in the quality of housing, hospitals, schools, etc., and therefore offset the gains in productivity. Alternatively, the war may have generated economies of agglomeration through improvements in worker training, intermediate input markets, transportation, and technology, that continued to benefit manufacturers in the postwar period. As a result, wages may increase further (i) to compensate for a decline in the value of consumption amenities or (ii) despite rising local input prices in response to the

¹¹The model here follows the exposition in Hornbeck and Keskin (forthcoming).

¹²This assumption is not too restrictive if access to capital markets is similar across all counties or if differences are constant within a county over time.

lasting benefits from the war economy.

To summarize the impact of mobilization for World War II, consider the change in manufacturing profits in the short run by taking the total derivative of profits with respect to war-related facilities construction assuming that firms are price taker and pay all inputs according to their marginal product:

$$\frac{d\Pi_c}{dW_c} = \left(\frac{\partial f}{\partial \omega_c} \times \frac{\partial \omega_c}{\partial W_c} \right) - \frac{\partial p_c^N}{\partial W_c} N^* - \frac{\partial p_c^X}{\partial W_c} X^* \quad (1)$$

The first term on the right-hand side of equation (1) captures the net of the positive effects that work through improvements in worker training, intermediate input markets, transportation, and technology, and the negative effects that result from the deterioration of the quality of housing, hospitals, schools, etc. The last two terms capture the effect of changes in local input prices. The empirical analysis tests the predictions implied by equation (1) using data on aggregate manufacturing, the number of establishments and employment by sector, and the cost of housing.

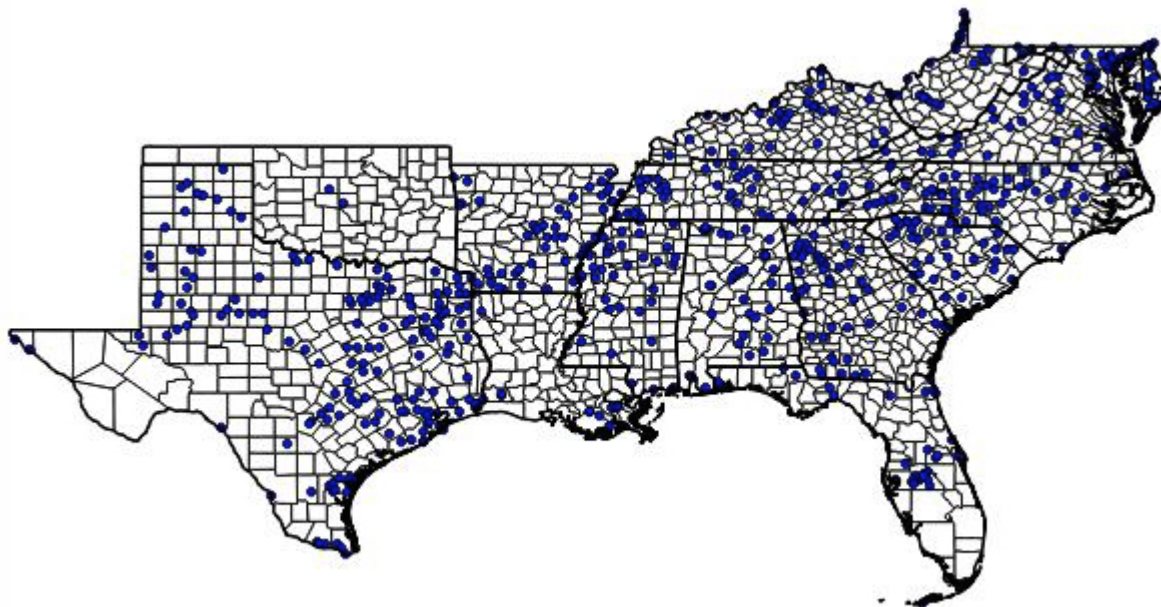
4 Data

The data for the empirical analysis are drawn from several sources. First, county-level information on aggregate manufacturing, wholesale and retail trade, and the housing sector is taken from (Haines, 2010). In particular, I make use of information on value-added, employment, and the number of establishments for manufacturing in 1919, 1929, 1939, 1947, 1954, and 1958. Similarly, for the wholesale and retail sectors I use information on total sales, employment, and establishment over the same period. Second, I digitized county-level information on the number of establishments by manufacturing sector from various years of the Census of Manufactures as well as the *Industrial Market Data Handbook of the United States*.

Third, data on the construction and location of investment in structures were collected from *War Manufacturing Facilities Authorized through December 1944 by State and County* published by the War Production Board.¹³ These data provide the most comprehensive view of individual investment projects during mobilization for World War II. In particular, the

¹³I identify investment in structures by summing the number projects listed in *War Manufacturing Facilities*, which excludes projects valued at less than \$25,000.

Figure 3: Location of WWII Facilities in the US South



Notes: The dots (in blue) show the location of investment in structures during World War II.
Source: See text of Section 4.

fact that the data end in December 1944 is not too concerning since most new construction was already planned or underway by this time and these are included in *War Manufacturing Facilities*. These data also indicate whether the source of financing was directly public or private and give the month and year the new capital investment became available. Although some new establishments were financed directly by the private sector, the owner still benefited from indirect subsidies due to, for example, accelerated depreciation. For this reason, in the main results I use both types of investment and later in the paper as robustness show the results for public and private separately. I also show results by the average cost per project to give a sense of how heterogeneity in the quality or size of investment during wartime may have affected the value of investment in the postwar period.

Finally, to construct a measure of prewar manufacturing capacity related to military production I use the Industrial Mobilization Plan collected by Fishback and Cullen (2013). These data give the number of establishment assigned to each branch of the military in the event of war mobilization plans set up in the 1930s from the US Joint Army and Navy Munitions Board (1938). As additional county-level controls, I include information from

1940 on population density, the share of population living urban area as well as the foreign and African-American population shares from Haines (2010).

The empirical analysis uses all counties in the southern states, which include Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, and Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The result is a balanced panel of 1,272 counties. Figure 3 shows the city of each establishment constructed as part of mobilization for World War II overlaid on the 1920 county boundaries. The total number investment projects in the South during World War II was 1,658. The map in Figure 3 indicates at least one facility was located in each southern state: Texas had the most at 437 and Delaware had the fewest at 35. For the empirical analysis I construct a county-level variable, W_c , by aggregating these city-level observations.

5 Empirical Framework and Prewar Trends

The empirical analysis quantifies the relative magnitude of spillovers from investment in structures due to mobilization for World War II. Specifically, I regress a manufacturing outcome, Y_{ct} , for county c and year t on the indicators for the number of newly constructed manufacturing facilities during World War II:

$$Y_{c,t} = \alpha_c + \alpha_{st} + \beta_{1t}1\{W_c = 1\} + \beta_{2t}1\{W_c = 2\} + \beta_{3t}1\{W_c \geq 3\} + \Gamma_t \mathbf{X}_c + \epsilon_{c,t} \quad (2)$$

The excluded variable is an indicator for W_c equal to zero, so that the estimated β s capture the difference relative to counties that had no war-related construction. In addition, these indicators are interacted with year effects for each postwar year in the sample (i.e., 1947, 1954, and 1958) to trace out changes over time in the impact of mobilization for World War II.

Equation (2) includes additional controls for prewar differences in county characteristics that may predict differential growth in the postwar period. The vector \mathbf{X}_c includes indicators for the number of facilities allocated under the Industrial Mobilization Plan as well as the population density and the African-American, foreign, and urban shares of the county population in 1940. These characteristics are interacted with year fixed effects to allow for differences in the rate of conditional convergence. Differencing equation (2) controls time-invariant differences in county characteristics. State-year fixed effects control unobserved

differences at the state level that impact regional industrialization. For the postwar period, changes in state policy following the passage for Taft-Hartley in 1947 played a substantial role in the growth of manufacturing shown in Figure 2 (see Cobb, 1982; Holmes, 1998).

Table 1 presents summary statistics for the aggregate manufacturing outcomes used in this study. Each column of Panel A shows the results from regressing the given manufacturing outcome (in log) measured in 1939 on indicator for the number of World War II investments, $W_c \in (1, 2, 3+)$. The results reveal substantial differences between counties in terms of prewar manufacturing and the extent of mobilization for World War II. County fixed effects, state-year fixed effects, and controls for 1940 county characteristics included in equation (2) adjust for these differences. Importantly, in Panel B of Table 1, comparing the prewar trends across counties with $W_c \in (1, 2, 3+)$ relative to W_c equal to zero reveal no statistically significant differences for any outcome or level of mobilization. These results support the validity of the postwar comparisons that are the focus of this paper.

To be clear, the identifying assumption for the β s in equation (2) is that in the absence of new facility construction during World War II, relative changes in the southern economy would have followed their prewar trajectory. In practice, this assumption is violated if war planners decided the placement of new facilities with domestic goals in mind. The discussion of the mobilization program by Koistinen (2004), in particular, the centralized control in the military rather than the civilian bureaucracy, suggests the location of new facilities was not motivated by economic development objectives. Instead, planners aimed to maximize the production of standardized and relatively high quality products. In this case, the key concern is that characteristics correlated with planners' ability to achieve these objectives were also correlated with growth potential. Controls for the Industrial Mobilization Plan ensure that my estimates capture the effect new facilities construction due to actual mobilization, not industrial potential based on prewar capacity; controls for latitude, longitude, and soil quality capture changes in southern agriculture that may have influenced industrial development. Finally, as robustness, I also discuss separate estimates that control for aspects of the New Deal that may have influenced the growth of manufacturing either directly through new infrastructure (e.g., the Tennessee Valley Authority) or policies intended to modernize agriculture (e.g., the Agricultural Adjustment Act). Structural transformation in the 1930s and the contribution of the New Deal have been studied extensively (e.g., Whatley, 1983; Caselli

Table 1: Prewar Differences by Number of World War II Facilities

	Emp. (1)	Wage Bill (2)	Value-Added (3)
Panel A: Diff.			
Relative to $W_c = 0$			
$1\{W_c = 1\}$	0.443 (0.187)	0.464 (0.253)	0.473 (0.252)
$1\{W_c = 2\}$	0.687 (0.176)	0.735 (0.288)	0.711 (0.281)
$1\{W_c \geq 3\}$	0.989 (0.204)	1.217 (0.182)	1.204 (0.161)
Panel B: Trend			
Relative to $W_c = 0$			
$1\{W_c = 1\} \times t$	0.002 (0.008)	-0.007 (0.015)	-0.007 (0.016)
$1\{W_c = 2\} \times t$	-0.001 (0.011)	-0.009 (0.022)	-0.009 (0.021)
$1\{W_c \geq 3\} \times t$	0.002 (0.010)	-0.007 (0.025)	-0.008 (0.029)

Notes: The table presents differences across counties in terms of prewar aggregate manufacturing characteristics. Panel A shows the difference in 1939 between counties with one, two, or more than three World War II investment projects, i.e., $W_c \in (1, 2, 3+)$ relative to counties with zero, i.e., $W_c = 0$. The estimates in each column come from the same regression, which includes state fixed effects and county characteristics. Panel B shows the difference in prewar trend between counties with $W_c \in (1, 2, 3+)$ relative to counties with $W_c = 0$. The years included are 1919, 1929, and 1939. The estimates in each column come from the same regression, which includes state-year and county fixed effects as well as county characteristics. Standard errors (in parentheses) are clustered at the state level and regressions are weighted by county population in each year. The number of sample counties is 1,272.

Source: For a description of the data and variables included as county characteristics see text of Section 4.

and Coleman, 2001; Fishback, Horrace, and Kantor, 2005; Hornbeck and Naidu, 2014). For the purposes of this study, it is important not to attribute the effects of changes underway by the early 1940s to the effect of World War II.¹⁴

6 Results

6.1 Manufacturing

The panels of Table 2 show the results of estimating different versions of equation (2) for several aggregate manufacturing outcomes. The estimates reported are relative to

¹⁴Indeed, in revising the early literature for the impact of World War II on industrial development in states along the Pacific Coast, Rhode (2000, 2003) emphasizes the small role of the war compared to forces already at work in the 1920s.

counties with zero investment projects and summarize the effect over the entire postwar sample period (i.e., 1947, 1954, and 1958). The results provide insight into the magnitude of the first term on the right-hand side of equation (1), which can be interpreted as the net production amenities due to World War II investment.

The outcomes reported in columns 1 through 4, respectively, are the total number of manufacturing establishments, employment, wage bill, and value-added by manufacturing. Panel A shows results from specifications that include only year fixed effects, Panel B replaces year with state-year fixed effects, Panel C adds county characteristics interacted with year effects, and Panel D controls for county fixed effects. Moving from Panel A to Panel B suggests that differences across states are not driving the estimated effect of mobilization for World War II. In Panel C, the addition of county characteristics substantially diminishes the effect of war-related investment at all levels, although the estimates for two and three or more investments remain positive and statistically significant.

In Panel D, which controls for county fixed effects, the impact of World War II is no longer statistically significant at any level of investment.¹⁵ This is consistent with the hypothesis put in forward in Higgs (2006) and Field (2011) that mismatch between the investment used in mobilization for war and industrialization in peace. This pattern suggests that despite gains in productivity and output during mobilization in the early 1940s, the majority of production reverted to sale in private markets (i.e., not government procurement) at the end of the war. In the absence of demand through government contracts, local entrepreneurs elected to return to prewar activities in non-manufacturing sectors and the influence on aggregate manufacturing in the long-run was limited.

From the historical record, there is evidence that war-related plants were shuttered soon after the war or that reconversion was costly. As a test of this effect, Figure 4 shows results in which the main effects are allowed to vary with each postwar year. Each panel of Figure 4 shows the results for a different outcome by postwar year. In general, the estimates show that negative effects from Table 2 are concentrated in the reconversion period and in counties with the least mobilization. One interpretation is that this is where the adjustments costs between industrial and non-industrial activities was highest. In subsequent years, the

¹⁵In the appendix, Figure A2 plots the estimates from specifications including all controls for $W_c \in (1, 2, \dots, 10+)$. These results are qualitatively similar.

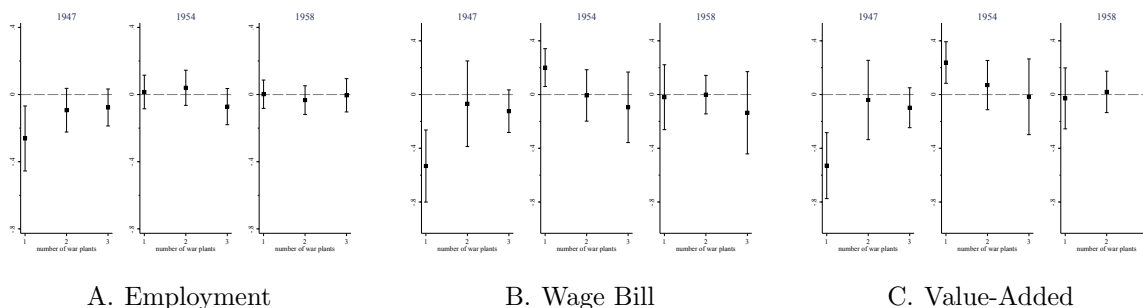
Table 2: Impact of World War II on Manufacturing

	Emp. (1)	Wage Bill (2)	Value-Added (3)
Panel A:			
Controls: α_t			
$1\{W_c = 1\} \times post_t$	0.300 (0.293)	0.195 (0.306)	0.232 (0.314)
$1\{W_c = 2\} \times post_t$	1.022 (0.326)	1.117 (0.368)	1.176 (0.374)
$1\{W_c \geq 3\} \times post_t$	2.874 (0.357)	3.283 (0.401)	3.460 (0.411)
Panel B:			
Controls: α_{st}			
$1\{W_c = 1\} \times post_t$	0.417 (0.257)	0.308 (0.285)	0.358 (0.288)
$1\{W_c = 2\} \times post_t$	1.107 (0.301)	1.218 (0.339)	1.314 (0.335)
$1\{W_c \geq 3\} \times post_t$	3.002 (0.412)	3.378 (0.441)	3.545 (0.434)
Panel C:			
Controls: $\alpha_{st}, \mathbf{X}_c$			
$1\{W_c = 1\} \times post_t$	0.112 (0.147)	-0.038 (0.180)	0.003 (0.180)
$1\{W_c = 2\} \times post_t$	0.574 (0.101)	0.615 (0.134)	0.677 (0.140)
$1\{W_c \geq 3\} \times post_t$	0.821 (0.200)	0.909 (0.165)	0.974 (0.162)
Panel D:			
Controls: $\alpha_c, \alpha_{st}, \mathbf{X}_c$			
$1\{W_c = 1\} \times post_t$	-0.048 (0.038)	-0.084 (0.070)	-0.077 (0.068)
$1\{W_c = 2\} \times post_t$	0.004 (0.049)	-0.017 (0.091)	0.028 (0.088)
$1\{W_c \geq 3\} \times post_t$	-0.024 (0.033)	-0.120 (0.085)	-0.089 (0.082)

Notes: Each panel gives the results of estimating a version equation (2). The columns contain the results for different manufacturing outcomes: employment (column 1), wage bill (column 2), and value-added by manufacturing (column 3). Panel A includes only year fixed effects, Panel B includes state-year fixed effects, Panel C adds county characteristics interacted with year fixed effects, and Panel D is the first difference of equation (2) to control for time-invariant county characteristics. Standard errors (in parentheses) are clustered at the state level and regressions are weighted by county population in each year. The years included are 1919, 1929, 1939, 1947, 1954, and 1958. The number of sample counties is 1,272.

Source: For a description of the data and variables included as county characteristics see text of Section 4.

Figure 4: Impact of World War II on Manufacturing by Year



Notes: Each panel shows the estimated coefficient for each variable along the 90 percent confidence interval based on standard errors clustered at the state level. All regressions are weighted by county population in each year. The years included are 1919, 1929, 1939, 1947, 1954, and 1958. The number of sample counties is 1,272.

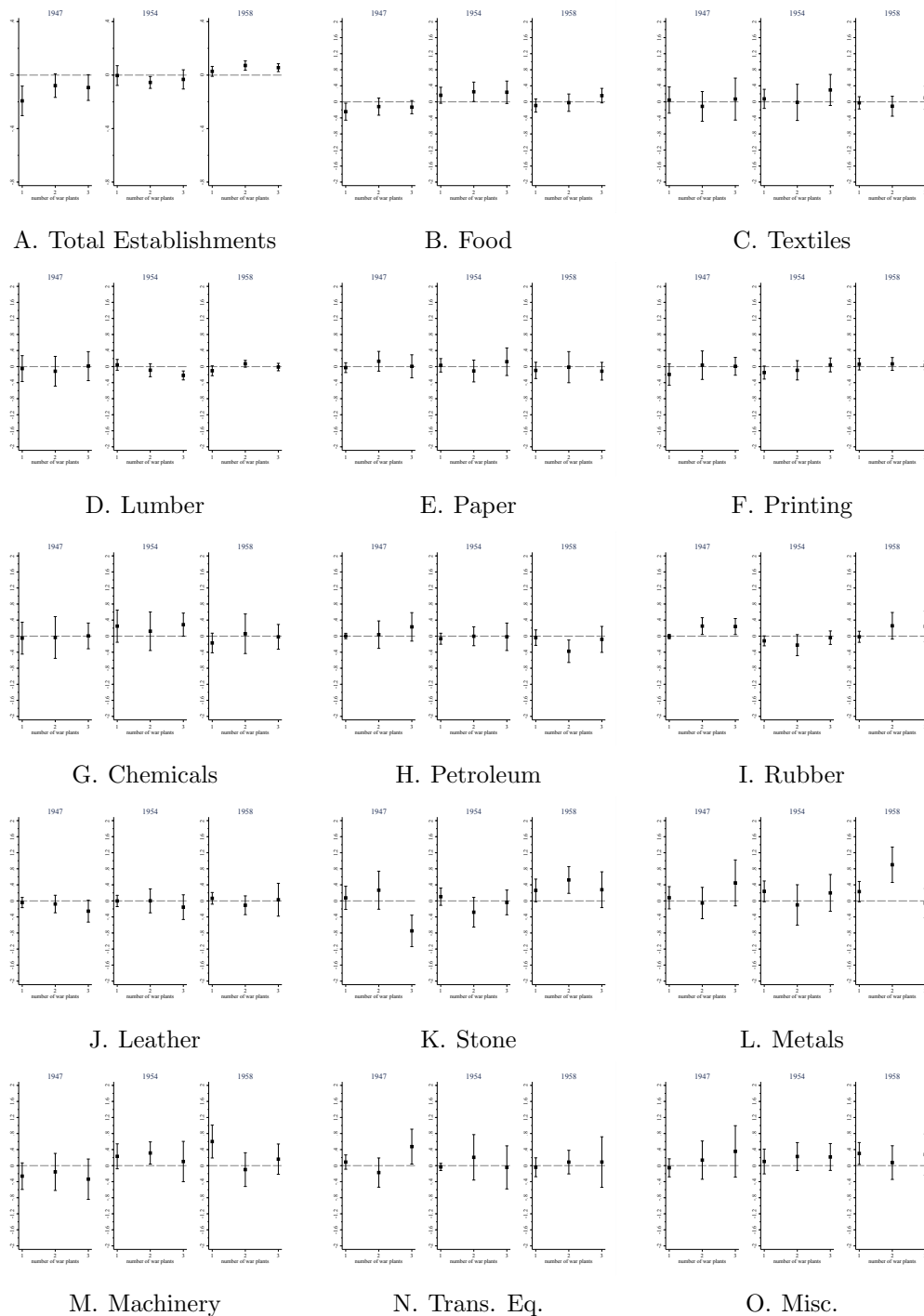
Source: For a description of the data and variables included as county characteristics see text of Section 4.

effect tends to be close to zero and statistically insignificant. The limited effect of war-related investment suggest that it was too specific to military production needs or utilized to the point of near complete depreciation as a result of two- or three-shift runs during the mobilization period (Higgs, 2006; Field, 2011; Rockoff, 2012). This is consistent with the substantial discounts tabulated by White (1980) that were applied to the sale of surplus property in the postwar period.¹⁶

In Figure 5, Panel A presents the results for each postwar year for the number of manufacturing establishments. The number of establishments was more in 1958 relative to the prewar period. To assess the impact of wartime investment across different manufacturing sectors, the remaining panels of Figure 5 disaggregates the results for the number of establishments by fourteen sectors. This is useful because even in the absence of substantial changes in the aggregate number of establishments, the war may have facilitated the reallocation of activity across sectors. In the context of the mid-twentieth century South, this effect may be particularly important since a key focus of contemporary policy makers and scholars was the concentration of the region’s industrial activity in low wage, low value-added sectors. Overall, there is little evidence that reallocation is underlying the changes in southern manufacturing in the postwar period. Following the end of the war the number of establishments in rubber goods, metals, machine tools, and transportation equipment was higher. However,

¹⁶This is line with evidence presented by Kline and Moretti (2014b) for the Tennessee Valley Authority, which suggests that the program’s benefits were due to the direct investment in infrastructure and not through the accumulation of agglomeration economies.

Figure 5: Impact of World War II on Manufacturing Establishments by Sector and Year



Notes: Each panel shows the estimated coefficient for each variable along the 90 percent confidence interval based on standard errors clustered at the state level. All regressions are weighted by county population in each year. The years included in Panel A are 1919, 1929, 1939, 1947, 1954, and 1958; for the remaining panels (by sector) the years are 1935, 1939, 1947, 1954, and 1958. The number of sample counties is 1,272. *Source:* For a description of the data and variables included as county characteristics see text of Section 4.

ultimately, the results in Figure 5 suggest that reallocation of manufacturing activity across sectors due to World War II was short-lived and, in any case, not widespread.

Focusing on a particular example, Combes (2001, pp. 28-33) describes the efforts on the part of local politicians that led to the opening of a Bell Aircraft in Marietta, Georgia, in early 1942. The plant, which manufactured B-29s during the war, grew from 1,179 employees in the beginning to 17,094 by the end of 1943 and eventually reached an employment peak above 20,000. In part, the tremendous growth of manufacturing reflected in this and other accounts of the wartime South (see Schulman, 1991) helped reinforce the view of structural transformation fueled by World War II investment. In the case of Bell Aircraft in Georgia and other newcomers to advanced manufacturing across the South, the war appeared to bring demand and training for new skills. Nevertheless, despite attempts to find a postwar use for the plant, \$60 million in payroll disappeared and the \$47 million investment was converted for storage for military surplus in the immediate aftermath of the war.

The plant in Marietta eventually housed operations for the production of the Lockheed C-130, C-141, and C-5, although “in contrast to a successful private sector manufacturer, the Marietta plant looks more like a mission-oriented federal laboratory...” (Combes, 2001, p. 39). More generally, the lesson that the potential uses for Marietta plant were limited seemed to also apply to other wartime investment across the South.

So far, the results treat investment projects as homogeneous. However, there may have been substantial differences in the quality and type of investment across countries. In particular, my data include information on (i) the cost of projects and (ii) whether the direct course of financing was private or public. Differences in (i) are informative about utilization and quality, while differences in (ii) indicate the ability of firms to make investments that were more (private) or less (public) likely to be compatible with peacetime production.¹⁷

To examine the impact of investment type and quality, I estimate specifications similar to equation (2) and report the results in Table 3. Panel A includes a control variable for the average cost per investment project in a given county.¹⁸ Panel B includes interactions

¹⁷Deming and Stein (1949, p. 3, 12) describe how both privately and publicly financed project ultimately received some form of government subsidy indirectly through the accelerated depreciation provisions of the 1940 Second Revenue Act or directly. In addition, privately financed projects were subject to less oversight and more likely to be built with dual purposes to meet wartime demand *and* be useful in peacetime.

¹⁸This variable was constructed by summing the total cost of all projects in county c and dividing by the

Table 3: Impact of World War II on Manufacturing by Quality and Type

	Emp. (1)	Wage Bill (2)	Value-Added (3)
Panel A:			
$1\{W_c = 1\} \times post_t$	-0.027 (0.137)	-0.057 (0.160)	-0.064 (0.172)
$1\{W_c = 2\} \times post_t$	0.026 (0.152)	0.013 (0.170)	0.042 (0.181)
$1\{W_c \geq 3\} \times post_t$	-0.001 (0.151)	-0.089 (0.150)	-0.075 (0.165)
$\ln(\text{average cost})_c \times post_t$	-0.002 (0.012)	-0.003 (0.013)	-0.001 (0.014)
Panel B:			
$1\{W_c = 1\} \times post_t$	0.067 (0.210)	-0.281 (0.438)	-0.374 (0.452)
$1\{W_c = 2\} \times post_t$	0.230 (0.185)	0.276 (0.260)	0.285 (0.272)
$1\{W_c \geq 3\} \times post_t$	-0.216 (0.157)	-0.128 (0.251)	-0.040 (0.297)
$\ln(\text{average cost})_c \times 1\{W_c = 1\} \times post_t$	-0.011 (0.018)	0.019 (0.040)	0.028 (0.042)
$\ln(\text{average cost})_c \times 1\{W_c = 2\} \times post_t$	-0.019 (0.014)	-0.025 (0.019)	-0.022 (0.020)
$\ln(\text{average cost})_c \times 1\{W_c \geq 3\} \times post_t$	0.016 (0.012)	0.001 (0.023)	-0.004 (0.027)
Panel C:			
$1\{\text{Public}_c = 1\} \times post_t$	0.005 (0.029)	0.007 (0.122)	0.000 (0.119)
$1\{\text{Public}_c = 2\} \times post_t$	-0.045 (0.050)	-0.075 (0.066)	-0.014 (0.059)
$1\{\text{Public}_c \geq 3\} \times post_t$	0.106 (0.080)	0.152 (0.063)	0.122 (0.066)
$1\{\text{Private}_c = 1\} \times post_t$	-0.049 (0.039)	-0.098 (0.078)	-0.090 (0.076)
$1\{\text{Private}_c = 2\} \times post_t$	-0.002 (0.051)	-0.024 (0.100)	0.004 (0.104)
$1\{\text{Private}_c \geq 3\} \times post_t$	-0.018 (0.032)	-0.115 (0.088)	-0.090 (0.085)

Notes: Each panel adds variables to the specification reported in Panel D of Table 2. Panel A adds the (log) average cost per project in county c , Panel B adds an interaction between (log) average cost per project in county c and the indicators for the levels of W_c , and Panel C replaces the indicators for W_c with separate indicators for the number of publicly- and privately-financed projects. Standard errors (in parentheses) are clustered at the state level and regressions are weighted by county population in each year. The years included are 1919, 1929, 1939, 1947, 1954, and 1958. The number of sample counties is 1,272.

Source: For a description of the data and variables included as county characteristics see text of Section 4.

between this variable and the indicators for the number of war-related investments. Panel C replaces the indicators for the number of war-related investments with separate indicators for privately and publicly financed projects. Including the measures that capture the quality of investment (panels A and B) and differences in the source of financing (Panel C) does not change the interpretation of the estimates.

Finally, in the appendix, Table A1 reports additional robustness checks that add an indicator for whether a county was in the service area of the Tennessee Valley Authority (Panel A), the value of rental and benefit payments under the 1933 Agricultural Adjustment Act (Panel B), and both (Panel C). Previous work has attributed at least some of the structural transformation in the South to the TVA and AAA and New Deal programs more broadly (Cobb, 1982; Whatley, 1983; Wright, 1986; Schulman, 1991; Alston and Ferrie, 1999). Including the impact of these programs does not change the estimated effect of mobilization for World War II on the manufacturing sector. I include controls for the impact of the TVA and AAA in the results reported in the rest of the paper to rule these explanations out as confounding factors.

By the late 1940s, the number of successful reconversions to peacetime uses was small: depending more on access to markets and labor, less on the specific nature of wartime investment (Deming and Stein, 1949). Overall, this suggests that the effect of World War II on manufacturing was transitory and did not facilitate the production-side spillovers within regional industrial clusters that help to sustain long-run growth (Jacobs, 1984; Glaeser, Kallal, Scheinkman, and Shleifer, 1992; Saxenian, 1994). Even without manufacturing growth, other sectors may have been affected on the demand-side by population growth. The next subsection examines the impact of wartime mobilization on population, housing, and wholesale and retail trade.

6.2 *Population, Housing, Wholesale and Retail Trade*

Table 4 shows the results of replacing the left-hand side of equation (2) with population and measures of the number of housing units (owned and rented), median house value, and monthly rent. Column 1 indicates that postwar population increased with the extent of mobilization: 3.9 percent for W_c equal to one, 7.5 percent for W_c equal to two, and 13.2 percent for W_c equal to three. For counties with no projects \$1 is added in order to take the logarithm.

Table 4: Impact of World War II on Population and Housing

	Population (1)	Owned:		Rented:	
		# units (2)	Median Value (3)	# units (4)	Monthly Rent (5)
$1\{W_c = 1\} \times post_t$	0.039 (0.028)	-0.005 (0.036)	-0.075 (0.024)	0.001 (0.029)	0.064 (0.021)
$1\{W_c = 2\} \times post_t$	0.078 (0.024)	-0.044 (0.024)	-0.075 (0.025)	-0.005 (0.025)	0.025 (0.022)
$1\{W_c \geq 3\} \times post_t$	0.131 (0.020)	-0.015 (0.030)	-0.050 (0.042)	-0.001 (0.024)	0.001 (0.024)

Notes: Standard errors (in parentheses) are clustered at the state level and regressions in columns 2 through 5 are weighted by county population in each year. The years included are 1929, 1939, 1949, and 1959. The number of sample counties is 1,272.

Source: For a description of the data and variables included as county characteristics see text of Section 4.

percent for three or more new facilities. The results in columns 2 through 4 indicate little change in the number of available non-farm units. Columns 3 and 5 point toward a decrease in the value of owner-occupied units—consistent with crowding into these areas *during* the war accelerating depreciation of the value of the housing stock—and an increase in monthly rent.

Table 5 shows the results for wholesale and retail trade. From columns 1 through 3, the war’s effect on wholesale is limited and, in any case, imprecisely estimated. The effect on the retail sector is consistently positive and, for employment and sales, statistically significant for counties with two or more facilities. Together with the increase in population the results for the retail sector suggest that wartime investment did stimulate growth in local economies. This is supported by the example from Combes (2001) for Marietta, Georgia. One interpretation is that investment may have helped to coordinate the placement of government contracts and investment in the postwar period. For example, the research facility in Marietta, and other installations related to the military, US Atomic Energy Commission, National Aeronautics and Space Administration, and the Center for Disease Control (US Public Health Service, various years; Schulman, 1991; Klein, 2013; Downs, 2014). This, in turn, stimulated local demand.

Note that this mechanism for the impact of World War II is different from the standard story of southern structural transformation fueled by mobilization. Parts of the mobilization

Table 5: Impact of World War II on Wholesale and Retail Trade

	Wholesale:			Retail:		
	Estab. (1)	Emp. (2)	Sales (3)	Estab. (4)	Emp. (5)	Sales (6)
$1\{W_c = 1\} \times post_t$	0.009 (0.050)	-0.015 (0.187)	-0.146 (0.139)	0.018 (0.023)	0.038 (0.045)	0.048 (0.039)
$1\{W_c = 2\} \times post_t$	0.052 (0.047)	-0.026 (0.110)	-0.027 (0.123)	0.023 (0.018)	0.049 (0.017)	0.051 (0.019)
$1\{W_c \geq 3\} \times post_t$	0.073 (0.050)	-0.136 (0.179)	-0.026 (0.111)	0.050 (0.025)	0.060 (0.021)	0.061 (0.020)

Notes: Standard errors (in parentheses) are clustered at the state level and regressions are weighted by county population in each year. The years included are 1929, 1939, 1948, and 1958. The number of sample counties is 1,272.

Source: See text of Section 4.

program may have facilitated growth in some industries and counties, but this effect was not consistently positive or statistically significant.

7 Conclusion

Prior to 1940 the development of the American South lagged behind the rest of the country. Mobilization for World War II stimulated demand for industrial goods and infused the region with substantial investment in new manufacturing capital. A long-standing question in the economic history of the United States is whether war-related investment created agglomeration economies that stimulated the region's postwar growth. More generally, the answer to this question contributes to a large literature on the role of specific government policies in regional development and economic growth.

In this paper, I combine information on the location of manufacturing facilities constructed in the South between 1940 and 1945 with information on aggregate manufacturing and the number of establishments by sector to examine the impact of the war on southern industrialization. The results suggest no differential growth in aggregate manufacturing and limited permanent reallocation of manufacturing activity toward higher value-added sectors within manufacturing; in rubber goods, metals, machine tools, and transportation equipment there were more establishments immediately following the war, but these effects were short-lived. This suggests that structural transformation and the growth of manufacturing in the American South were not the result of mobilization for World War II.

The only lasting impact of the war was concentrated in the retail sector and county-level population, which were up to 6.1 and 13.1 percent larger, respectively. I interpret this finding as evidence that investment during World War II helped coordinate the placement of government contracts and investment in the South in the postwar period. The finding that war-related investment had no effect on the *average* southern county does not preclude success stories in more narrowly defined industries or in certain places. Indeed, the historical record contains evidence for aircraft, aluminum, and synthetic rubber where the role of the South during and after the war was important; the confidence intervals for the effect on aggregate manufacturing and by sector suggest substantial variation. I leave these case studies for future research, and conclude that the evidence does not support a region transformed by mobilization for war. Rather, as on the Pacific Coast, industrialization already underway continued during the war and the war itself did not lay the foundation for growth of manufacturing in the American South.

References

- Daron Acemoglu and Simon Johnson. Unbundling Institutions. *Journal of Political Economy*, 113(5):949–995, 2005.
- Lee J. Alston and Joseph P. Ferrie. *Southern Paternalism and the American Welfare State: Economics, Politics, and Institutions in the South, 1865-1965*. Cambridge University Press, Cambridge, UK, 1999.
- Robert J. Barro. Output Effects of Government Purchases. *Journal of Political Economy*, 89(6):1086–1121, 1981.
- Robert J. Barro and Xavier Sala-i-Martin. Convergence Across States and Regions. *Brookings Papers on Economic Activity*, pages 107–182, 1991.
- Robert J. Barro and Xavier Sala-i-Martin. Convergence. *Journal of Political Economy*, 100(2):223–251, 1992.
- Fred Bateman, Jamie Ros, and Jason E. Taylor. Did New Deal and World War II Public Capital Investments Facilitate a ‘Big Push’ in the American South? *Journal of Institutional and Theoretical Economics*, 165(2):307–341, 2009.
- David L. Carlton and Peter A. Coclanis. *The South, The Nation, and The World: Perspectives on Southern Economic Development*. University of Virginia Press, Charlottesville, VA, 2003.
- Francesco Caselli and Wilbur John Coleman. The U.S. Structural Transformation and Regional Convergence: A Reinterpretation. *Journal of Political Economy*, 109(3):584–616, 2001.
- James C. Cobb. *The Selling of the South: The Southern Crusade for Industrial Development, 1936-90*. Louisiana State University Press, Baton Rouge, LA, 1982.
- Craig E. Colten. Texas v. the Petrochemical Industry: Contesting Pollution in an Era of Industrial Growth. In Philip Scranton, editor, *The Second Wave: Southern Industrialization from the 1940s to the 1970s*. University of Georgia Press, New York, GA, 2001.
- Richard S. Combes. Aircraft Manufacturing in Georgia: A Case Study of Federal Industrial Investment. In Philip Scranton, editor, *The Second Wave: Southern Industrialization from the 1940s to the 1970s*. University of Georgia Press, Athens, GA, 2001.
- J. Bradford De Long and Lawrence H. Summers. Equipment Investment and Economic Growth. *Quarterly Journal of Economics*, 106(2):445–502, 1991.
- Frederick L. Deming and Weldon A. Stein. *Disposal Of Southern War Plants*. National Planning Association, Washington, DC, 1949.
- Matthew L. Downs. *Transforming the South: Federal Development in the Tennessee Valley, 1915-1960*. Louisiana State University Press, Baton Rouge, LA, 2014.
- Alexander J. Field. *A Great Leap Forward: 1930s Depression and U.S. Economic Growth*. Yale University Press, New Haven, CT, 2011.
- Price V. Fishback and Joseph A. Cullen. Second World War Spending and Local Economic Activity in US Counties, 1939-58. *Economic History Review*, 66(4):975–992, 2013.
- Price V. Fishback, William C. Horrace, and Shawn Kantor. Did New Deal Grant Programs Stimulate Local Economies? A Study of Federal Grants and Retail Sales during the Great Depression. *Journal of Economic History*, 65(1):36–71, 2005.

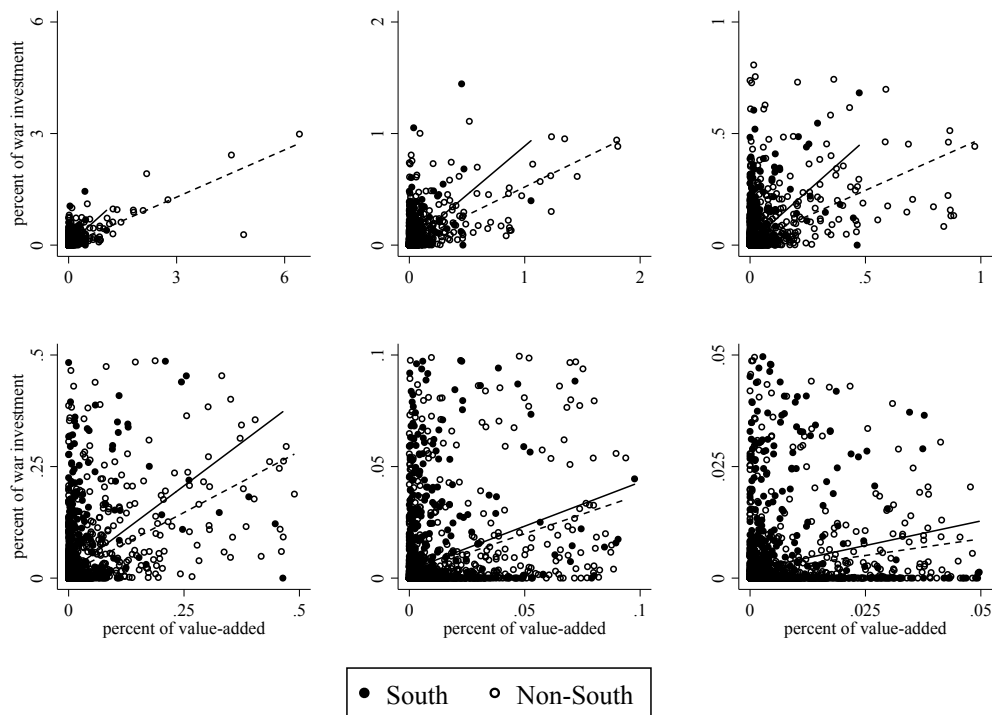
- Robert W. Fogel and Stanley L. Engerman. *Time on the Cross: The Economics of American Negro Slavery*. Little, Brown, Boston, MA, 1974.
- Andrew D. Foster and Mark R. Rosenzweig. Learning by Doing and Learning from Others: Human Capital and Technical Change in Agriculture. *Journal of Political Economy*, 103(6):1176–1208, 1995.
- Edward L. Glaeser, Hedi D. Kallal, Jose A. Scheinkman, and Andrei Shleifer. Growth in Cities. *Journal of Political Economy*, 100(6):1126–1152, 1992.
- Robert J. Gordon. \$45 Billion of U.S. Private Investment Has Been Misaid. *American Economic Review*, 59(3):221–238, 1969.
- Michael R. Haines. *Historical, Demographic, Economic, and Social Data: The United States, 1790-2000*, volume ICPSR02896-v3. Inter-university Consortium for Political and Social Research [distributor], Ann Arbor, MI, 2010.
- Robert Higgs. *Crisis and Leviathan: Critical Episodes in the Growth of American Government*. Oxford University Press, Oxford, UK, 1989.
- Robert Higgs. Private Profit, Public Risk: Institutional Antecedents of the Modern Military Procurement System in the Rearmament Program of 1940-41. In Robert Higgs, editor, *Depression, War, and Cold War: Studies in Political Economy*. Oxford University Press, Oxford, 2006.
- Thomas J. Holmes. The Effect of State Policies on the Location of Manufacturing: Evidence from State Borders. *Journal of Political Economy*, 106(4):667–705, 1998.
- Richard Hornbeck and Pinar Keskin. Does Agriculture Generate Local Economic Spillovers? Short-run and Long-run Evidence from Ogallala Aquifer. *American Economic Journal: Economic Policy*, forthcoming.
- Richard Hornbeck and Suresh Naidu. When the Levee Breaks: Black Migration and Economic Development in the American South. *American Economic Review*, 104(3):963–990, 2014.
- Jane Jacobs. *Cities and the Wealth of Nations: Principles of Economic Life*. Random House, New York, NY, 1984.
- Charles I. Jones. Intermediate Goods and Weak Links in the Theory of Economic Development. *American Economic Journal: Macroeconomics*, 3(2):1–28, 2011.
- Sukkoo Kim. Expansion of Markets and the Geographic Distribution of Economic Activities: The Trends in U.S. Regional Manufacturing Structure, 1860-1987. *Quarterly Journal of Economics*, 110(4):881–908, 1995.
- Sukkoo Kim. Economic Integration and Convergence: U.S. Regions, 1840-1987. *Journal of Economic History*, 58(3):659–683, 1998.
- Carl Kitchens. The Role of Publicly Provided Electricity in Economic Development: The Experience of the Tennessee Valley Authority, 1929-1955. *Journal of Economic History*, 74(2):389–419, 2014.
- Maury Klein. *A Call to Arms: Mobilizing America for World War II*. Bloomsbury Press, New York, NY, 2013.
- Patrick Kline and Enrico Moretti. Local Economic Development, Agglomeration Economies and the Big Push: 100 Years of Evidence from the Tennessee Valley Authority. *Quarterly*

- Journal of Economics*, 129(1):275–331, 2014a.
- Patrick Kline and Enrico Moretti. Local Economic Development, Agglomeration Economies and the Big Push: 100 Years of Evidence from the Tennessee Valley Authority. *Quarterly Journal of Economics*, 129(1):275–331, 2014b.
- Paul A.C. Koistinen. *Arsenal of World War II: The Political Economy of American Warfare, 1940-1945*. University Kansas Press, Lawrence, KS, 2004.
- Naomi R. Lamoreaux and Kenneth L. Sokoloff. Market Trade in Patents and the Rise of a Class of Specialized Inventors in the Nineteenth-Century United States. *American Economic Review*, 91(3):39–44, 2001.
- Ann Markusen, Peter Hall, Scott Campbell, and Sabina Deitrick. *The Rise of the Gunbelt: The Military Remapping of Industrial America*. Oxford University Press, Oxford, UK, 1991.
- Kris Mitchener and Ian W. McLean. U.S. Regional Growth and Convergence, 1880-1980. *Journal of Economic History*, 59(4):1016–1042, 1999.
- Kris Mitchener and Ian W. McLean. The Productivity of U.S. States since 1880. *Journal of Economic Growth*, 8(1):73–114, 2003.
- Kevin M. Murphy, Andrei Shleifer, and Robert W. Vishny. Industrialization and the Big Push. *Journal of Political Economy*, 97(5):1003–1026, 1989.
- Gerald D. Nash. *The American West Transformed: The Impact of the Second World War*. Indiana University Press, Bloomington, 1985.
- Gerald D. Nash. *World War II and the West: Reshaping the Economy*. University of Nebraska Press, Lincoln, 1990.
- National Defense Act. *U. S. Statutes at Large*, 41:759–811, 1920.
- Douglass C. North. *Structure and Change in Economic History*. WW Norton, New York, NY, 1981.
- Mancur Olson. *Power And Prosperity: Outgrowing Communist And Capitalist Dictatorships*. Basic Books, New York, NY, 2000.
- Valerie A. Ramey and Matthew D. Shapiro. Displaced Capital: A Study of Aerospace Plant Closings. *Journal of Political Economy*, 109(5):958–992, 2001.
- Earle L. Rauber. Economic Appraisal of the Postwar South. *Monthly Review of the Federal Reserve Bank of Atlanta*, 31(1):1–2, 1946.
- Paul W. Rhode. California in the Second World War. In Roger Lotchin, editor, *The Way We Really Were: The Golden State in the Second Great War*. University of Illinois Press, Urbana, 2000.
- Paul W. Rhode. After the War Boom: Reconversion on the Pacific Coast, 1943-1949. In Timothy Guinnane William Sundstrom and Warren Whatley, editors, *History Matters: Essays on Economic Growth, Technology, and Demographic Change*. Stanford University Press, Stanford, 2003.
- Hugh Rockoff. *America's Economic Way of War: War and the US Economy from the Spanish-American War to the Persian Gulf War*. Cambridge University Press, Cambridge, UK, 2012.
- Paul M. Romer. Increasing Returns and Long-Run Growth. *Journal of Political Economy*,

- 94(5):1002–1037, 1986.
- AnnaLee Saxenian. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Harvard University Press, Cambridge, MA, 1994.
- Bruce J. Schulman. *From Cotton Belt to Sunbelt: Federal Policy, Economic Development, and the Transformation of the South, 1938-1980*. Oxford University Press, Oxford, UK, 1991.
- Chad Turner, Robert Tamura, Sean E. Mulholland, and Scott Baier. Education and Income of the States of the United States: 1840-2000. *Journal of Economic Growth*, 12(2):101–158, 2007.
- US Joint Army and Navy Munitions Board. *Industrial Mobilization Plan: Revision of 1938*. Government Printing Office, Washington, DC, 1938.
- US National Emergency Council. *Report on Economic Conditions of the South*. Government Printing Office, Washington, DC, 1938.
- US Public Health Service. *Malaria Control in War Areas Report*. Office of Government Printing, Washington DC, various years.
- US War Production Board. *War Manufacturing Facilities Authorized through December 1944, by State and County*. Government Printing Office, Washington, DC, 1945.
- Warren C. Whatley. Labor for the Picking: The New Deal in the South. *Journal of Economic History*, 43(4):905–929, 1983.
- Gerarld T. White. *Billions for Defense: Government Finance by the Defense Plant Corporation During World War II*. University Alabama Press, University, AL, 1980.
- Gavin Wright. *The Political Economy of the Cotton South: Households, Markets, and Wealth in the Nineteenth Century*. W.W. Norton, New York, NY, 1978.
- Gavin Wright. *Old South, New South: Revolutions in the Southern Economy Since the Civil War*. Basic Books, New York, NY, 1986.

A Additional Figures & Tables

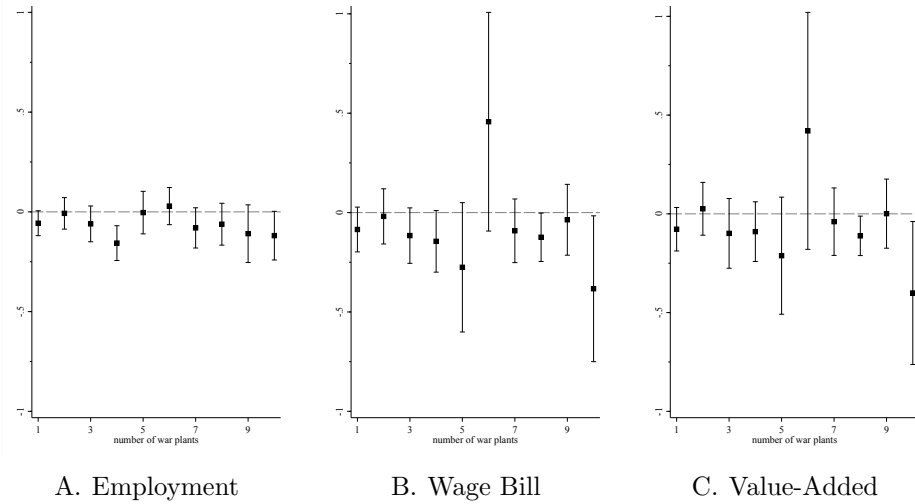
Figure A1: Prewar Manufacturing Activity Relative Wartime Investment



Notes: Each point indicates a county with given share of value-added by manufacturing in 1939 and given share of total wartime investment. The solid (empty) dots indicate counties from southern (non-southern) states; solid (dashed) lines indicate the best linear fit through the southern (non-southern) dots. The different panels are restricted to successively smaller samples to show that the conclusions does not depend on a few outliers. See footnote 1 for the states included in the “South” and “Non-South.”

Source: Data on the value-added by manufacturing in 1939 and wartime investment are drawn from Haines (2010).

Figure A2: Impact of World War II on Manufacturing by Year



Notes: Each panel shows the results of estimating equation (2) for different manufacturing outcomes: employment (Panel A), wage bill (Panel B), and value-added by manufacturing (Panel C). Standard errors (in parentheses) are clustered at the state level and regressions are weighted by county population in each year. The number of sample counties is 1,272.

Source: For a description of the data and variables included as county characteristics see text of Section 4.

Table A1: Impact of World War II on Manufacturing including TVA and AAA

	Emp. (1)	Wage Bill (2)	Value-Added (3)
Panel A:			
Including indicator for TVA area			
$1\{W_c = 1\} \times post_t$	-0.046 (0.038)	-0.085 (0.070)	-0.078 (0.069)
$1\{W_c = 2\} \times post_t$	-0.001 (0.048)	-0.016 (0.091)	0.029 (0.088)
$1\{W_c \geq 3\} \times post_t$	-0.021 (0.032)	-0.119 (0.085)	-0.089 (0.082)
Panel B:			
Including AAA payments			
$1\{W_c = 1\} \times post_t$	-0.058 (0.038)	-0.092 (0.067)	-0.084 (0.066)
$1\{W_c = 2\} \times post_t$	-0.010 (0.048)	-0.029 (0.091)	0.017 (0.088)
$1\{W_c \geq 3\} \times post_t$	-0.034 (0.029)	-0.129 (0.083)	-0.098 (0.081)
Panel C:			
Including TVA, AAA			
$1\{W_c = 1\} \times post_t$	-0.057 (0.038)	-0.093 (0.068)	-0.086 (0.067)
$1\{W_c = 2\} \times post_t$	-0.014 (0.047)	-0.028 (0.091)	0.018 (0.088)
$1\{W_c \geq 3\} \times post_t$	-0.030 (0.028)	-0.129 (0.083)	-0.098 (0.081)

Notes: Standard errors (in parentheses) are clustered at the state level and regressions are weighted by county population in each year. The number of sample counties is 1,272.

Source: For a description of the data and variables included as county characteristics see text of Section 4.