Did War Mobilization Cause Aggregate and Regional Growth?*

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Abstract

The participation of the United States in World War II led to a substantial mobilization of domestic resources to produce the materiel used on the battlefields of Europe and in the Pacific. We produce new estimates for the impact of war mobilization on long-run economic growth and regional development in the United States over the postwar period. Guided by an economic geography model, we interpret our estimates as the direct effect of mobilization on local productivity. The findings suggest the largest likely aggregate welfare impact was modest, although there is variation across region. In addition, industrial mobilization contributed to manufacturing growth relatively more in the Northeast and Midwest, and less in the South and West.

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1 Introduction

Did World War II spur economic growth in the United States? The view that it did appears in popular accounts (Romer, 2011; Krugman, 2011) as well as in the scholarly literature (Klein, 2013) regarding what can be learned from this period of history. An alternative view is that mobilization for war imposed substantial costs that could not be easily recouped (White, 1980; Goldin, 1980; Rockoff, 2012) or brought about changes in political economy or deviations from peacetime technological progress that were a drag on and not a boon to the postwar economy (Higgs, 1987; Field, 2022).

The tension in these views regarding the potential benefits of war in spurring aggregate growth extends to other dimensions of economic development, including business strategy (Wilson, 2016; Bianchi and Giorcelli, 2022), innovation systems (Gross and Sampat, 2023), and the impact of government spending (Higgs, 2006; Cullen and Fishback, 2013; Brunet, forthcoming). There is also a literature on the impact of war-related interventions across regions (Nash, 1985, 1990; Hooks and Bloomquist, 1992; Rhode, 1994; Nash, 2002; Rhode, 2003; Lewis, 2007; Bateman, Ros and Taylor, 2009; Jaworski, 2017; Findlay, 2023). In particular, mobilization could have yielded benefits as government spending on supply contracts and new investment exposed workers and firms to new production techniques or better infrastructure. However, costs arising from the process of converting facilities to wartime uses and subsequent reconversion may have been large or the benefits from new capital and temporary demand stemming from mobilization fleeting.

Resolving these competing views requires taking a stand on and then quantifying the mechanisms through which government actions influence economic growth. In this paper, we revisit the effect of the World War II-related capital investment on postwar regional development, structural transformation, and national economic performance. Our focus reflects the potential for investment to transform the places and people touched by it as well as the attention this aspect has received in the literature due to its connection to economic theories of agglomeration (Rosenthal and Strange, 2003; Glaeser and Gottlieb, 2009; Greenstone, Hornbeck and Moretti, 2010), big push (Rosenstein-Rodan, 1943; Nurkse, 1953; Murphy, Shleifer and Vishny, 1989; Azariadis and Stachurski, 2005), and the importance of World War II in shaping American history in the twentieth century and beyond (Koistinen, 2012). Our main goal is to bring clarity to the specifically aggregate general equilibrium effects of industrial mobilization using an economic geography model that allows us to distinguish between direct effects of mobilization on productivity and roles of spillovers from agglomeration economies, goods market linkages via interregional trade, and imperfectly mobile labor.

To do this, we develop a model applied to all US counties and three sectors (agriculture, manufacturing, and services). The model features a limited form of dynamics via the forward-looking decisions of workers regarding where to live and work in each period to maximize lifetime utility (Caliendo, Dvorkin and Parro, 2019).[1] Following Yang (2024) we also incorporate non-homothetic preferences as in Fan, Peters and Zilibotti (2023) to allow changes in the consumption share across sectors consistent with the pattern of structural transformation during this period. This is an alternative to the commonly used and less flexible Cobb-Douglas preferences in which economy-wide consumption shares remain constant in value terms.[2] The introduction of the non-homothetic preferences allows for income effects that capture an overall shift toward the non-agriculture sector as incomes grow. Finally, the model incorporates agglomer-

[1]Our model focuses exclusively on migration dynamics, where workers' migration and industry transition are influenced by migration frictions and preference shocks. The extent of heterogeneity in these preference shocks, captured by the migration elasticity, determines the pace of adjustment in a reduced-form manner. Our model does not include physical capital investment, endogenous technical change, or other potential dynamic mechanisms.

[2]Under the more restrictive assumption, a rise in manufacturing productivity could reduce the employment share in manufacturing, and the main adjustment that takes place is through spatial reallocation toward regions experiencing productivity gains.

ation economies or congestion (Allen and Donaldson, 2022), a “market access” structure for trade (Donaldson and Hornbeck, 2016), and imperfectly mobile labor (Artuc, Chaudhuri and McLaren, 2010). These are the channels through which the direct effect on productivity due to World War II investment affect the rest of the economy across regions and sectors.

We follow Rudik, Lyn, Tan and Ortiz-Bobea (2022) by allowing World War II investment to enter the model with a direct effect on local productivity. Building on the interpretation of Word War II investment adopted by Garin and Rothbaum (2025), the intuition for this approach is that large plants constructed in the 1940s exogenously increased local productivity through learning-by-doing (Thompson, 2001; Thornton and Thompson, 2001; Ilzetzki, 2024) or improved management practices (Bianchi and Giorcelli, 2022). In the decades following World War II, this attracted inflows of labor to these areas, which ultimately contributed to agglomeration economies.[3]

We first use the model to guide the estimation of the direct effects of World War II on productivity. We rely on the structure of the model to construct the key dependent variables used in our empirical strategy. In particular, a naive approach for estimating the productivity effects of World War II would simply use a measure of the average wage or value-added per worker as the dependent variable. Informed by the model, we apply an adjustment to account for the role of spatial spillovers due to general equilibrium interactions via interregional trade, migration, and agglomeration. The results of this estimation exercise yield a direct effect on productivity of approximately 10 percent stemming from the presence of a war-related plant.

We then simulate the model to quantify the implications of the industrial mobilization for the national and regional economies. Our baseline counterfactual considers the

[3]This is similar to the mechanism for the Tennessee Valley Authority studied by Kline and Moretti (2014) and Kitchens (2014) as well as for World War II-era pipelines examined by Greenspon and Hanson (2024) in this Volume. There also overlap with work by Greenstone et al. (2010).

impact of new plants constructed during World War II and finds an increase in welfare of 0.581 percent for the entire United States. This effect is largest in the Northeast (0.815 percent) followed by the Midwest (0.664 percent), West (0.514 percent), and South (0.276 percent). In addition to the welfare impact, we also consider changes in the manufacturing employment share nationally and across regions. In the absence of industrial mobilization would have been lower in the country as a whole. These effects are largest for the Northeast and Midwest and smallest for the South and West (relative to the national average).

This paper contributes to the literature on the local economic effects and long run implications of mobilization for World War II (Cullen and Fishback, 2013; Li and Koustas, 2019). The work of Garin and Rothbaum (2025) is the most closely related. Our estimated direct effects of industrial mobilization for World War II – which we interpret as an effect on local productivity – are similar to the estimates in their paper. The main contribution of our paper is to use these estimates together with an economic geography model to quantify the impact of war mobilization on aggregate welfare and regional structural change.

This paper also contributes to a large literature on the economics of place-based policy-making (Glaeser and Gottlieb, 2008). In this context, industrial mobilization for World War II is treated as an intervention that has a direct effect on local productivity and, therefore, potentially reshapes the spatial equilibrium of the United States. In a related historical setting, Kline and Moretti (2014) estimate the impact of the Tennessee Valley Authority (TVA) on local economic activity and then use the spatial equilibrium model of Roback (1982) to quantify the aggregate effect of the TVA. As in Kline and Moretti (2014), our approach allows for a role for agglomeration economies. In addition, we explicitly allow for costly trade in final goods as well as costly transitions across industries and counties such that worker utility across markets need not be equalized.

Finally, this paper contributes to research on the relationship between the military-industrial complex, regional development, and aggregate economic growth. Field (2022) provides an overview of the direct impact of mobilization on aggregate productivity in the 1940s. Markusen, Hall, Campbell and Deitrick (1991) describe the relationship between military spending and regional economic activity during the postwar period. Wright (2017) makes the connection between World War II, the postwar military-industrial complex, and the development of human capital-intensive industries in the West. In this paper, we provide a link between changes in the local productivity, regional economic development, and economic performance over the long run.

In the next section we give an overview of industrial mobilization in the United States. We also discuss the subsequent demobilization, in particular, the relationship between the disposal or transfer of surplus property and the potential long-run impact of wartime investment. Section 3 introduces the theoretical framework that informs our approach to estimation and that we use to conduct counterfactuals. Section 4 describes the data sources and Section 5 presents our estimates for the direct effect of mobilization on productivity. Section 6 presents the results of our main counterfactual exercises, as well as robustness that considers alternative values for the direct effect of industrial mobilization as well as approaches to measuring war-related investment. Section 7 concludes.

2 Historical Background

The US effort to prepare for and fight in World War II involved substantial economic mobilization as well as reallocation of manpower and physical resources. This included enlistees into military service, workers moved across industries and locations, and new large-scale investment in equipment, structures, and plants. By the end of the war in 1945, 15 million people had served in the military and auxiliary branches, official unemployment fell to its lowest level since the late 1920s, and over $68 billion was spent on capital improvements in agriculture, mining, highways, military installations, and industrial plants and equipment. The immediate outcome was more than $180 billion in military goods, what President Roosevelt called the "arsenal of democracy" in a fireside chat in December 1940 (McGrane, 1945; Smith, 1945).[4]

The initial effort to prepare for war was carried out under the auspices of the National Defense Advisory Commission (NDAC), which was reactivated in 1940 in response to the escalation of fighting in Europe in 1939. The NDAC had its origins in World War I and reviving it rather than creating a new agency with new power, reflected the relatively cautious approach of the Roosevelt administration throughout the 1930s in the face of noninterventionist resistance while balancing New Deal, business, and military concerns seeking to shape economic mobilization. Throughout 1941, mobilization continued to face challenges under the Office of Production Management (OPM) stemming from infighting among the branches of the armed forces as well as disagreements over military versus civilian needs. However, OPM proved successful in creating a greater modicum of centralized control (Koistinen, 2004).

After the attack on Pearl Harbor and under the War Production Board – created by Executive Order 9024 in January 1942 – the mobilization effort accelerated. Ultimately, facilities expansions would come to be valued at approximately $26 billion with more than 65 percent financed by the federal government through the War and Navy departments, US Maritime Commission, and Defense Plant Corporation. The portion not directly financed by the government was usually subject to favorable treatment under the tax code, e.g., accelerated depreciation (McGrane, 1945). Legally, the wartime value and use had to be certified to take advantage of accelerated depreciation, however this was

[4]The sixteenth fireside chat delivered by President Roosevelt since 1933, the address aired prior to Pearl Harbor on December 29, 1940, and was originally intended as a call to fortify national security through assistance to American allies: "We must be the great arsenal of democracy. For us this is an emergency as serious as war itself. We must apply ourselves to our task with the same resolution, the same sense of urgency, the same spirit of patriotism and sacrifice as we would show were we at war. We have furnished the British great material support and we will furnish far more in the future" (Roosevelt, 1940).

typically done for the entire amount of investment without verification (Koistinen, 2004, p. 300).

Several factors during the war as well as the potential uses in reconversion suggest significant adjustments to the capital stock that would be available for use in postwar economic activity.[5] The upper end estimate provided by the Smaller War Plants Corporation (1946) was that three-fourths of the value of new plants could be retained for peacetime uses. A lower end estimate from White (1980) was 15 percent based on information from the Defense Plant Corporation. Koistinen (2004, p. 296) suggests "one-quarter to one-third of the $26 billion figure seems to be a more accurate and reasonable estimate."

The connection between the value of wartime investment, reconversion to peacetime uses, and postwar growth hinges on more than the discounts applied to the transfer of surplus property. The nation's productive capacity relative to 1939 increased. Although most of this investment was directed toward regions that were industrialized before the war, a variety of considerations (e.g., security, availability of labor and raw materials, congestion of transportation and other infrastructure) drove investment to parts of the Midwest, West, and South that were less developed. This suggests that the interaction between placement of new plants and the strength of local agglomeration forces in these areas as well as the long-run trends in regional economic development due to underlying structural change both play a role in understanding the ultimate impact of war-related investment. In the next section we present a framework that incorporates these elements into a spatial general equilibrium model.

[5] For example, the source of financing (private versus public) shaped direct control over the use of funds. White (1980) notes that with private financing firms designed the plants and determined their location. This frustrated government officials who viewed these private choices to be at odds with fast-paced mobilization. In addition, variation in plant construction quality and utilization across multiple shifts to achieve production goals also played a role in the ultimate value of war-related capital investment (Koistinen, 2004).

3 Theory

This section describes an economic geography model of interregional trade and migration following closely the formulation in Yang (2024). We build on the dynamic spatial general equilibrium model in Caliendo, Dvorkin and Parro (2019) and include forces of historical persistence and agglomeration as in Allen and Donaldson (2022). In the model, time is indexed by t and is discrete. Locations are counties indexed by n and i, and industries are indexed by k and s. In the exposition below, subscripts reference time and counties, and superscripts reference industries.

The main goal of this paper is to quantify the impact of mobilization for World War II on worker welfare and regional economic structure in the United States. To do this, we apply the model to counties in the contiguous United States between 1920 and 1990. In each county there are three industries, including agriculture (A), manufacturing (M), and services (S), as well as non-employment to allow for transitions out of work. We allow for productivity differences by county and industry. In each county and industry, representative firms use a technology that only employs labor ($L^k_{n,t}$) in industry k county i at time t that is paid a wage ($w^k_{n,t}$) set in perfectly competitive labor markets. The cost of moving goods between counties is industry-specific and subject to iceberg trade costs ($\tau^k_{ni,t}$). Workers make decisions subject to the costs of moving (δ^{ks}_{ni}) between counties and industries as well as the expectation of future consumption.

More specifically, workers choose where to live (i.e., location) and work (i.e., industry) in the next period to maximize welfare, where welfare is defined as the discounted sum of the infinite path of log consumption utility. Workers supply labor inelastically and earn the competitive wage. Non-employed individuals receive the value of home production; we assume that home production is not affected by mobilization for World War II.

The preferences of individuals over consumption are in the non-homothetic Price-Independent Generalized Linear (PIGL) class (Boppart, 2014; Fan, Peters and Zilibotti, 2023) and indirect utility for an individual with expenditure e and facing the local price index P_n is given by,

$$C(e, P_n) = \frac{1}{\varepsilon}\left(\frac{e}{(P_n^A)^{\phi^A}(P_n^M)^{\phi^M}(P_n^S)^{\phi^S}}\right)^{\varepsilon} - \sum_{s\in\{A,M,S\}} \nu^s \ln P_n^s, \tag{1}$$

and combines sectoral value-added CES aggregates of varieties from all regions. The local price index is defined as follows: $P_n \equiv (P_n^A)^{\phi^A}(P_n^M)^{\phi^M}(P_n^S)^{\phi^s}$ where $\sum_{s\in\{A,M,S\}} \phi^s = 1$. In the case where $\nu^s = 0$ for all sectors and $\varepsilon = 1$, consumption utility is just Cobb-Douglas utility with consumption shares ϕ^s. The income elasticity parameter, $\varepsilon \in (0,1)$, is also called the Engel elasticity where larger values indicate a stronger effect of real income on consumer demand. Applying Roy's identity to indirect utility gives a consumption share for sector s of

$$\varphi^s(e, P_n) = \phi^s + \nu^s\left(\frac{e}{P_n}\right)^{-\varepsilon}, \tag{2}$$

so that demand depends on both the price index and income.

Workers make forward-looking decisions based on the expected future value of utilities where the expectation is taken over both regions and industries:

$$v_{n,t}^k = U(C_{n,t}^k, B_{n,t}) + \max_{\{i,s\}}\left\{\beta\mathbb{E}[v_{i,t+1}^s] - \delta_{ni}^{ks} + \eta u_{i,t}^s\right\}, \tag{3}$$

and idiosyncratic preference shocks, $u_{i,t}^s$, follow the Type I extreme value distribution. The parameter η scales the variance of the shock and $1/\eta$ is interpreted as the migration elasticity.

The solution to the workers' dynamic problem yields the share of people moving from industry k and county n to industry s and county i, which is proportional to the cost and elasticity-adjusted utility, compared to that of all other possible destinations:

$$\mu_{ni,t}^{ks} = \frac{\exp\left(\beta \mathbb{E}_t(V_{i,t+1}^{s} - \delta_{ni}^{ks})/\eta\right)}{\sum_{l=1}^{N}\sum_{h=0}^{K}\exp\left(\beta \mathbb{E}_t(V_{lt+1}^{h} - \delta_{nl}^{kh})/\eta\right)}, \tag{4}$$

which, combined with the initial population, yields labor market distributions in the next period:

$$L_{n,t+1}^{k} = \sum_{i=1}^{N}\sum_{s=0}^{K}\mu_{in,t}^{sk}L_{i,t}^{s}. \tag{5}$$

Throughout the paper, the labor market denotes the region-industry pair, and the migration share refers to both shares of migration between regions and industry switching between sectors.

On the production side, there is a continuum of firms indexed by ζ. Firms in each region n and industry k produce output using constant return to scale technology. Labor, $L_{n,t}^{k}$, is the only factor of production. The production technology of firm ζ in region n, industry k, and period t is given by:

$$q_{n,t}^{k}(\zeta) = A_{n,t}^{k}(\zeta)L_{n,t}^{k}, \tag{6}$$

where productivity, $A_{n,t}^{k}$, has an exogenous component, an endogenous agglomeration component, and a component due to the potential effect of industrial mobilization:

$$A_{n,t}^{k} = \underbrace{z_{n,t}^{k}}_{\text{exogenous productivity}} \times \underbrace{(L_{n,t}^{k})^{\rho_{A,1}^{k}}(L_{n,t-1}^{k})^{\rho_{A,2}^{k}}}_{\text{productivity endogenous to population}} \times \underbrace{W_{n,t}^{\gamma_A}}_{\text{direct productivity effect of war}} \tag{7}$$

where $z_{n,t}^{k}$ is drawn from a Frechet distribution with scale parameter $Z_{n,t}^{k}$ and the shape parameter θ^{k} and captures the portion of productivity not determined by agglomeration or war mobilization. The base productivity, $Z^k_{n,t}$, is time-varying and indicates the extent of absolute advantage; the industry-specific parameter θ^k reflects heterogeneity in productivity across regions, and is interpreted as the trade elasticity.

The endogenous component of productivity arises from agglomeration forces in which the parameter $\rho^k_{A,1}$ on current period population indicates externalities arising from the current size of a location. Following Glaeser, Kallal, Scheinkman and Shleifer (1992), Ellison and Glaeser (1997), and Ellison, Glaeser and Kerr (2010), these can be interpreted as the result of spillovers from innovation, input-output linkages, or labor market pooling. In addition, the parameter $\rho^k_{A,2}$ on past population indicates persistence stemming from historical local economic activity. This persistence may reflect local productive investment or knowledge sharing. Finally, the variable $W_{n,t}$ indicates war-related investment and the parameter γ_A is the direct effect of investment on productivity.

The price in each industry k in importer county n is determined as the minimum unit cost across all regions:

$$p^k_{n,t} = \min_{1 \leq i \leq N} \left\{ \frac{w^k_{i,t} \tau^k_{ni,t}}{A^k_{i,t}} \right\}, \tag{8}$$

where the term inside Equation (8) is the factory-gate price of one unit of goods multiplied by the trade costs.

With the distributional assumption on productivity, the bilateral expenditure share is given as:

$$\pi^k_{ni,t} = \frac{X^k_{ni,t}}{X^k_{n,t}} = \frac{\left(c^k_{i,t} \tau^k_{ni,t} / A^k_{i,t} \right)^{-\theta^k}}{\sum_{j=1}^N \left(c^k_{j,t} \tau^k_{nj,t} / A^k_{j,t} \right)^{-\theta^k}}, \tag{9}$$

where the denominator can be interpreted as inward market access of region n.[6] It also represents the sectoral price index up to a constant. The region-industry-level price in-

[6]The trade flows can be written only using trade costs and inward and outward market access term, as in Donaldson and Hornbeck (2016) and Allen and Donaldson (2022). We use this approach to construct initial trade flows between counties.

dices are aggregated to yield the regional price index. Finally, goods market clearing implies that regional total expenditure, X_n, equals regional total income, Y_n, where income solely consists of labor payment $Y^k_{ni,t} = w^k_{ni,t} L^k_{ni,t}$. Goods market clearing conditions are then given by $Y^k_{n,t} = \sum_{i=1}^N \pi^k_{ni,t} X^k_{n,t}$.

By substituting the labor market clearing condition, $Y^k_{ni,t} = w^k_{ni,t} L^k_{ni,t}$, into the outward market access term, $\Pi^k_{i,t} \equiv \left(\frac{w^k_{i,t}}{A^k_{i,t}}\right)^{-1} \left(\frac{Y^k_{i,t}}{Y_W}\right)$, the wage rate can be written as a function of productivity, the number of workers, and the outward market access:

$$w^k_{ni,t} = (A^k_{i,t})^{\frac{\theta}{1+\theta}} (L^k_{i,t})^{-\frac{1}{1+\theta}} (\Pi^k_{i,t})^{-\frac{\theta}{1+\theta}}. \tag{10}$$

Using the expression for productivity in equation (7), the wage can be further decomposed to make the potential role of the effect of industrial mobilization on productivity explicit. We use this equation to estimate the direct of productivity effect of industrial mobilization in Section 5.

4 Data

The key data for this paper are county-level information on manufacturing, agriculture, and services between 1920 and 1990 from Haines (2010).[7] This includes information on output or sales, wage bill, and employment. In particular, we construct value-added per worker or the average wage for manufacturing, output per worker for agriculture, and sales per worker or wage for services. This information is available for 1920, 1930, 1940, and then (approximately) every five years between 1947 and 1992. For the postwar years in the our sample, we take the average of the two years closest to each decade (e.g., 1958 and 1963 for 1960) to match the availability of information, e.g., on travel times that we use to construct trade costs. To ensure that all county level variables sum to the total in each census year, we construct the county share or mean of a given

[7] For "services," we use information on wholesale and retail available for the entire sample period.

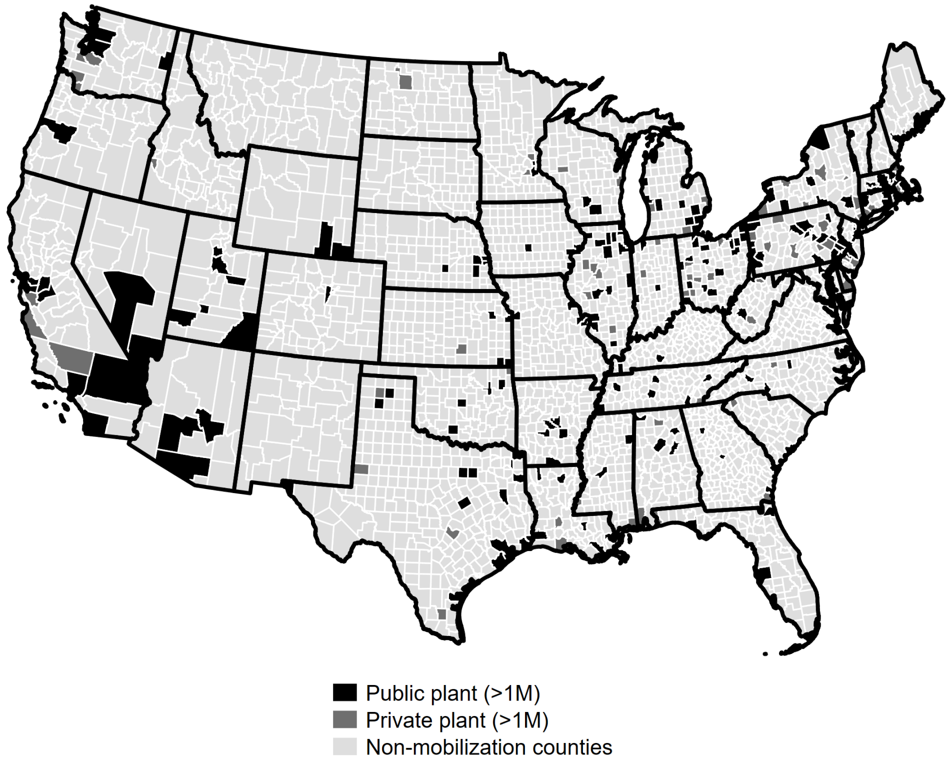
variable such that the sum or average matches the aggregate value in a given year based on the *Historical Statistics of the United States: Millenial Edition* and US Census Bureau. The result is a balanced panel of approximately 3,000 counties every year between 1920 and 1990. Finally, we match the spatial unit of analysis for different data to the 1990 county boundaries using Eckert et al. (2020).

In addition, we control for prewar manufacturing and demographic differences at the county level. For manufacturing characteristics, we use the number of establishments and value-added in 1940. For demographic characteristics, we use the urban population, median housing value, share of electrified households, fraction of men and women over age 25 with a high school degree, and employment (all in 1940), and the number of unemployed men and women in 1937. These variables capture differences in manufacturing and demographic structure that may have shaped regional development in the postwar period. We construct market access based on county-to-county travel times via the highway network in year from 1920 to 1990.

This paper uses data from *War-Created Manufacturing Plant* (US Civilian Production Administration, 1945) for information on the location, size, and source of funding for new plants during World War II.[8] There were over 300 of these plants located in over 200 counties throughout the United States. In the map in Figure 1, each county with a new plant is shaded in blue colors (dark blue for a public plant valued at more than $1 million, aqua blue for private plants valued at more than $1 million, and light blue for private plants valued at less than $1 million). Investment in these plants could be substantial. For example, the largest plants received over $100 million in investment and included the production of a variety of war-related goods. In addition to information on newly created plants, we also use information from Haines (2010) on the total amount

[8]This is the same source first used by Garin and Rothbaum (2025) to estimate the direct and intergenerational effects of industrial mobilization for World War II. In this paper, our focus is on estimating the direct effect on productivity as well as quantifying the implications for regional economic structure and worker welfare.

Figure 1: Location of New War-Related Plants



Notes: The figure shows each county in the United States where a new plant related to industrial mobilization for World War II was located. Counties shaded **dark gray** had a public plant valued at more than $1 million and counties shaded **gray** had private plants valued at more than $1 million. Counties with no new plants are shaded light gray.

of war-related contract and capital spending.

5 Estimating the Productivity Effect of Industrial Mobilization

To recover the direct effect of World War II industrial mobilization on productivity, we exploit the market access structure of the model. Following equation (10), the expression for expenditure shares describing trade flows are a function of location characteristics specific to origins and destinations as well as bilateral trade costs. We rewrite the origin and destination components in terms of market access (see Donaldson and Hornbeck, 2016) and then substitute in the expression for productivity in equation (7) (see Allen and Donaldson, 2022).

Focusing on manufacturing ($k = M$), we take logs and rearrange equation (10) to arrive at the the following estimation equation for the direct productivity effects:

$$\left(\frac{1+\theta^M}{\theta^M}\right)\log w^M_{i,t} - \frac{1}{\theta^M}\log \Pi^M_{i,t} - \left(\rho^M_{A,1} - \frac{1}{\theta^M}\right)\log L^M_{i,t} - \rho^M_{A,2}\log L^M_{i,t-1} = \gamma_A W_{n,t} + \phi_i + \phi_t + \beta_t X_i + u_{i,t} \tag{11}$$

where the dependent variable is the manufacturing wage adjusted for local market access and the role of agglomeration. Intuitively, equation (11) reflects the potential role of spatial connections across counties – via agglomeration, trade, and migration – to shape the average wage in addition to the direct effects of productivity. We fix the values of the parameters used to construct the dependent variable. In particular, we set the manufacturing elasticity, θ^M, equal to 6.5 following Nigai (2016), and set the agglomeration parameters, $\rho^M_{A,1}$ and $\rho^M_{A,1}$, equal to 0.19 and -0.04, following Allen and Donaldson (2022).

The first term on the left-hand side is a function of the wage, while the remaining terms capture the role of market access and agglomeration or congestion forces. Below we first estimate equation (11) as it appears above to recover γ_A and then present a decomposition using the wage, market access, and agglomeration components separately. On the right-hand side, we define $W_{n,t}$ as equal to one if a new plant was constructed during the 1940s interacted with a post-1940 indicator variable.[9] The second set of terms, ϕ_i and ϕ_t, are county and year fixed effects to account for the time-invariant differences across counties and national shocks. Finally, we include county-level controls interacted with year fixed effects to address differences over time in the adjusted manufacturing wage based on prewar county manufacturing characteristics.[10] The coefficient

[9] In Appendix Table A1, we consider alternative measures of war-related investment as robustness.

[10] These characteristics include the number of establishments and value-added in 1940, urban popula-

of interest, γ_A, is identified from comparisons of counties before and after World War II that received a new war-related plant, relative to counties that did not and with similar prewar county manufacturing characteristics.[11]

We take three approaches to relaxing the common and reasonable concerns that threaten a causal interpretation of γ_A. First, the adjustment to the dependent variable confronts the issue that county-level wages, market access, and (current and past) population are determined in the equilibrium of the model. Since the placement of World War II plants or investment may be spatially correlated, wages and market access are potentially affected by the placement of World War II plants in nearby counties. This means that World War II investment in neighboring counties is a potentially omitted variable, but adjusting for market access at least partially reflects the extent of these spatial linkages. Including current and lagged population in the left-hand side variable allows for an explicit role for agglomeration economies – another potentially omitted variable.[12] Finally, county and year fixed effects as well as prewar county manufacturing characteristics interacted with year effects capture the variation in local productivity that is correlated with wage and may also drive the presence of war-related investment.

The results of estimating equation (11) are shown in Table 1. We define treatment as either the presence of any new plant (Panel A) or any public plant (Panel B). In column 1, the specification includes only county and state-year fixed effects. The estimated effect of a new World War II plant is statistically significant at the 99 percent level and equal to -0.262 (Panel A) or -0.235 (Panel B), which is interpreted as a reduction in productivity of approximately 20 percent. In column 2, in addition to county and year fixed effects, the specification also includes prewar county manufacturing characteristics interacted

tion, median housing value, share of electrified households, fraction of men and women over age 25 with a high school degree, employment, and the number of unemployed men and women.

[11]Note that the empirical specification explicitly takes into account spatial linkages across regions so that the estimated coefficients have an interpretation as productivity effects in the spatial model.

[12]As noted before, preferred specification fixes θ_M as well as $\rho^M_{A,1}$ and $\rho^M_{A,1}$ at the values obtained, respectively, by Nigai (2016) and Allen and Donaldson (2022).

Table 1: Impact of Industrial Mobilization on Manufacturing Wage

	(1)	(2)	(3)	(4)	(5)
Panel A. All Plants					
1{Any WW2 Plant } × After 1940	-0.2623	0.1155	0.1011	0.0071	-0.0060
	(0.0931)	(0.0351)	(0.0300)	(0.0015)	(0.0015)
Panel B. Public Only					
1{Any WW2 Public Plant } × After 1940	-0.2353	0.0828	0.0728	0.0064	-0.0052
	(0.0902)	(0.0246)	(0.0211)	(0.0021)	(0.0012)

Notes: The table reports the results of estimating versions of equation (11). The dependent variable is $\left(\frac{1+\theta^M}{\theta^M}\right)\log w_{i,t}^M - \frac{1}{\theta^M}\log \Pi_{i,t}^M - \left(\rho_{A,1}^M - \frac{1}{\theta^M}\right)\log L_{i,t}^M - \rho_{A,2}^M \log L_{i,t-1}^M$ in columns 1 and 2, $\left(\frac{1+\theta^M}{\theta^M}\right)\log w_{i,t}^M$ in column 3, $\frac{1}{\theta^M}\log \Pi_{i,t}^M$ in column 4, and $\left(\rho_{A,1}^M - \frac{1}{\theta^M}\right)\log L_{i,t}^M - \rho_{A,2}^M \log L_{i,t-1}^M$ in column 5. In Panel A treatment is defined using all war-related plants and in Panel B treatment is defined using only war-related public plants. The sample is all US counties for the period from 1920 to 2000. All columns include county and year fixed effects; columns 2 through 5 include prewar county manufacturing characteristics interacted with year fixed effects. Each specification is weighted by the number of manufacturing workers. Robust standard errors in parentheses are clustered on state. The number of counties is 2,906.

with year effects. Including these controls changes the estimated effect from negative to positive and statistically significant; the presence of a new World War II plant increases productivity by approximately 10 percent, i.e., 0.116 in Panel A and 0.082 in Panel B. In the remaining columns, we decompose the effect of war-related investment on the composite dependent variable into the effect on each of the wage, market access, and population components separately. The results show that the most of the effect of war-related investment is captured by the direct wage effects and only a small portion – less than 10 percent of the total effect – works through market access and population.

Column 1 in Table 2 reproduces the estimate for all counties from column 2 of Table 1 and then provides separate estimates of the effect of a new World War II plant by region in columns 2 through 5. The regional heterogeneity is noteworthy. The estimated direct effect on productivity is positive for all years regions and statistically significant for the Northeast and West. The panels of Appendix Figure A1 provide the estimated effect in each postwar by region (gray line) compared with the effect for all counties (black line) for each postwar year. The results for the Northeast, Midwest, and West are con-

Table 2: Impact of Industrial Mobilization on Manufacturing Wage by Region

	All (1)	Northeast (2)	Midwest (3)	South (4)	West (5)
1{Any WW2 Plant } × After 1940	0.1155	0.0680	0.0339	0.0302	0.1379
	(0.0351)	(0.0307)	(0.0299)	(0.0700)	(0.0553)

Notes: The table reports the results of estimating versions of equation (11). The dependent variable is $\left(\frac{1+\theta^M}{\theta^M}\right)\log w^M_{i,t} - \frac{1}{\theta^M}\log \Pi^M_{i,t} - \left(\rho^M_{A,1} - \frac{1}{\theta^M}\right)\log L^M_{i,t} - \rho^M_{A,2}\log L^M_{i,t-1}$. Treatment is defined using all war-related plants. The sample in column 1 is all US counties, and the sample in columns 2, 3, 4, and 5 are counties in Northeast, Midwest, South, or West regions, respectively, for the period from 1920 to 1990. All columns include county fixed effects, year fixed effects, and prewar manufacturing characteristics interacted with year effects. Each specification is weighted by the number of manufacturing workers. Robust standard errors in parentheses are clustered on state.

sistently positive and imply a roughly 5-10 percent increase in productivity in counties with a new World War II plant; the results for the South are generally positive, but much larger standard errors reflecting both the relatively small number of treated counties and potentially heterogenous effects in this region.

In general, the pattern of results is robust to different approaches to measuring the industrial mobilization for World War II and alternative specifications. Appendix Table A1 shows that a similar qualitative pattern of the estimated effects across all counties and by region is preserved using only larger new World War plants or publicly-financed plants as well as using all capital or industrial capital investment. Appendix Table A2 presents a similar pattern of estimated effects across all counties using Poisson pseudo-maximum likelihood instead of ordinary least squares in line with Chen and Roth (2023). In Appendix Table A3 we report results contrasting our empirical strategy for estimating the direct productivity effects on manufacturing with other sectors (i.e., services and agriculture). The difference in results across sectors suggest that the positive direct effects of industrial mobilization on productivity are concentrated in manufacturing.

The estimated effects across all counties are also consistent with the broad patterns in the literature. Garin and Rothbaum (2025) were the first to estimate the effect of new plants constructed as part of industrial mobilization for World War II and find "medium run" effects for the 1960s around 9 percent and slightly larger "long run" effects for the 1980s around 10 percent (relative to the prewar period) using the same measure of the average manufacturing wage as the dependent variable. Cullen and Fishback (2013) find more muted effects on manufacturing wages in the "short run" for the late 1940s; the main effects were in increased population. The estimated effects for specific regions are roughly consistent with the results in the literature in some cases (e.g., for the South) but not in others (e.g., for the West) (e.g., Lewis, 2007; Findlay, 2023).

The counterfactual results in the next section will start by exploring the aggregate implications of industrial mobilization for World War II using the direct productivity effects from Table 1 as the baseline. However, to give appropriate credence to the alternative estimates and, therefore, to allow for a greater role for war mobilization emphasized in the literature, we will also consider counterfactuals that allow for larger direct productivity effects than estimated in this paper or stronger agglomeration forces.

6 Aggregate and Regional Impact of Industrial Mobilization

In this section we present results from counterfactuals that compare the actual equilibrium of the model with a counterfactual equilibrium that removes the impact of the direct effect on productivity of World War II plants estimated in Section 5. The quantitative results allow us to assess the impact of both direct and indirect effects of the mobilization. We are primarily interested in the changes in two sets of variables. First, we report the change in aggregate welfare as well as welfare disaggregated for individual counties and by region. Second, we provide preliminary results on the change in the share of employment in manufacturing by region relative to the national average. Together these results provide a comprehensive view of the impact of industrial mobilization for World War II on the economic geography of the United States over the second half of the twentieth century.

Table 3: Summary of Structural Parameters

Definition	Parameter	Comment
Migration elasticity	$\eta = 0.84$	Yang (2024)
Engel elasticity	$\varepsilon = 0.39$	Yang (2024)
Asymptotic consumption share	$\boldsymbol{\phi} = (0.01, 0.33, 0.66)$	Yang (2024)
Preference elasticity	$\boldsymbol{\nu} = (1.27, -0.27, -1.0)$	Yang (2024)
Discount rate	$\beta = 0.60$	Set to 0.95^{10}
Agglomeration externalities	$\boldsymbol{\rho} = (0.19, -0.04)$	Allen and Donaldson (2022)
Frechet distribution	$\boldsymbol{\theta} = (12, 6.5, \infty)$	Nigai (2016)

Notes: See main text.

In addition to the estimates of the direct productivity effect in the previous section, we need the values of other parameters for the quantitative analyses, which we summarize in Table 3. We draw on previous work covering the context of the United States in the twentieth century for estimates of the migration (η) and Engel (ε) elasticities as well as the consumption share and preference elasticities by sector (Yang, 2024).[13] One difference from our setting is that the industry classification in Yang (2024) consists of agriculture and tradable and non-tradable non-agriculture; we interpret the tradable non-agriculture as manufacturing and non-tradable as services. The preference elasticities indicate that agriculture is a necessity, while manufacturing and services are considered luxuries, where services have the highest income elasticity. Outside of agriculture, manufacturing is closer to a normal good. The discount rate β for the decennial interval is set to 0.60 by assuming the yearly discount rate of 5%. We take values for the parameters characterizing the agglomeration externalities from Allen and Donaldson (2022). Finally, direct estimation of the trade elasticities in our setting is difficult since

[13]For the migration elasticity, Yang (2024) estimates for the value over a ten-year period to be $\eta = 0.84$, which suggests a higher migration response compared to the estimates of 1.88 at the annual frequency (Artuc et al., 2010) and 5.34 at the quarterly frequency (Caliendo et al., 2019).

Table 4: Aggregate and Regional Welfare Impact of Industrial Mobilization

Welfare Impact (in %) of World War II Plants	All (1)	Northeast (2)	Midwest (3)	South (4)	West (5)
All Plants	0.581	0.815	0.664	0.276	0.514
Public Only	0.495	0.597	0.620	0.261	0.471

Notes: This table shows the change in welfare for the entire United States (column 1) as well as by region (columns 2 through 5) after counterfactually removing the impact of World War II plants. The first row uses all plants and the second row uses only public plants.

detailed data on interregional trade flows are not available for this period. Therefore, we use contemporary settings and set θ^A to 12 for agriculture and θ^M to 6.5 for manufacturing, following Nigai (2016). The value for services is set to ∞ to reflect that this sector is local.

The main quantitative results for the aggregate and regional welfare impact of new World War II plants are reported in Table 4 and Figure 2. The first and second rows of Table 4 show the welfare impact of all plants and only public plants, respectively, across all counties (column 1) and for each of the four census regions: Northeast (column 2), Midwest (column 3), South (column 4), and West (column 5). Aggregate welfare was 0.581 percent higher as a result of all World War II plants and 0.495 percent higher for public plants. The effect for all plants was highest in the Northeast at 0.815 percent and lowest in the South at 0.276 percent. The relatively high concentration of investment in the Northeast contributed to the larger gains in welfare. The results for public plants indicate similar welfare increases in the Northeast (0.597 percent) and Midwest (0.620 percent) followed by the West (0.471 percent) and then the South (0.261 percent).

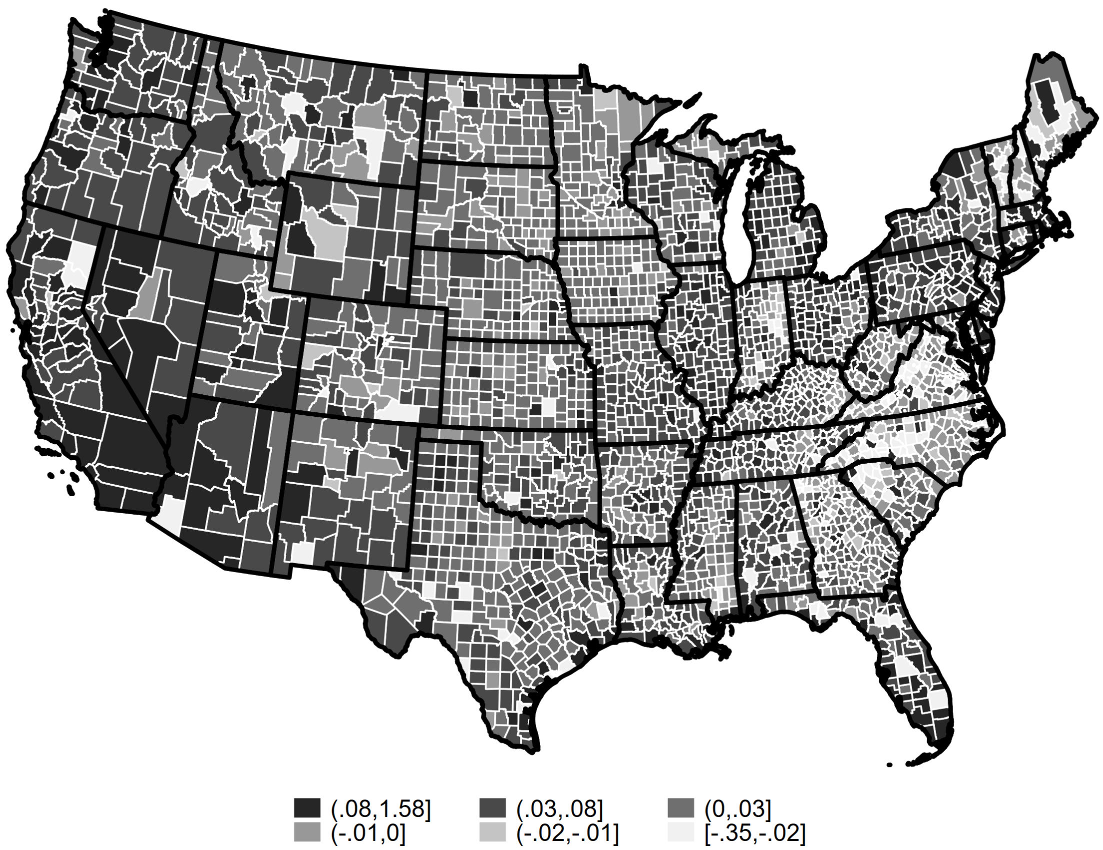
Since we rely on estimates of the trade elasticity not drawn from the historical context of the United States in the twentieth century, we consider the robustness of our baseline results to two alternative values of this parameter for manufacturing: $\theta = 3.5$ and $\theta = 9.5$. Our conclusions regarding the aggregate welfare effects are robust to these values. In particular, the welfare effect for all counties is 0.526 percent using $\theta = 3.5$ and 0.603 percent using $\theta = 9.5$. While the levels of elasticity influence the size of trade responses, their impact on welfare operates through consumption welfare, and the changes in trade elasticity lead to a quantitatively small effect on the aggregate effects.[14]

Regions that were not directly affected by investment experienced some gains due to their linkages to the mobilization counties that became more productive, while a small number of counties saw decreased welfare due to competition effects. For example, counties in the Great Plains and South Atlantic tended to be negatively affected by the absence of World War II plants. Figure 2 summarizes the spatial distribution of the welfare impacts across all US counties, where darker gray represents larger gains in welfare and lighter gray indicates larger losses.

These results are shaped in potentially different ways by the mechanisms of the model, the spatial distribution of new plants, and the size of the direct productivity effects. We next focus on better understanding how the agglomeration, migration, and trade mechanisms in the model shape the results. In particular, we also carry out counterfactuals that remove all plants, while also shutting down adjustments that take place due to agglomeration, migration, or trade. In each case, welfare effects, i.e., in the absence of agglomeration, migration, and trade, are 0.600, 0.689, and 0.730 percent, respectively, which are similar to the baseline result. Hence, we interpret the impact of each of these mechanisms as second-order relative to the direct effects. To see this more clearly, Table 5 provides additional results focusing on the welfare impact under alter-

[14] For intuition, the formula introduced by Arkolakis, Costinot and Rodríguez-Clare (2012) illustrates the role of trade elasticity. Arkolakis, Costinot and Rodríguez-Clare (2012) demonstrate that changes in real income in canonical trade models can be expressed as changes in own expenditure share (one minus import share) raised to the inverse of trade elasticity. A lower trade elasticity simultaneously increases changes in own expenditure share and the elasticity exponent, which leads to offsetting effects. The consumption effects of the model consist of the changes in real income and the non-homothetic price adjustment term.

Figure 2: Spatial Distribution of Welfare Impact of Industrial Mobilization



Notes: This figure shows the welfare impact of World War II plants for all US counties. Darker shades of gray versus lighter shades of gray indicate "more positive" versus "more negative" welfare effects, respectively.

Table 5: Welfare Impact of Industrial Mobilization Varying Direct Productivity Effects

	All (1)	Northeast (2)	Midwest (3)	South (4)	West (5)
Baseline					
Welfare Impact (in %) of Any Plant	0.581	0.815	0.664	0.276	0.514
Change in Direct Effect of World War II Plants					
Multiplied by:					
1.25	0.729	1.022	0.833	0.346	0.646
1.50	0.877	1.230	1.002	0.417	0.778
1.75	1.027	1.439	1.172	0.488	0.911
2.00	1.177	1.649	1.343	0.559	1.045

Notes: This table shows the change in welfare for the entire United States (column 1) as well as by region (columns 2 through 5) after counterfactually removing the impact of World War II plants. The first row reproduces the result in Table 4. The remaining rows increase the direct productivity effects of industrial mobilization.

native assumptions regarding the direct impact of World War II plants. The table shows the effect of increasing the (baseline) estimated direct productivity of industrial mobilization in Table 4 by 25, 50, 75, and 100 percent for all counties (column 1) and the four census regions (columns 2 through 5). The results suggest that the welfare effects scale approximately linearly with increases in the magnitude of the direct effects. For example, moving from the top to the bottom row, if the productivity parameter doubles then the aggregate welfare impact across all counties in column 1 increases from 0.581 to 1.177 percent. A similar pattern holds within each census region. Overall, this suggests the importance of the direct productivity effects in determining welfare.

Alternatively, rather than focusing on different values of the direct effect applied to all plants, we next consider the impact of counterfactually placing new plants in the largest counties rather than the actual placement. This is an attempt to capture the plausible scenario in which new plants would have been built even in the absence of World War II. In particular, we consider how much placing new plants in the largest counties to better exploit agglomeration economies would have increased welfare over the actual distribution of plants built as part of industrial mobilization. The results suggest that welfare would have been 0.736 percent higher if plants had been built in the highest population counties.[15] This finding is consistent with the significant public control over industrial mobilization steering investment to locations in order accomplish shorter-run objectives related to the fighting the war rather than longer economic development goals.

Finally, Figure 3 shows the counterfactual change in employment across sectors respectively for all counties in the United States and by region.[16] Across the entire United States and in each region, industrial mobilization leads to a long run increase of employment in manufacturing. The largest increases in the manufacturing employment share are in the Northeast and Midwest (approximately 0.25 percentage points), while increases in the South and West are roughly half the size. In contrast, agricultural employment decreases relative to the counterfactual in the absence of World War II. This effect varies between 0.1 and 0.25 percentage points across different regions, with the largest counterfactual decrease in the West. For services, there are regional differences: employment shares decrease in the Northeast and Midwest, but increase in the South (slightly) and West. Taken together, these results suggest industrial mobilization played a modest role in facilitating structural change nationally, particularly in the transition from agricultural to manufacturing, while the largest effects on manufacturing in the Northeast and Midwest relative to the South and West indicate that the war did not contribute regional convergence in the sectoral composition of employment.

[15] This is based on counterfactually allocating plants to the 304 counties with the largest populations, where 304 is the number of counties that actually received new war plants.

[16] The counterfactual change in employment shares is calculated by taking the difference in the share of workers in each industry between the baseline economy and the counterfactual economy in the absence of industrial mobilization.

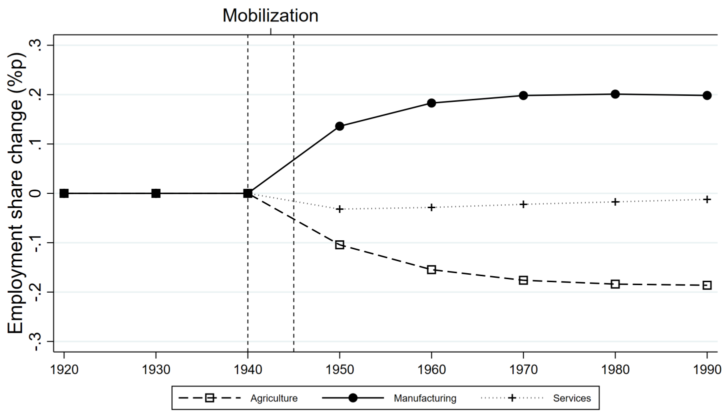
7 Conclusion

This paper presents results regarding the aggregate and regional impact of industrial mobilization for World War II on the United States. We first estimate the direct effect of large plants on productivity; our results across all US counties are similar to those obtained elsewhere in the literature. We then simulate a dynamic spatial equilibrium model to assess the implications of industrial mobilization for aggregate welfare and regional development by incorporating spatial linkages via trade, migration, and agglomeration.

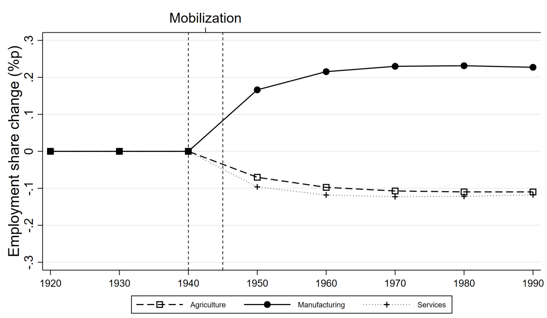
The main findings suggest a positive effect of industrial mobilization on aggregate welfare (approximately 0.581 percent) with the largest welfare gains accruing to counties in the Northeast (0.815 percent) and the smallest to counties in the South (0.276 percent). In terms of sectoral composition, at the aggregate level, industrial mobilization facilitated structural change out of agriculture. Regionally, industrial mobilization reinforced the prominence of the Northeast and Midwest in manufacturing, although the South and West did experience some gains; agriculture was smaller everywhere; and service sector employment decreased in the Northeast and Midwest, but increased in the South and West.

Taken together, these results suggest that mobilization had a modest positive overall effect on welfare, although there is substantial regional heterogeneity. Similarly, mobilization promoted industrialization, but our results suggest that the lasting impact was something less than the transformation of backward regional economies. Those changes took place as the result of slower moving processes stretching back to nineteenth and through the twentieth centuries (Rhode, 2021). In light of this, the aggregate and regional transformations of the US economy in the postwar period should more sensibly be attributed to myriad factors.

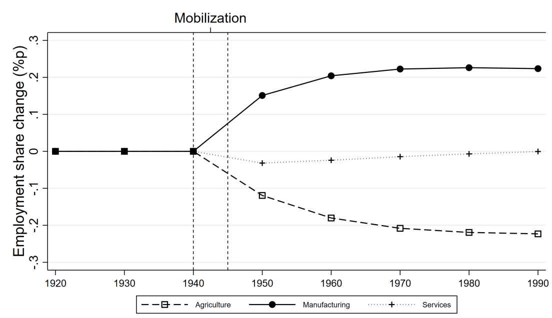
Figure 3: Counterfactual Employment in Agriculture, Manufacturing, and Services



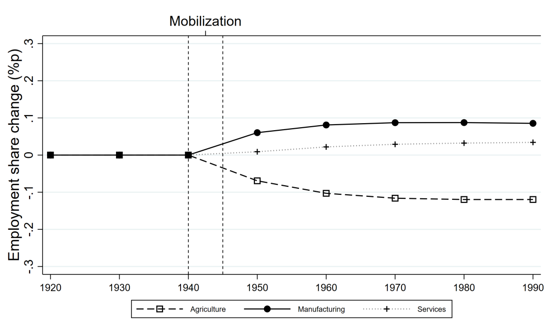
A. All Counties



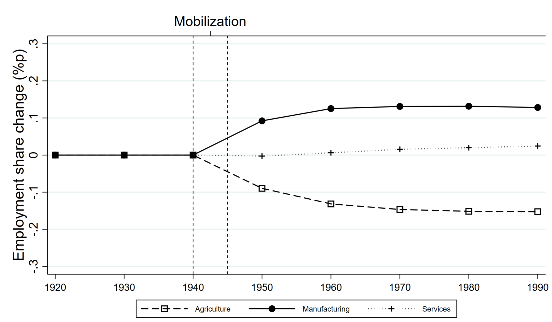
B. Northeast



C. Midwest



D. South



E. West

Notes: The figure shows the counterfactual results for the sectoral employment shares in the United States (Panel A) and by region for the Northeast (Panel B), Midwest (Panel C), South (Panel D), and West (Panel E). The employment share change is calculated as the difference in the share of workers in each industry between the baseline economy and the counterfactual economy in the absence of industrial mobilization. Each line indicates the counterfactual change in the employment share without large plants in agriculture (in dashed line □), manufacturing (in straight line ○), and services (in dotted line +).

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Appendix

A Additional Tables and Figures

Table A1: Impact of War Mobilization by Type of Investment

	Any Plant (1)	Public Plant (2)	Log of Any Plant (3)	Log of Public Plant (4)	Value of Any Plant (5)	Value of Public Plant (6)
Panel A. All Counties						
Mobilization × After 1940	0.1155	0.0828	0.0122	0.0087	0.7077	0.8747
	(0.0351)	(0.0246)	(0.0030)	(0.0024)	(0.1155)	(0.1294)
Panel B. Northeast						
Mobilization × After 1940	0.0680	0.0323	0.0062	0.0026	0.2387	0.1074
	(0.0307)	(0.0259)	(0.0029)	(0.0026)	(0.2772)	(0.3366)
Panel C. Midwest						
Mobilization × After 1940	0.0339	0.0276	0.0047	0.0040	0.5141	0.6349
	(0.0299)	(0.0270)	(0.0026)	(0.0025)	(0.1009)	(0.1134)
Panel D. South						
Mobilization × After 1940	0.0302	0.0472	0.0044	0.0054	0.4094	0.3368
	(0.0700)	(0.0671)	(0.0065)	(0.0065)	(0.3052)	(0.3532)
Panel E. West						
Mobilization × After 1940	0.1379	-0.0171	0.0144	-0.0006	2.3026	1.4686
	(0.0553)	(0.0512)	(0.0052)	(0.0039)	(0.4917)	(0.5444)

Notes: The table reports the results of estimating versions of equation (11) using alternative measures of World War II mobilization. The dependent variable in each column is the log of average manufacturing wage (plus one) adjusted for market access as well as current and lagged population. The sample in Panel A is all US counties, and the sample in panels B, C, D, and E are counties in Northeast, Midwest, South, or West regions, respectively, for the period from 1920 to 1990. The measures of World War II investment are an indicator for any World War II plant (column 1), an indicator for a World War II plant with a value greater than $1 million (column 2), an indicator for a publicly-financed World War II plant with a value greater than $1 million (column 3), the log value of industrial capital (column 4), and the log value of military capital (column 5). All columns include county fixed effects, year fixed effects, and prewar manufacturing characteristics interacted with year effects. Each specification is weighted by the number of manufacturing workers. Robust standard errors in parentheses are clustered on state.

Table A2: Impact of War Mobilization by Type of Investment using PPML

	Any Plant	Public Plant	Log of Any Plant	Log of Public Plant	Value of Any Plant	Value of Public Plant
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. All Counties						
Mobilization × After 1940	0.0926	0.0479	0.0090	0.0049	0.4535	0.5685
	(0.0301)	(0.0188)	(0.0027)	(0.0018)	(0.1129)	(0.1224)
Panel B. Northeast						
Mobilization × After 1940	0.0694	0.0265	0.0061	0.0020	0.2157	0.0457
	(0.0377)	(0.0300)	(0.0036)	(0.0031)	(0.3516)	(0.4091)
Panel C. Midwest						
Mobilization × After 1940	0.0151	0.0062	0.0021	0.0015	0.3612	0.4837
	(0.0233)	(0.0174)	(0.0017)	(0.0013)	(0.0548)	(0.0770)
Panel D. South						
Mobilization × After 1940	0.0339	0.0177	0.0037	0.0027	0.1984	0.2494
	(0.0375)	(0.0435)	(0.0038)	(0.0043)	(0.2333)	(0.2879)
Panel E. West						
Mobilization × After 1940	0.1242	0.0187	0.0127	0.0021	1.4244	0.9108
	(0.0334)	(0.0679)	(0.0029)	(0.0056)	(0.2729)	(0.1833)

Notes: The table reports the results of estimating versions of equation (11) using Poisson pseudo maximum likelihood. The dependent variable in each column is the average manufacturing wage adjusted for market access as well as current and lagged population. The sample in Panel A is all US counties, and the sample in panels B, C, D, and E are counties in Northeast, Midwest, South, or West regions, respectively, for the period from 1920 to 1990. The measures of World War II investment are an indicator for any World War II plant (column 1), an indicator for a World War II plant with a value greater than $1 million (column 2), an indicator for a publicly-financed World War II plant with a value greater than $1 million (column 3), the log value of industrial capital (column 4), and the log value of military capital (column 5). All columns include county fixed effects, year fixed effects, and prewar manufacturing characteristics interacted with year effects. Each specification is weighted by the number of manufacturing workers. Robust standard errors in parentheses are clustered on state.

Table A3: Impact of World War II Plants by Sector

	Manufacturing	Services	Agriculture
	(1)	(2)	(3)
$1\{$Any WW2 Plant $\} \times$ After 1940	0.1011	0.0033	-0.0178
	(0.0300)	(0.0082)	(0.0532)
Number of Counties	2,906	2,906	2,906

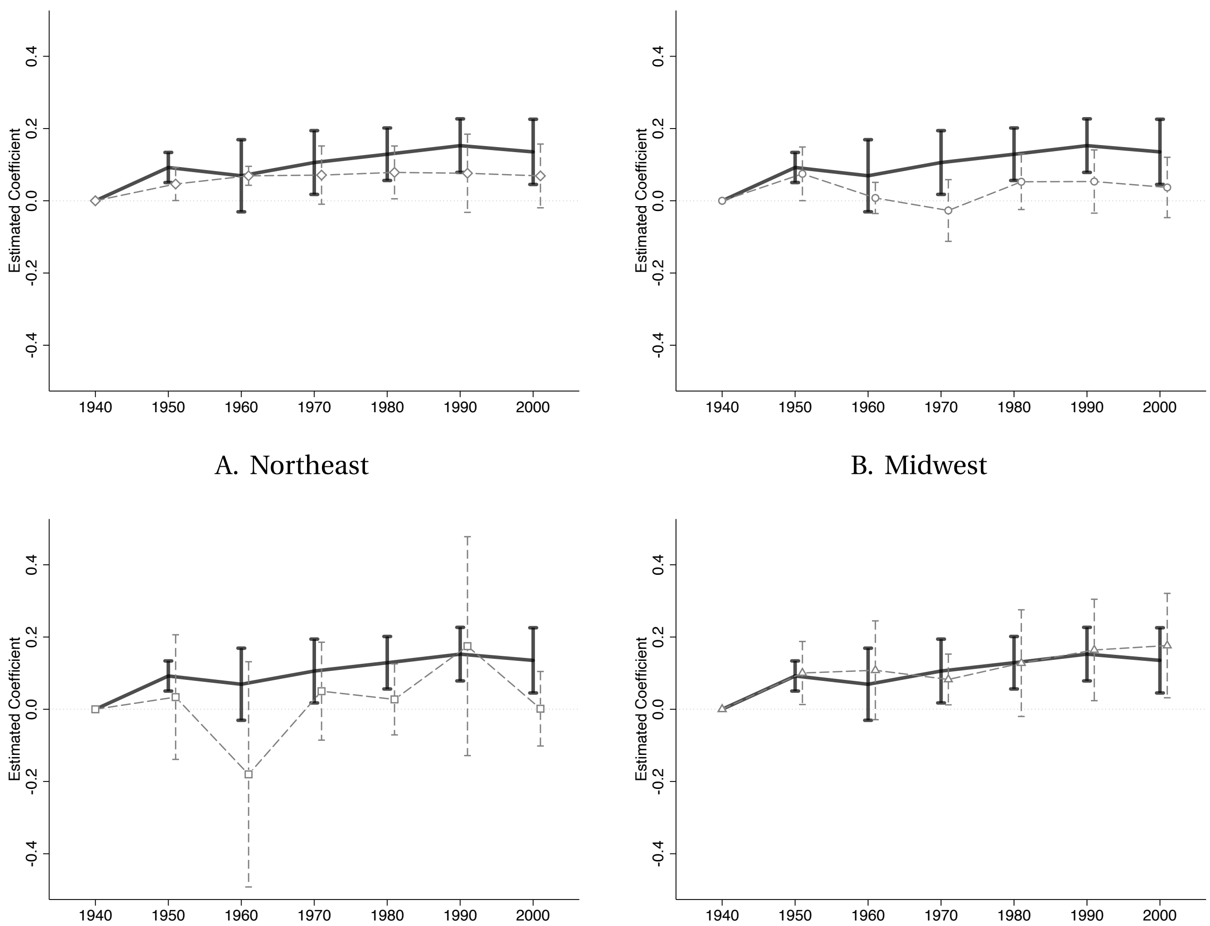
Notes: The table reports the results of estimating versions of equation (11) for manufacturing, services, and agriculture. The dependent variable is the average wage in manufacturing, average wage in services– where we use information from wholesale and retail to proxy for services– and average crop value per worker in agriculture in columns 1, 3, and 5. In columns 2, 4, and 6, the variable for each sector is adjusted for market access as well as current and lagged population. All columns include county fixed effects, year fixed effects, and prewar manufacturing characteristics interacted with year effects. Each specification is weighted by the number of workers in each sector. Robust standard errors in parentheses are clustered on state.

Table A4: Welfare Impact of Industrial Mobilization by Type of Investment

	Indicator (1)	Log (2)	Level (3)
All Plants	0.581	0.852	1.068
Public Only	0.495	0.505	0.959

Notes: This table shows the change in welfare for the entire United States after counterfactually removing the impact of World War II plants. The first row includes all plants and the second row includes only public plants. Column 1 reproduces the results from in Table 4 using an indicator to reflect the presence a plant. The remaining columns provides results using the log of investment (column 2) or the dollar value of investment (column 3) as alternative measures of war related investment

Figure A1: Impact of Industrial Mobilization on Manufacturing Wage by Region and Year



A. Northeast

B. Midwest

C. South

D. West

Notes: The figure shows the estimated coefficient γ_A from equation (11). In each panel estimate of γ_A using all US counties appears as a solid black line together with an estimate of γ_A using only counties in the Northeast (Panel A), Midwest (Panel B), South (Panel C), and West (Panel D) as a dashed gray line. In addition, for each set of estimates there is a 95 percent confidence interval based on robust standard errors clustered on state.