# The Rise and Fall of Female Labor Force Participation During World War II

Evan K. Rose*

June 5, 2017

**Abstract**

I use newly digitized and existing data on military manpower mobilization, employment in war-related industries, and public employment office activities to revisit the impact of World War II on female labor force participation (FLFP). First, I show that geographic variation in female employment during the war was largely driven by the allocation of military contracts. Manpower mobilization, which several recent studies implicitly use as an instrument for female labor demand, has a limited connection to wartime work. Second, I show that the wartime boom in female employment had no detectable effect on FLFP by 1950 beyond modest effects in manufacturing industries for white women. Finally, I provide evidence using data and narratives from the U.S. Employment Service (USES) that the decline in female employment immediately following the war was the result of displacement by returning veterans and sharp cutbacks in war-related industries, rather than drops in female labor supply. The results suggest that the rapid rise of female employment during WWII was made possible by temporary changes in labor demand that quickly reverted at the war's conclusion. Permanent shifts in opportunities for women in the labor force would continue to evolve gradually over the ensuing decades, despite the sudden and short-lived WWII shock.

## 1 Introduction

World War II prompted one of the largest shifts in female labor supply in United States history. Roughly 6.7 additional million women went to work during the war, increasing

*University of California, Berkeley. ekrose@econ.berkeley.edu. Thanks to David Card, Barry Eichengreen, Nicholas Li, Christina Romer, David Romer, and the students in Econ 210A, who provided much valuable feedback and advice. Li also provided excellent assistance with data entry. The Berkeley Economic History Laboratory provided generous financial support.

the female labor force by almost 50% in a few short years.[1] Many of these new entrants worked in previously male-dominated jobs constructing aircraft, assembling munitions, and staffing a burgeoning federal service. At the same time, the 1940s also marked the start of a remarkable run of female labor force participation (FLFP) growth in the U.S. By 1950, FLFP had increased by 3.7 p.p. overall from a base of 25.8% and 8.2 p.p. for white, married women (from a base of 12.5%), kicking off a run of 5-10 p.p. decadal growth that persisted until 1990.

Did WWII "jump start" this rapid growth in FLFP over the second half of the 20th century? The empirical evidence is mixed. Despite the size of the boom in female employment, the wartime experiment ended almost as abruptly as it began. Many female wartime workers left the labor force in the fall of 1945 and spring of 1946, returning aggregate FLFP almost to pre-war levels (see Figure 1). A sample of the female workforce in 1950 suggested that wartime work had little *direct* impact on the female labor force by the end of the decade (Goldin 1991). But more recent work studying manpower mobilization finds that siphoning off prime age men from local labor markets had lasting impacts on women's labor force attachment by 1950 and beyond (Acemoglu, Autor & Lyle 2004, Goldin & Olivetti 2013, Jaworski 2014).

This article uses a combination of new and existing data to revisit both the sources of the WWII boom and bust in female work and its impact on the changes in FLFP that followed. I make three primary contributions. First, I present data on the spatial distribution of more than 4 million women working in war-related industries in 1943 and 1944 and the placement of women into more than 10 million jobs by public employment offices over the same period. This data has not been previously analyzed in the literature. While recent work has hypothesized that the withdrawal of men from local labor markets and into the armed forces prompted women to join the workforce, this does not appear to be the case. Instead, wartime female work is much more closely related to the allocation of military contracts for equipment and supplies, which predict both the quantity of workers and the female share. The results suggest that labor demand and active recruiting for critical war jobs was a primary driver of the wartime female worker boom, rather than draft-induced local labor shortages or shocks to household income as husbands and fathers transitioned to modest military payrolls.

Second, I show that this boom in female wartime work did not persist into 1950, consistent with earlier results but contrary to the relatively new literature studying manpower mobilization. This result holds across multiple levels of geographic aggregation (states and

[1] This is a trough-to-peak measure from December, 1940 (13,590 thousand) to June, 1945 (20,290 thousand) as reported in (U.S. Census Bureau, Department of Commerce 1947).

"commuting zones" – defined below) and across multiple measures of female wartime employment intensity. The result also holds when instrumenting for female wartime employment using spatial variation in military contracts. At the industry level, however, it appears that areas more exposed to wartime employment saw modestly faster growth in female manufacturing employment at the expense of jobs in non-durables industries like apparel and textiles, particularly for white women. While these findings run counter to several studies on the effects of manpower mobilization, it is difficult to interpret that work given the weak relationship between female wartime work and the draft. Some earlier positive results also appear to be driven by use of census labor force variables that change definition between 1940 and 1950, leading to spurious measured increases in weeks worked for part-time female workers.

Third, I provide evidence that the large declines in female employment after the war appear to have been the combined result of layoffs in industries scaling back wartime production, displacement in industries that traditionally favored men or with explicit policies to rehire returning veterans, and large discrepancies in the wages and positions available to laid-off women relative to their wartime work. Detailed records from the U.S. Employment Service (USES) show sharp declines in the female share of job placements exactly when WWII veterans began to rejoin the civilian workforce. The industries that experienced the largest drops in total job placements, such as ordnance, rubber, and aircraft manufacturing, also saw the sharpest declines in female placement shares. Women continued to apply for work in large numbers, however, and swelled the unemployment compensation rolls in urban areas like Atlanta, GA, Trenton, NJ, and Columbus, OH. Thus while the war may have shifted cultural attitudes towards women in the workforce and set the stage for gains over the second half of the 20th century, the wartime experience of "Rosie the Riveter" appears to have been a temporary exception to the labor demand patterns that prevailed at the start the decade and had largely resumed by its end.

There is a substantial related literature on the role of WWII in female labor supply changes over the 20th century. Early readings of the narrative evidence suggested that the temporary surge in wartime employment increased both female labor supply, as women invested in skills and redefined their roles in the household, and demand, as employers became more willing to hire women after positive experiences during the war. This view was challenged in the 1980s and 1990s by both historians and economists, who showed that the majority of Rosies – women who entered the workforce from 1940 to 1945 – did not become permanent participants. Goldin (1991), for example, uses a retrospective survey to demonstrate that among among women working in 1950, the rate of entrance into the labor force was roughly

constant over the previous decade.

A related literature followed these challenges by attempting to explain why so few wartime workers appear to have remained in labor force in a series of case studies. Kossoudj & Dresser (1992*a*) and Kossoudj & Dresser (1992*b*), for example, examine employment records for Ford's Willow Run bomber plant and show that many of the factory's female workers were laid off and not recalled as the plant convert to peace-time production, despite the fact that jobs requiring similar skills continued to exist at the converted plant. Milkman (2016) documents similar patterns in the broader automobile sector. Mulligan (1998) argues that non-pecuniary incentives were the primary driver of wartime work, perhaps explaining its exceptional and short-lived impact.

In the last 15 years, however, several analyses have resuscitated a direct role for World War II in subsequent female labor supply patterns. Acemoglu, Autor & Lyle (2004) and Goldin & Olivetti (2013) exploit cross-state variation in manpower mobilization rates induced by the draft to argue that the war increased female labor force participation in 1950, despite the fact that many wartime workers left the labor force. Acemoglu et al. find that women worked 1.1 more weeks on average in states with 10 percentage points higher mobilization rates. Goldin et al. finds that the effect is concentrated among white, married women from the top half of the education distribution. Fernandez, Fogli & Olivetti (2004) use the same data to argue that the war also changed work preferences for the subsequent generation. Using similar methods but reaching a different conclusion, Jaworski (2014) uses within-state variation in mobilization across time to argue that exposure to World War II decreased educational attainment among high-school aged women and reduced their later employment and earnings. While they do not exploit mobilization, Carr & Rettenmaier (2015) also argue for long-run effects of WWII, finding that women who worked during the war were more attached to the labor force in later decades relative to women who did not.

The remainder of this paper is organized as follows. In Section 2, I detail the new and existing data sources analyzed. In Section 3.1, I present results on the determinants of spatial variation in female wartime employment. In Section 3.2, I analyze the relationship between female wartime work and FLFP in 1950. In Section 3.3, I test for effects of mobilization on FLFP in 1950 and reconcile my results with previous work. In Section 4, I analyze the mechanisms behind women's exit from the labor force after the war. And in Section 5, I conclude.

# 2 Data

## 2.1 Female wartime employment

I use two separate data sources on female employment in the wartime economy. The first consists of reports from the War Manpower Commission's (WMC) form ES-270, a regular labor force survey of employers in critical war industries and labor markets conducted by local field offices. The survey focused on critical manufacturing and ordnance industries, but also covered employment in government, transport, mining and other sectors.[2] ES-270 reports were previously studied in Collins (2001) in the context of minority employment and fair employment laws, but have not been used to study female workers, to my knowledge.

The WMC produced detailed summaries of these reports for several months between 1943 and 1945, providing point-in-time measures of female employment in metropolitan areas across the U.S. The summary reports for July 1944, when total female employment was highest in the data, cover more than 14.3 million employees and 4.6 million women, 3.8 million of whom worked in manufacturing industries and 438 thousand of whom worked in government. The BLS estimated the number women employed in manufacturing in March 1944 as 5.6 million (see Table 1), while the U.S. civil service commissions lists 1.1 million total female employees in the federal civilian service in 1944. This suggests that the ES-270 reports, while not comprehensive, capture a meaningful share of female employment in manufacturing and government, which were the primary drivers of the wartime female employment boom.

The second source consists of monthly reports on the activities of the USES, a network of public employment offices originally created before World War I and reinstated during the Great Depression to recruit men for President Roosevelt's Civilian Conservation Corps. During the war, the USES became an important labor market clearinghouse, especially for defense-related industries. By the third quarter of 1944, 7 out of 10 jobs in manufacturing were filled by the USES, according to the agency. In 1944 alone, the USES filled 11.4 million jobs, including 3.8 million with women. About 6.8 million of these jobs were in manufacturing industries, with the remainder in retail and wholesale trade, transport, government, and other sectors.

USES activities are detailed in monthly reports published under a variety of names as the

[2]Critical manufacturing industries were not limited to ordnance. For example, the October 1943 ES-270 reports count roughly 640,000 women in textile mills and apparel industries, 420,000 in electrical machinery, and 1,100,000 in transport equipment (including automobiles).

department was transferred between agencies over the course of the war.[3] These reports typically included information on job applications and placements for women, nonwhites, and veterans, often broken down by detailed industry and occupation categories, state, or both. Alongside the placement data, the reports provided qualitative summaries of the employment situations in a diverse set of industries ranging from airframes to department stores and in a wide set of geographies. The reports also contain data from several one-off studies of local labor markets. In what follows, I make use of information from a study of unemployment compensation claimants in Atlanta, GA, Columbus, OH, and Trenton, NJ, in the fall of 1945.

The WMC and USES datasets capture related but distinct aspects of the female employment experience during WWII. While roughly 80% of reported employment in the ES-270 data is in manufacturing industries, USES placements data provides broader coverage. 50-60% of placements during the war were in manufacturing, with the remainder spread across retail and wholesale trade, services, government, and private households. Figure 2 Panel A shows that despite these differences, states with more female WMC employment also had more female placements.

The female shares of employment and placements, however, do not show the same pattern, as displayed in Figure 2 Panel B. This may be due to both the broader industrial coverage of the USES data as well as the fact that placements are a measure of hires (flows), while the WMC data provides a point-in-time measure of total female employment (stocks). If separation rates varied for men and women across states, the cross-sectional flows relationship need not be the same as the cross-sectional stock relationship. Other factors, such as higher turnover in male-dominated jobs in some states, may also decrease the female share of placements while leaving the female share of WMC employment fixed.

In what follows, I consider total WMC female employment in July 1944 at the state-level and 1990 commuting zone-level and normalized by the 1940 female population aged 16 or older. Commuting zones provide a convenient way to group counties into individual labor markets more likely to respond to WMC employment, especially because the metro areas listed in WMC reports often straddle multiple counties. Since the USES data is only available for individual states, I consider total placements from 1942-1944 at that level of aggregation and again normalized by the 1940 female population aged 16+. Finally, I also study the female share of placements and employment. All sub-state level rates and per-capita measures are

[3]Early reports were called "Labor Market Developments" and published by the Federal Security Agency, which became home to the USES in 1939. In 1942, after the USES was transferred to the WMC, information comes from "The Labor Market," published by the WMC's Bureau of Program Planning and Review. By 1945, the USES had moved to Labor Department, who published the reports under the same name.

winsorized at the 95th percentile. See Appendix Tables 9 and 10 for a complete list of state-level WMC and USES data and the Data Appendix for additional details on the data construction.

## 2.2 Manpower mobilization

I use several sources of data on manpower mobilization. State-level data come from tables in Selective Service Administration reports (Selective Service System 1948). These tables report the total number of men registered for the draft in each state through September 1, 1945 and the number of men who enlisted or were drafted. Mobilization intensity is measured as the fraction of registered men who were drafted and enlisted, which given the broad scope of later draft registrations approximates the share of military-aged men who served.[4] The same or similar data is used and discussed in Acemoglu, Autor & Lyle (2004), Goldin & Olivetti (2013), and Jaworski (2014), all of which provide additional detail on the draft process and mobilization measure.[5]

To measure mobilization at the sub-state level, I use induction records from a National Archives database of about nine million individual records for the U.S. Army and Army Air Forces. The data were created from the Army's original induction "punch cards" that recorded basic information about inductees, including serial number, name, address, rank, height, weight, and other information on paper index cards. In 1994, the National Archives and the Census Bureau converted over a thousand microfilm rolls of punch card images into a digital format. Because some microfilm roles were unreadable, several blocks of known Army serial numbers are missing. Unfortunately, serial numbers began with two digits that denoted the soldier's state of origin in clusters of three to nine states. The result is that several states are missing significant shares of total inductions as reported in other Army documents.[6]

[4]The armed forces were segregated during WWII and black men were drafted less frequently. States with larger black populations consequently experienced lower mobilization rates when measured as a share of total population.

[5]One addendum to these discussions is that variation in manpower mobilization does not solely reflect idiosyncratic variation in draft rates. Many men volunteered for service directly to the various branches of the armed forces before 1942. Although a common claim is that volunteering was banned after 1942, this is not true. Individuals could still volunteer after 1942 with their local draft board's permissions. This may make the true share of troops drafted lower than the reported 70% figure.

[6]In 14 states, induction records cover 90% or more of the known total. These states are Alabama, California, Connecticut, Florida, Georgia, Massachusetts, Maine, Mississippi, Nevada, North Carolina, New Hampshire, Rhode Island, Utah, and Vermont. Twenty-three states have 80% coverage or more. Eight states have less than 50% coverage. Importantly, the data also do not include officers.

To obtain a more comprehensive measure of manpower mobilization, I also collect data on total war deaths by county. If the conditional probability of being killed in action is uncorrelated with other county-level characteristics that influence the outcomes of interest, death rates can provide a noisy but unbiased measure of county-level induction rates. I show in the Data Appendix that casualty rates are a strong predictor of induction rates in areas with high induction data coverage.

I consider both induction and war death rates at the state and 1990 commuting zone level. In commuting zone analyses, I normalize by the 1940 male population aged 21-54, which roughly captures the population of eligible men. In state-level analyses, I normalize by total draft registrants as in the previous literature studying manpower mobilization. When studying the induction data, I restrict to states where the data captures at least 80% of the known totals. All sub-state level rates and per-capita measures are winsorized at the 95th percentile.

## 2.3 Military contracts

In order to measure the scale and geography of industrial mobilization for the war, I use measures of county-level spending on WWII military contracts drawn from Census Bureau's County Data Book of 1947, as studied in Fishback & Cullen (2013). This data lists major contract spend for equipment and non-equipment related supplies and facilities between June 1940 and September 1945. Spending is allocated to individual counties if the primary producing plants were located there. I use the sum of spending across all categories and normalize by the 1940 population aged 16+. All sub-state level rates and per-capita measures are winsorized at the 95th percentile.

## 2.4 Labor force participation

Finally, I combine the above sources with information on female employment and labor force participation in each state and county from IPUMS micro-samples for 1880-1970 (Ruggles et al. 2010). Because counties are unavailable in the 1950 IPUMS micro-sample, I assign individuals to commuting zones probabilistically using their 1950 State Economic Area's population overlap with the each zone's constituent counties, as in Autor, Dorn & Hanson (2013).[7] I perform the same probabilistic assignment for the 1960 PUMAs and 1970 County Groups for the single piece of analysis that makes use of that data. Whenever possible, I use

[7]The requisite code is available on the author's website.

the 1940 complete count census to construct 1940 measures. I also use ICPSR's State and County data books to collect additional covariates, such as the share of land devoted to agriculture (Haines & Inter-university Consortium for Political and Social Research 2010).

# 3 Results

## 3.1 Female wartime employment

To begin, I study the determinants of geographic variation in female employment during the war. While women worked in war-related industries and were placed into new jobs by the USES in every state across the country, wartime employment increases were concentrated in select areas in the West Coast, Great Lakes, and New England. The top ten labor markets accounted for more than 43% of female WMC employment by the end of 1944, including over a quarter million in the Chicago area and similar concentrations in Newark-Trenton, NJ, and Detroit. In Oregon, California, and Washington, meanwhile, the USES placed more than three times as many women into jobs on a per capita basis during the war than Oklahoma, Nebraska, or Montana.

This spatial variation is tightly linked to where military investments in supplies and facilities increased the need for new workers to rivet, weld, and solder. In Figure 3, I plot the spatial distribution of peak female WMC employment and total military contract spending (Panels A and B), as well as the unadjusted bivariate relationship between the two (Panel C). Strong spatial concentrations are clearly visible in both maps, such as in the aircraft manufacturing hubs in the Pacific North West, and, as expected, while roughly half of the 722 commuting zones report no female work, WMC employment and contract spending remain tightly correlated. The fit in Panel C suggests that contract spending explains more than 50% of the spatial variation in war-related employment. Contract spending also predicts the *share* of female employment in WMC jobs, although female utilization appears to have been roughly capped at about 40% and the relationship is weaker among commuting zones with positive female shares only.

In Table 2, I test whether the relationship between WMC employment and contract spending holds conditional on other controls likely to affect female labor force participation. Columns 1 and 2 show that the overall relationship is largely unchanged by the inclusion of controls for the 1940 share of employment in manufacturing, white share of population, median schooling for women 25 years or older, and the 1940 female labor force participation rate. Thus, it does

not appear that war contracts were allocated to areas otherwise predisposed to send a large share of women into the wartime workforce. The results in columns 7 and 8 confirm that war contracts also robustly predict the female share of employment, although the relationship is weakened slightly by the controls.

This results stand in stark contrast to the relationship between manpower mobilization and female wartime employment. As shown in Panels E and F of Figure 3. Both manpower mobilization and war deaths exhibit a weak relationship with female WMC employment. The relationship is also very sensitive to controls. The results in columns 3 to 6 of Table 2, for example, show no consistent pattern and often do not reject a zero effect. The results in columns 9 to 12 tell a similar story for the female share of WMC employment.

In order to compare these results to previous studies and to make use of the USES data, in Table 3 I repeat these regression exercises at the state level. Contract spending appears to predict both WMC employment and USES placements across states, as shown in columns 1-2 and 5-6. The relationship is less precisely estimated, however, due to the drop in sample size, and the connection between contract spending and the female share of employment or placements is imprecisely estimated, as shown in columns 3-4 and 7-8.

Finally, in Table 4, I show that state-level manpower mobilization is also only weakly related to wartime WMC employment or USES placements. While both measures show a positive unconditional relationship (columns 1 and 5), the point estimates become negative and insignificant with the inclusion of the same set of controls (columns 2 and 6). The results for the share of employment or placements female also do not show a consistent pattern, either conditionally or unconditionally.

Thus, it appears that the location of rapidly ramping-up wartime production, rather than manpower shortages due to the draft, appears to have driven female labor demand. There are several reasons why this may be the case. First, it is not true that female wartime workers were primarily the wives of soldiers picking up new jobs to supplement meagre military pay. In a BLS analysis of special questions added to a CPS survey in the spring of 1944, married women constituted 44% of the female workforce, but only 7.7% had a husband absent in the armed forces (U.S. Department of Labor 1944). Thus there is little reason to suspect that the bulk of female wartime workers were making up for lost income as the household's primary earner joined the military.

Second, war industries drove a disproportionate share of the female employment boom. Manufacturing industry jobs climbed from 21% of female employment in 1940 to 34% by March 1944, with many of the gains coming from ordnance, rubber products, scientific

instruments, industrial electrical equipment, and telecommunications equipment essential to the war effort. Areas like Detroit, which was home to a large cluster of defense-related jobs, more than doubled the number of women in their labor force after active recruiting efforts by the USES and local employers. The scope of labor shortages generated by large scale war production appears to have dominated any decreases in male labor supply caused by the carefully managed mobilization process. Hence "the industrial composition of an area largely determines the extent of [female] employment in that area," as the USES noted in a 1944 report.

## 3.2 Short-run effects of wartime work

Regardless of the ultimate drivers of female wartime work, it is clear from Figure 3 that there was substantial geographic variation in the scale of female employment in the war-related economy. If the WWII employment experience had any immediate effect on female work or industry choice, we would expect that areas that experienced more wartime work would have higher levels of FLFP by 1950, either overall or within specific sectors. To test this hypothesis, I employ the difference-in-difference specification from Acemoglu, Autor & Lyle (2004) using the IPUMS micro samples. The basic estimating equation is:

$$Y_{ist} = \alpha_s + \beta_0 \cdot 1\{t = 1950\} + \beta_1 \cdot WMC_s \cdot 1\{t = 1950\} + \beta_2 \cdot X_{ist} + \beta_3 \cdot X_{ist} \cdot 1\{t = 1950\} + e_{it} \quad (1)$$

where $Y_{ist}$ is the outcome variable for individual $i$ in commuting zone $s$ at time $t$, $\alpha_s$ is a commuting zone fixed effect, $WMC_s$ is the total WMC female employment normalized by 1940 female population aged 16 or older, and $X_{ist}$ is a set of individual characteristics, such as age, state of birth, and martial status, and commuting zone-level controls measured as of 1940, such as median education and the white share of the population. The primary coefficient of interest is $\beta_1$, which reflects differential changes in the outcome for high vs. low employment commuting zones, conditional on all controls.

The main results are presented in Table 5, where the outcome variable is a indicator for whether the individual reported being in the labor force at the time of the census. In the first three columns, I estimate the effect of living in a high WMC employment CZ while successively adding controls and fixed effects. The coefficients are sensitive to controls, imprecisely estimated, and small. In column 1, for example, the coefficient implies that moving from zero WMC employment to the 90th percentile (0.1 per female capita) would decrease the growth in female labor force participation from 1940 to 1950 by 0.25 p.p. The

estimate in column 3 has the opposite sign and suggest that a similar shift would *increase* labor force participation growth by 0.55 p.p.

Of course, female WMC employment was in no sense randomly assigned, making it difficult to give a causal interpretation to these estimates. Areas where many women worked during the war may have had already high levels of labor force participation by 1940 and thus have been unlikely to see large increases relative to the rest of the country by 1950. Alternatively, they may have been on track to outpace other areas due to other factors like local industrial composition and educational achievement. To attempt to account for these confounders, in column 4 I instrument for WMC employment rates using total military spending on equipment and facilities in the area. While military spending was also not randomly assigned, it may be less likely to correlate with other unobserved and omitted determinants of female labor force participation growth. The coefficient, however, is similar and reflects the same small reduced form reported in Fishback & Cullen (2013).

The positive coefficients reported in columns 4 and 8 are primarily driven by white women. The estimate in column 4 of Panel B, for example, is almost twice the magnitude of overall estimate from Panel A and has a 95% confidence interval that excludes zero. It suggests that a shift to the 90th percentile of WMC employment would generate a 0.9 p.p. increase in the growth in female labor supply from 1940 to 1950. The estimates for black women, however, are negative and insignificant when estimated using instrumental variables, as shown in Panel C.

In order to investigate these effects further, in Table (6) I estimate equation 1 with an indicator for participation in various industries as the outcome variable. Each cell in the table contains the coefficients and standard error for the $\beta_1$ coefficient. Two patterns emerge. First, there appear to be positive effects for the manufacturing industry that are partly offset by declines in the non-durables and retail trade industries. Second, the effect is again driven primarily by white women, as Panel B makes clear.

The manufacturing category includes many industries directly involved with war production, such as aircraft and ship building, electrical machinery, and transport equipment. It seems likely that elevated participation in these industries by 1950 may be the result of wartime work. The nondurables category, meanwhile, includes many traditionally female-heavy industries, suchas textiles and apparel. War manufacturing industries disproportionately drew female workers from other sectors, as opposed to students and those out of the labor force: 33% of the sector's workers in March 1944 were working in other industries before Pearl Harbor, compared to 24% for transport, communication and public utilities and 14% for

wholesale and retail trade (U.S. Department of Labor 1944). It thus appears that while wartime employment increased manufacturing work for white women, this was partly due to substitution from other industries.

In order to interpret these estimates causally, we require either that a parallel trends assumption holds (for the OLS estimates in columns 1 and 2) or that the instrument does not predict changes in FLFP before 1940 (for the IV estimates in columns 3 and 4). I assess these assumptions in Figure 4. Panel A plots the raw data for the share of women in manufacturing industries in commuting zones with above and below median female WMC employment during the war. The two groups appear to display parallel trends from 1920-1940, although high WMC employment areas also experienced faster growth from 1900 to 1920. The gap between the two groups widens considerably in 1950 and 1960, before closing in 1970. The parallel trends assumption thus receives mixed support.

Panel B displays the IV estimates of equation 1 estimated on each decadal pair of censuses. With the exception of 1920, the pre-treatment differences are reassuringly close to zero, especially when compared to the estimated effects in 1950 and 1960. The estimate becomes negative in 1970, however, reflecting the "catch-up" apparent in the raw data in Panel A.

In Appendix Table 11, I present estimates from the same specification estimated at the state level, which allows me to study the USES variation and to compare my results to previous work studying mobilization (discussed further below). The results for state-level WMC employment are similar. USES variation also suggests no detectable effects and often have negative point estimates when estimated with appropriate controls.

## 3.3 Short run effects of mobilization

Despite the evidence presented above, it is possible that manpower mobilization had an impact on female wartime work not captured in the WMC or USES data. This may explain why several previous results have detected positive impacts of manpower mobilization on female labor force participation in 1950. To test this hypothesis, I re-estimate equation 1 using inductions and war deaths at the commuting zone level as the explanatory variable of interest.

The main results are presented in Table 7. Neither induction intensity nor casualty shares appear to predict any changes in female labor force participation from 1940 to 1950. As in the previous analyses, the coefficients are inconsistent, imprecise, and small. A shift from

the 10th to 90th percentile of inductions (a 23 p.p. increase), for example, implies a 0.8 p.p. change in female labor force participation growth. If mobilization did increase female work in unmeasured jobs such as local retail work, farm labor, or other occupations, the increases did not persist into 1950.

In order to reconcile these results with previous estimates showing strong positive effects of manpower mobilization on female work, I replicate the results from Acemoglu, Autor & Lyle (2004). The specification is identical to equation 1, but is estimated across states and considers total weeks worked instead of an indicator for labor force participation as an outcome.

Results are reported in Table 8. Column 1 shows that, as in Acemoglu, Autor & Lyle (2004) and other results, there is a positive relationship between increases in total weeks worked and mobilization rates that is driven primarily by white women (Panel B). The result is weakened, but remains positive and significantly different from zero at conventional confidence levels after the introduction of individual (column 2) and state-level controls (column 3).

Columns 4-9, however, show that these results hold for the total weeks worked measure of labor supply but not an indicator for positive weeks worked in the last year (columns (4)-(6)) or labor force participation during the census reference week (columns 7-9). While it is possible these results indicate that mobilization was associated with purely intensive-margin increases in female labor supply, a more likely explanation is the results are driven by changing definitions of the weeks worked variable between 1940 and 1950. In 1940, census enumerators asked respondents to report the number of *full-time equivalent* weeks worked in the reference year. A full-time equivalent week was defined as the "number of hours locally regarded as a full-time week for the given occupation," or 40 hours if the respondent was unsure. In 1950, however, enumerators counted a week in which *any work was done* as a whole week. This change mechanically inflates intensive labor supply measures for part-time workers. A woman working every Monday and Tuesday only, for example, would have reported roughly 10 weeks worked in 1940. This same woman would have reported 52 weeks worked in 1950.

It appears that the prevalence of part-time work is also correlated with mobilization in 1940, as shown in Figure 5. Median weeks worked in 1940 is negatively related to mobilization, implying that high mobilization states may have also had a higher mechanical increase in the weeks worked measure absent any behavioral response. This pattern is likely driven by the fact that mobilization is correlated with the share of non-farm workers, urban population, education and other factors associated with the availability of part-time work. Moreover,

much of the increase in female labor force participation throughout this period came through the rise of part-time work in white-collar occupations, which was also concentrated in urban areas. The share of female employment that was part-time increased from 18 to 19% overall from 1940 to 1950, for example, but added 11 p.p. in the sales industry (14 to 25%) (Goldin 1991).

# 4 Why did women stop working?

Given the scale of the WWII Rosie boom, the weak effects of both wartime work and manpower mobilization on female labor supply by 1950 may be surprising. This section turns to more detailed records from the USES to provide new evidence on why the WWII experiment in female labor supply ended so abruptly and did not leave a lasting direct impact on FLFP. I first discuss patterns in aggregate placements of women into new jobs across the country over the war years, before looking more closely at state- and industry-specific placement and application patterns and a wealth of narrative evidence from USES labor market reports.

Overall, USES records reveal that just as industrial mobilization quickly drew women into the workforce, *demobilization* and the re-integration of veterans into civilian industries appears to have displaced them. Figure 6 Panel A shows that the aggregate female placement share rose through mid-1944, before declining through the end of 1946. The initial declines were driven by increases in non-female placements. Total female placements remained at roughly 1943 levels before dropping precipitously in mid-1945, when WWII veteran applications and placements began to climb.

These placement declines were concentrated in industries where women competed directly with veterans for jobs. Panel B shows that while the female share of placements in trade / services industries was roughly constant from mid-1945 through the start of 1946, manufacturing and government placements became increasingly male dominated. The timing of the large declines in female placement shares in government and manufacturing jobs coincided with the return of many WWII veterans, who turned to the USES to find work. Many of these veterans had a legal right to their old jobs or received priority for new ones due to formal and informal "veteran's preference" rules.

Regular USES reports published at the time provide a remarkable narrative window into the extent of female displacement and layoffs in the wake of VE and VJ day. A 1946 USES report on the airframe industry, for example, notes that employment opportunities were

limited "almost entirely to veterans, who receive preference in nearly all plants." In 48 large plants with 160,000 total employees, 4,000 veterans were hired in December 1945, despite net employment declines of 2,000 jobs.[8] A similar report on the rubber tires and tubes industry, which had been roughly 20% female since it became critical in mid-1944, noted "women to be displaced...many employers have indicated to the USES that they expect to replace most of the women on the production line with men." A similar report on the banking industry notes that "a majority of of banks indicated a desire to hire veterans for future openings."

Other industries that were large wartime employers of women, such as the ordnance industry, all but disappeared in 1945. Cutbacks in the industry after VE-day and continuing with VJ-day dropped total employment in ordnance plants from 1,360,000 in March 1945 to 250,000 by September. The female employment share, meanwhile, dropped from 33 to 23 percent.

Government employment also declined significantly at the war's conclusion. Federal employment in February 1946 stood at roughly 2.4 million, more than half a million less than at the time of Japan's surrender. While total employment shrank, many veterans returned to reclaim their old jobs at the end of 1945. From July 1944 to the start of 1946, 120,000 veterans had returned to federal service jobs under re-employment rights. The female share of federal jobs, meanwhile, declined from wartime peaks of 38% to 28% by year-end 1946 and 22% by 1950, slightly above the 1940 figure of 19% (U.S. Department of Labor 1953).

Industries that did not cut back on female workers tended to be those that had traditionally employed women in production and those that did not see sizable cutbacks as the war wound down. A USES report from early 1946 noted that the footwear industry was in dire need of women in jobs overseeing conveyers, operating power sewing machines, and as stitchers. Men were needed as shoemakers and assemblers. Even in female-heavy industries, however, wartime occupational and employment gains were often reversed. The USES noted that in the hosiery industry, where two-thirds of employees were female, some women hired to knitting and machine-fixing jobs were "bumped" as veterans returned. Evidently, however, the majority of the jobs in these industries were not considered suitable for men, limiting veterans' displacement of women workers: "Although employers are generally agreed on giving veterans preference on all job openings, the nature of the industry precludes any major steps in this direction."

The patterns shown in Figure 6 Panel C are consistent with this narrative evidence. The

[8]While it comprised only a small part of aggregate wartime female employment, the aircraft industry, along with shipbuilding, saw the most explosive increases in female employment during the war. While total employment in aircraft industries rose 35% from May 1942 to March 1943, female employment rose 184%, tripling the female share of employees from 10.5 to 30.8%.

graph plots the change in female share of placements over 1945 against the proportional change in total placements for 37 detailed industries. The diameter of the circles corresponds to total female placements in Jan-Mar 1945, indicating the industry's relative importance to wartime female employment as measured in the USES data. The upward sloping regression line indicates that industries with the largest employment cutbacks also saw the sharpest drops in their female share of job placements.

While the evidence above suggests that many women were displaced by returning WWII veterans and laid off in declining industries, it is also possible that as the war wound down, many women simply withdrew from these jobs voluntarily. Several pieces of evidence suggest this is not the predominant explanation for the postwar decline in female labor supply.

First, women continued to apply for jobs from the USES in large numbers, but faced increasing competition from veterans mustering out of the armed forces. The USES received more than 660,000 new applications for work from women in the first quarter of 1946.[9] By this point, however, USES placements appear to have shifted towards veterans. The USES received 105,942 job applications from veterans in January of 1945, making up 54% of the application pool. It placed 77,735 that same month for 7% of the total. In December, the USES received 644,448 new applications from veterans (66% of all applications) and placed 116,793 (31% of total). Despite the fact that total placements declined by 65% over this same period, veteran placement shares increased roughly four times as much as veterans' application shares.

Consistent with veterans receiving priority in USES placements, the differences in female placement shares across states are not fully explained by the patterns in female applications, as shown in Figure 7 Panel A. Each point on this graph is a state-month combination in January-March 1946. While states with a higher female application share also had a higher female placement share on average, the coefficient on the regression line plotted is 0.549 (0.141), suggesting that roughly two additional female applications were associated with an additional placement.

Figure 7 Panel B shows that changes in female application patterns are also not associated with changes in female placements within states. Each point in this figure plots the January to March 1946 change in female application share against the January to March change in female placement share for each state. The flat regression line indicates that female application changes are not correlated with shifts in female placements within states. Taken

[9]New York application data is missing in January 1946. The state received roughly 20,000 new applications from women in February and March. Female placements were 725,464 and 421,576 in Q3-Q4 2015 and 386,175 in Q1 2016.

together, Panels A and B suggest that the decline in female placements is not fully explained by a decline in female applications.[10]

A second piece of evidence comes from a special USES and Bureau of Employment Security study of unemployment compensation (UC) claimants in three cities in the Fall of 1945. In Atlanta, GA, Trenton, NJ, and Columbus, OH, in Oct. 1945 women comprised 60, 69, and 77 percent of UC claimants, respectively. The proportion of women is striking given that at their wartime peak in 1945 women comprised roughly 35% of the civilian labor force. Being eligible for UC required that these women did not quit voluntarily and were actively looking for work while claiming. Few employers were looking for them, however. 60 to 81 percent of jobs posted USES offices in these cities specified "men only." There were two and half times as many female UC claimants as jobs open for women.

The compensation offered in available jobs at USES offices represented steep wage cuts relative to UC claimants' previous earnings, especially for women. Matching claimants with available jobs implied a 34 to 49 percent wage cut for men and 49 to 53 cut for women. Less than 1 percent of women in Atlanta could have been offered a job paying 90 cents an hour, while 68 percent had previously earned as much. In Columbus, 1 percent of jobs for women were offering wages of 80 cents an hour, while 77 percent of claimants had previously earned as much.

The distribution of UC claimants' previous and usual occupations relative to the mix in available jobs is also telling. The modal unemployed woman in these three cities left the home to work in a semi-skilled job during the war, but primarily faced low-paying white collar job opportunities at its conclusion. Roughly 38-50 percent of female UC claimants listed their usual occupation as "housewife" in the three cities. 70 to 75 percent had worked in skilled or semi-skilled occupations in their last job. 50 to 60 percent of available jobs, however, were categorized as professional and managerial, clerical and sales, and service occupations. At least in Atlanta, Trenton, and Columbus, it appears that the immediate post-war labor market was not favorable to women transitioning successfully from wartime to peacetime employment.

[10]It should be noted that the female application data exists only for Jan-Mar 1946, when cutbacks in female placements were already well underway. Ideally, one would analyze data for the full course of 1944-1946. The USES also notes job application numbers do not totally capture all new job seekers, since some jobs did not take paper applications.

# 5 Conclusion

World War II constituted one of the largest re-organizations of the civilian labor force in U.S. history. As the economy converted to wartime production, women became a central component of the "engine of Democracy" in ammunition plants, shipyards and government offices across the country. But as the war concluded, women left the workforce almost as quickly as they had entered, putting female labor supply back close to pre-war levels.

I have used newly digitized data on the geographic distribution of employment in war-related industries and the activities of public employment offices to argue that despite the size of this experiment in female employment, its impacts on 1950 female labor supply were negligible. While there is some evidence for most positive effects on white women's employment in manufacturing, these effects are small and partially offset by declines in non-durables jobs. Other recent results arguing that areas that experienced higher rates of manpower mobilization saw larger increases in female labor force participation from 1940 to 1950 are difficult to interpret given mobilization's weak relationship with female wartime employment. Changing definitions of census variables between 1940 and 1950 also make it difficult to interpret estimates relying on annual weeks worked measures of labor supply. Taken together, the results suggest WWII played a limited direct role in the future course of American women's female labor supply.

Data from the activities of public employment offices, as well as narrative evidence on labor markets and industries at the war's conclusion, can help make sense of this finding. Women's exit from the the labor force in 1945 and 1946 was the result of mass lay-offs in war-related industries, displacement by returning veterans, and poor job opportunities relative to wartime work. Although women's wartime employment experience was exceptional in its breadth, rewards, and novelty, by 1946 it had become clear that this short-lived exception to prevailing norms was produced by the extreme circumstances of war and abruptly ended by the arrival of peace.

# References


**Acemoglu, Daron, David H. Autor, and David Lyle.** 2004. "Women, War and Wages: The Effect of Female Labor Supply on the Wage Structure at Midcentury." *Journal of Political Economy*, 112(3).

**Autor, David H., David Dorn, and Gordon H. Hanson.** 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review*, 103(6): 2121–68.

**Carr, Jillian B., and Andrew J. Rettenmaier.** 2015. "What Happened to Rosie?" *PERC Working Paper*, 1501.

**Collins, William J.** 2001. "Race, Roosevelt, and Wartime Production: Fair Employment in World War II Labor Markts." *American Economic Review*, 91(1).

**Fernandez, Raquel, Alessandra Fogli, and Claudia Olivetti.** 2004. "Mothers and Sons: Preference Formation and Female Labor Force Dynamics." *The Quarterly Journal of Economics*, 119(4).

**Fishback, Price, and Joseph A. Cullen.** 2013. "Second World War spending and local economic activity in US counties, 1939-58." *The Economic History Review*, 66(4): 975–992.

**Goldin, Claudia.** 1991. "The Role of World War II in the Rise of Women's Employment." *The American Economic Review*, 81(4).

**Goldin, Claudia, and Claudia Olivetti.** 2013. "Shocking Labor Supply: A Reassessment of the Role of World War II on Women's Labor Supply." *The American Economic Review: Papers & Proceedings*, 103(3).

**Haines, Michael R., and Inter-university Consortium for Political and Social Research.** 2010. "Historical, Demographic, Economic, and Social Data: The United States, 1790-2002." *Ann Arbor, MI: Inter-university Consortium for Political and Social Research* `http://doi.org/10.3886/ICPSR02896.v3`.

**Jaworski, Taylor.** 2014. "'You're in the Army Now:' The Impact of World War II on Women's Education, Work, and Family." *The Journal of Economic History*, 74(1).

**Kossoudj, Sherrie A., and Laura J. Dresser.** 1992*a*. "The End of a Riveting Experience: Occupational Shifts at Ford after World War II." *The American Economic Review*, 82(2).

**Kossoudj, Sherrie A., and Laura J. Dresser.** 1992*b*. "Working Class Rosies: Women Industrial Workers during World War II." *The Journal of Economic History*, 52(2).

**Milkman, Ruth.** 2016. *On Gender, Labor, and Inequality.* University of Illinois Press.

**Mulligan, Casey B.** 1998. "Pecuniary Incentives to Work in the United States during World War II." *Journal of Political Economy*, 106(6): 1033–1077.

**Ruggles, Steven, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Shroeder, and Matthew Sobek.** 2010. "Integrated Public Use Microdata Series: Version 5.0." *Minneapolis: University of Minnesota*.

**Selective Service System.** 1948. *Quotas, Calls and Inductions.* Vol. 12 of *Special Monographs*, Washington DC: GPO.

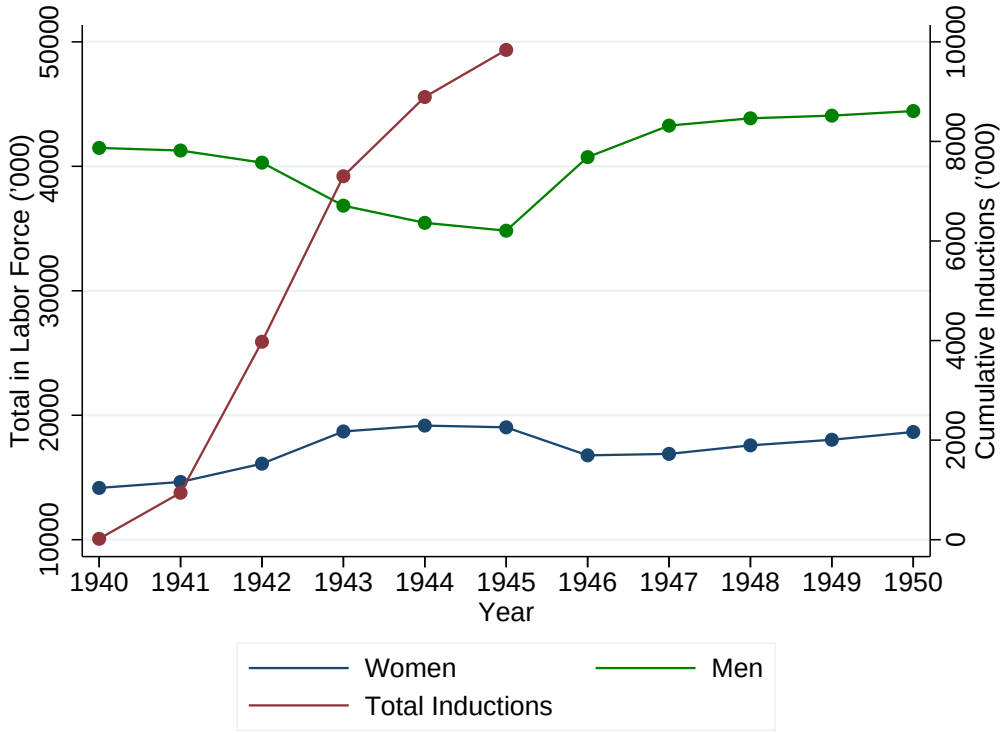
**U.S. Census Bureau, Department of Commerce.** 1947. *Labor Force, Employment, and Unemployment in the United States, 1940 to 1946.* Vol. P-15 No. 2 of *Current Population Reports: Labor Force*, Washington DC: U.S. Department of Commerce.

**U.S. Department of Labor.** 1944. *Changes in Women's Employment During the War. Women's Bureau Special Bulletin No. 20*, Washington, DC: GPO.

**U.S. Department of Labor.** 1953. *Women As Workers, A Statistical Guide.* Vol. D-65 of *Special Bulletin*, Washington DC: GPO.

**War Department: The Adjutant Generals' Office.** 1946. "World War II Honor List of Dead and Missing Army and Army Air Forces Personnel, 1946." *Record Group 407, The National Archives*.

Figure 1: **Civilian Labor Supply and Military Inductions During WWII**

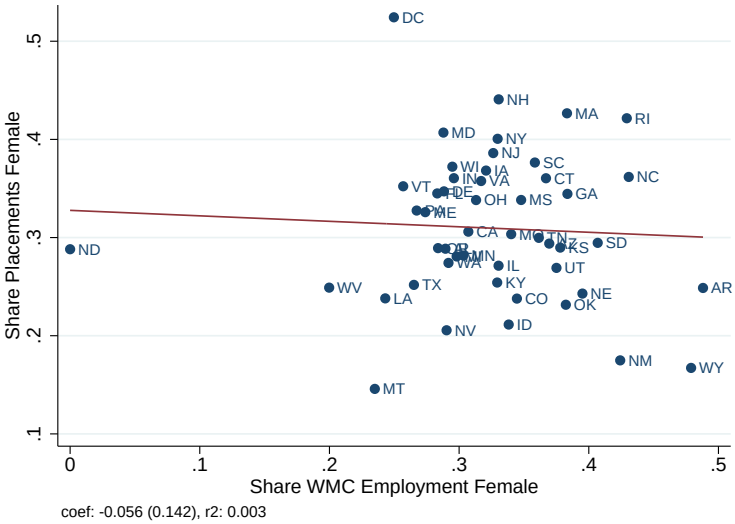



*Notes:* Data on male and female employment are taken from U.S. Department of Labor (1953), Tables 2 and 3, which complies Census and Current Population Survey figures. Total inductions are drawn from statistical tables published in Selective Service System (1948).

Figure 2: **Relationship Between WMC and USES Employment Measures**

A. Total Female Employment and USES Placements

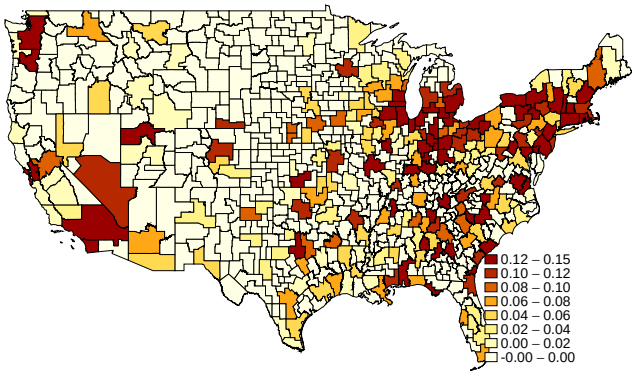

B. Shares of Employment and Placements Female



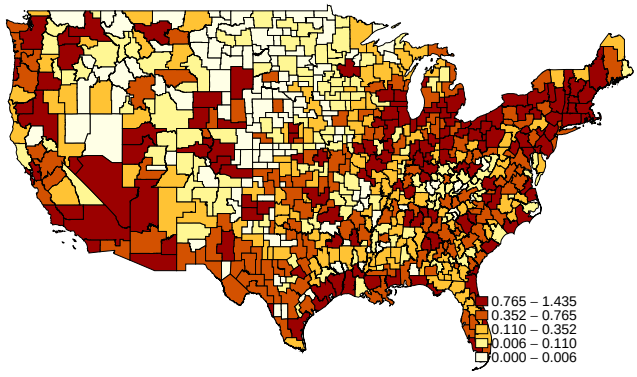

*Notes:* Panel A graphs the cross-sectional relationship between total WMC employment (measured in July 1944, with geographies falling in multiple states double counted) and total USES placements over 1943 and 1944h2-1945. Panel B shows the share of total employees who were female vs. the share of placements female in the same data.

Figure 3: **Relationship Between War Contracts and Female Employment**

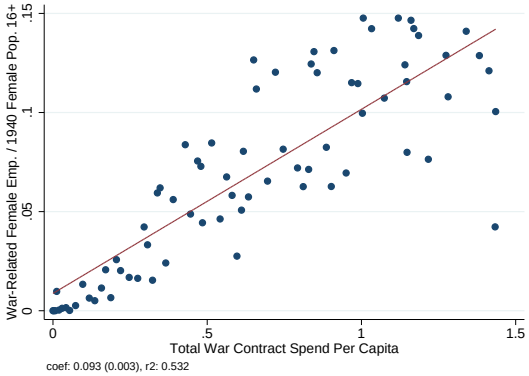
A. WMC Female Employment / 1940 Female Pop. 16+



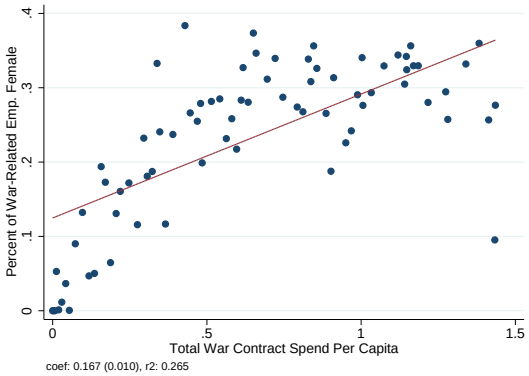

B. Military Contracts ($) / 1940 Pop. 16+



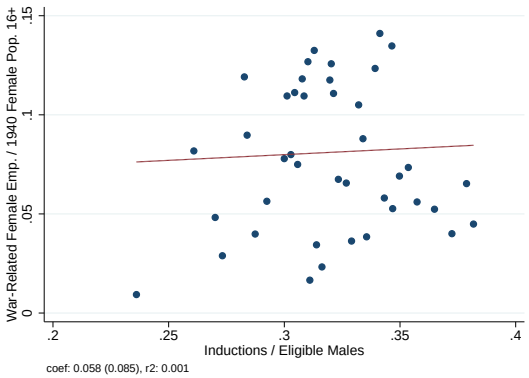

C. Female Employment vs. Contracts



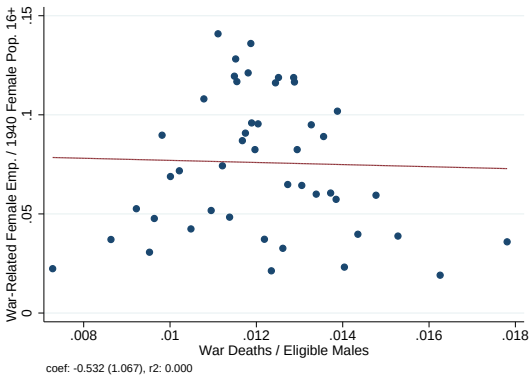

D. Share Employment Female vs. Contracts




E. Female Employment vs. Manpower Mobilization

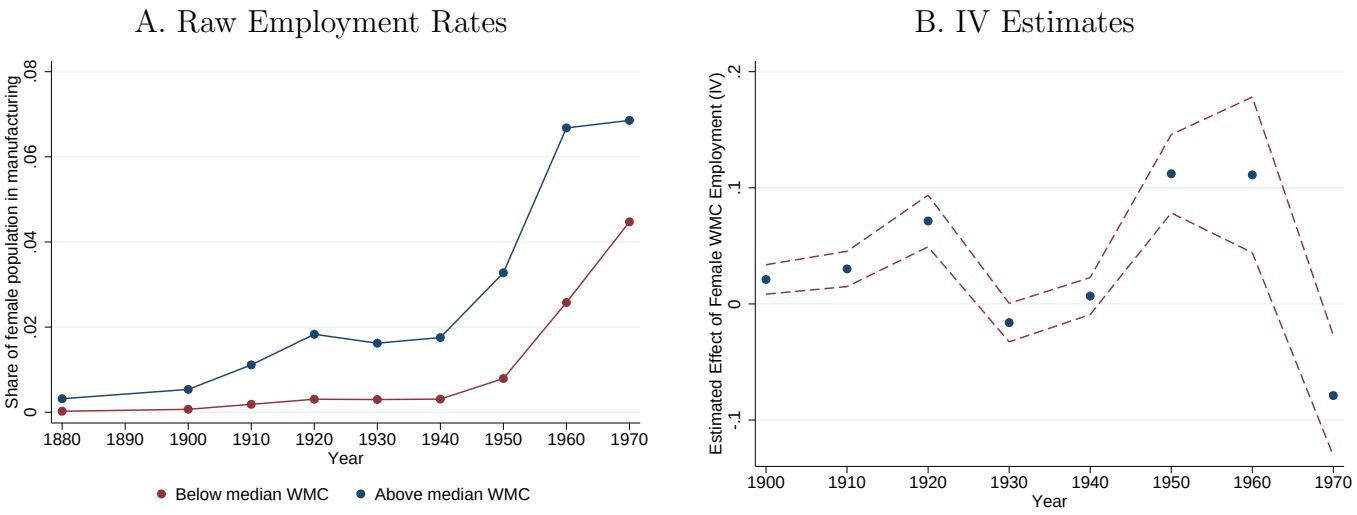



F. Female Employment vs. War Deaths



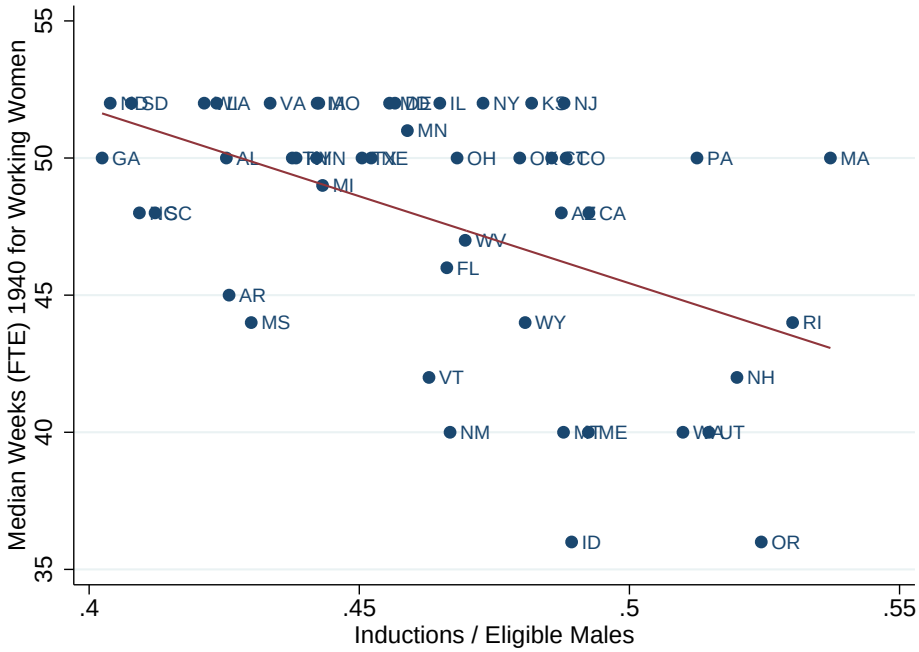

*Notes:* The outcome in panels A, C, E, and F is peak WMC female employment (July 1944) divided by the 1940 female population 16 or older. The dependent variable in Panel D is the female share of WMC employment in July 1944. War contracts per capita is total equipment and facilities spending from 1940-1945 divided by the 1940 population 16 or older. Inductions / eligible males is total inductions divided by the 1940 male population aged 21-54, and war deaths is total war deaths divided by the same measure. See the data appendix for additional detail on data construction. Regression lines in Panels C-F are weighed total 1940 population. Coefficients and standard errors are reported below each graph.

Figure 4: **Pre-trends in Effects of WMC Employment on Manufacturing**




*Notes:* Panel A plots the raw share of women who list their industry as manufacturing, averaged over commuting zones with above and below median (0) female WMC employment rates. Panel B plots the coefficient estimates and 95% confidence intervals for the 2SLS estimates of an interaction of a post indicator and female WMC employment / 1940 female population 16+, as in equation 1. The outcome is participation in the manufacturing industry (IPUMS 1950 codes 300-399) and the regression is estimated at the CZ-level. The year on the x-axis is the post year, so that the point above 1950 represents the difference-in-differences estimate from 1940 to 1950 presented in the first cell of Table 6. Results should be interpreted with caution because the universe asked about industry shifted across years. For 1880-1920, the universe includes all those reporting a gainful occupation. In 1930, all persons were asked. For 1940-1950, the universe includes all those in the labor force during the census reference week. And in 1960, the population includes those who had worked in the previous 10 years, but not persons with a job but not at work last week or new workers.

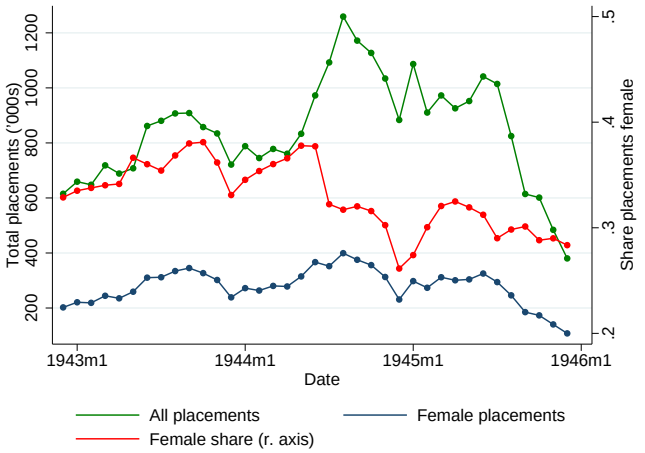
Figure 5: **Weeks Worked in 1940 and Mobilization**



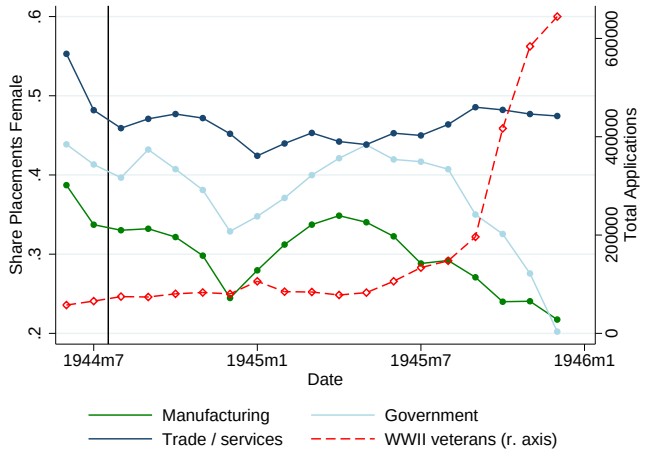

*Notes:* Sample is the same as in Table 8 Panel A, but restricted to women with positive weeks worked and in the year 1940 only. See the notes to Table 8 for additional details on sample.

Figure 6: **USES Placement Patterns**

A. Overall Female Placement Share

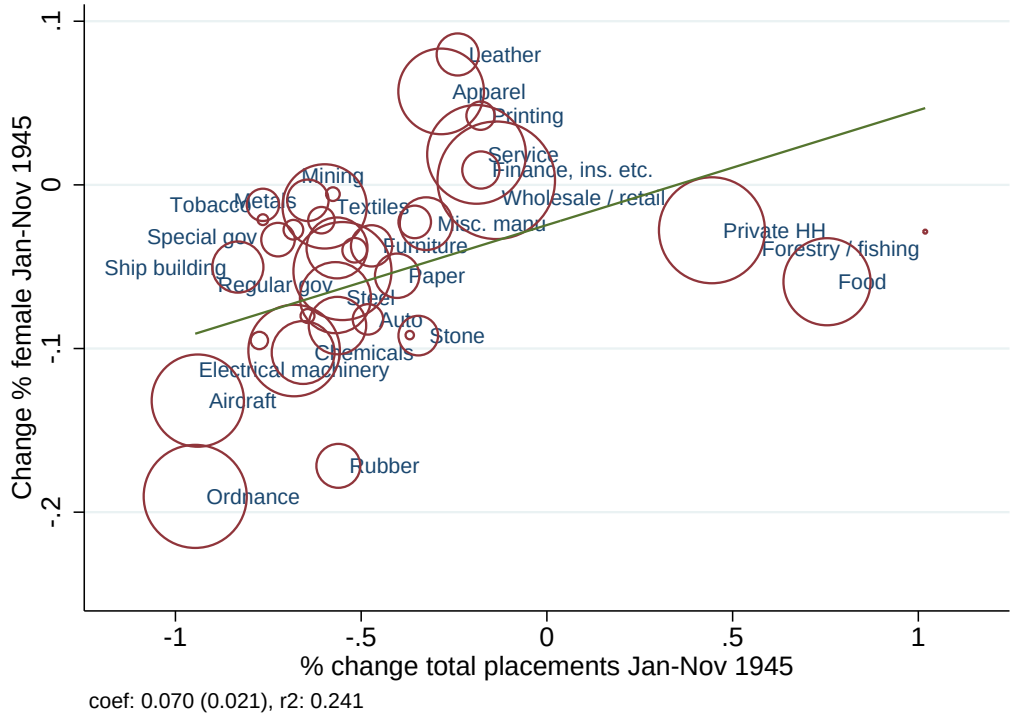



B. Female Share by Industry




m

C. Changes in Total Placements vs. Female Share

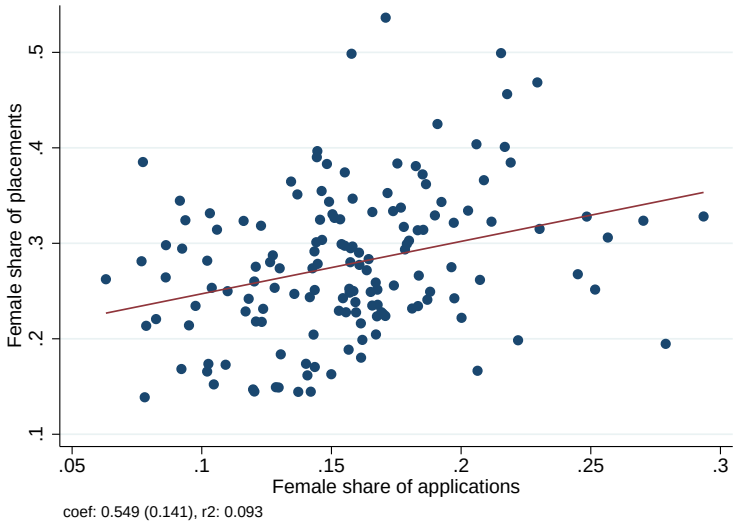



coef: 0.070 (0.021), r2: 0.241

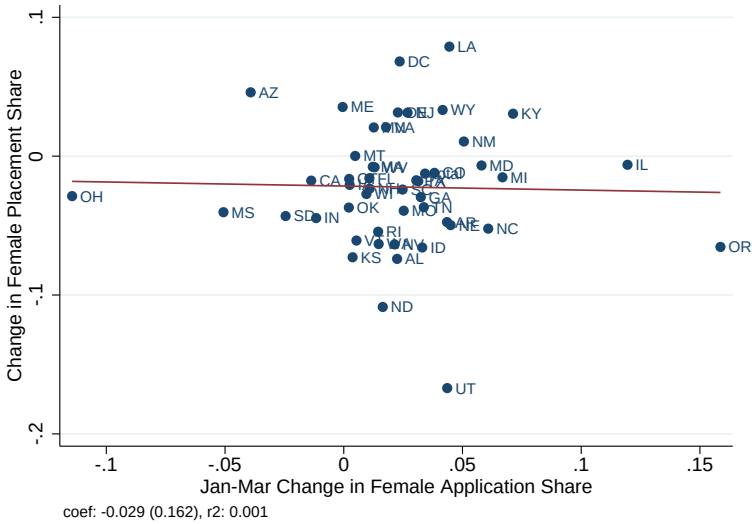
*Notes:* Panels A and B sourced directly from USES reports. Panel A plots female placements, all placements, and female share of placements. Panel B displays the share of placements female in three industries as well as new job applications from WWII veterans (not cumulative). Panel C presents changes from the Jan-Mar three month average to Sept-Nov three month average for total placements (percent change) and share female (percentage point change in share). Circle diameter represents Jan-Mar total female placements. Regression line is weighted by Jan-Mar total female placements. Some labels omitted for clarity. See Appendix Table 12 for full data.

Figure 7: **Female USES Job Applications and Placements**

A. Female Application vs. Placement Shares




B. Changes in Female Application vs. Placement Shares




*Notes:* Panel A plots each state's female share of new applications against its female share of new placements for the three months between January and March in 1946. The regression line has an unweighted coefficient estimate of 0.549 (0.141), suggesting that roughly two female applications are associated with an additional female placement in the cross-section. Panel B plots the January to March change in female application share against the January to March change in female placement share. As is clear from the graph, there is limited correlation, suggesting additional female applications are not associated with additional female placements within each state.

Table 1: **Shifts in Industrial Composition of Female Employment**

| | 1940 | | March 1944 | | 1950 | |
|---|---|---|---|---|---|---|
| Industry | Tot. | % | Tot. | % | Tot. | % |
| Agriculture | 485 | 0.044 | 580 | 0.035 | 692 | 0.042 |
| Manufacturing | 2322 | 0.21 | 5590 | 0.34 | 3765 | 0.23 |
| Transport, communications, public utilities | 345 | 0.031 | 680 | 0.041 | 663 | 0.040 |
| Trade, wholesale and retail | 2030 | 0.18 | 3190 | 0.19 | 3855 | 0.23 |
| Finance, business, repair, professional | 2299 | 0.21 | 2680 | 0.16 | 3750 | 0.23 |
| Domestic, personal, recreation services | 2955 | 0.27 | 2660 | 0.16 | 3000 | 0.18 |

*Notes:* Totals are reported in thousands. Data for 1940 and 1950 are from U.S. Department of Labor (1953), Table 8, which compiles Current Population Survey Data. Information from March 1944 is taken from U.S. Department of Labor (1944), a special report of the Women's Bureau analyzing supplemental questions added to the March Current Population Survey. Other includes government positions.

Table 2: **Relationship Between Contracts and Female Wartime Employment**

| | Female emp / 1940 female pop | | | | | | Share emp female | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| War contracts per capita | 0.09*** | 0.08*** | | | | | 0.17*** | 0.12*** | | | | |
| | (0.00) | (0.00) | | | | | (0.01) | (0.01) | | | | |
| Inductions | | | 0.06 | 0.22* | | | | | -0.30 | 0.29 | | |
| | | | (0.08) | (0.09) | | | | | (0.21) | (0.22) | | |
| War deaths | | | | | -0.53 | -4.60*** | | | | | -3.68 | -7.16* |
| | | | | | (1.07) | (1.07) | | | | | (2.71) | (2.86) |
| 1940 share emp manufacturing | | 0.05* | | 0.10* | | 0.22*** | | -0.04 | | 0.04 | | 0.23** |
| | | (0.02) | | (0.05) | | (0.03) | | (0.08) | | (0.12) | | (0.08) |
| 1940 share pop white | | 0.03* | | 0.02 | | 0.07*** | | 0.11** | | 0.14 | | 0.17*** |
| | | (0.01) | | (0.03) | | (0.02) | | (0.04) | | (0.07) | | (0.04) |
| 1940 median school women 25+ | | 0.00*** | | 0.02*** | | 0.01*** | | 0.01** | | 0.02 | | 0.02*** |
| | | (0.00) | | (0.00) | | (0.00) | | (0.00) | | (0.01) | | (0.00) |
| 1940 female LFP rate | | 0.00*** | | 0.00*** | | 0.00*** | | 0.01*** | | 0.01*** | | 0.01*** |
| | | (0.00) | | (0.00) | | (0.00) | | (0.00) | | (0.00) | | (0.00) |
| R2 | 0.53 | 0.57 | 0.00 | 0.26 | 0.00 | 0.32 | 0.26 | 0.34 | 0.01 | 0.26 | 0.00 | 0.25 |
| N | 722 | 722 | 342 | 342 | 722 | 722 | 722 | 722 | 342 | 342 | 722 | 722 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* The dependent variable in columns 1-6 is peak WMC female employment divided by the 1940 female population 16 or older. The dependent variable in columns 7-12 is the female share of WMC employment in July 1944. War contracts per capita is total equipment and facilities spending from 1940-1945 divided by the 1940 population 16 or older. Inductions is total inductions divided by the 1940 male population aged 21-54, and war deaths is total war deaths divided by the same measure. See the data appendix for additional detail on data construction. Regressions are weighted by total population in 1940. Only commuting zones with all constituent counties falling in states where at least 80% of known total inductions are captured are included in Columns 3-4 and 9-10.

Table 3: **State-level: Contracts and Female Wartime Employment**

| | WMC fem emp | | % WMC emp fem | | USES fem place | | % place fem | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| War contracts per capita | 0.122*** | 0.074** | -0.020 | -0.015 | 0.096** | 0.079* | 0.045 | -0.016 |
| | (0.020) | (0.026) | (0.026) | (0.036) | (0.030) | (0.031) | (0.028) | (0.026) |
| 1940 share emp manufacturing | | 0.264 | | -0.064 | | -0.125 | | 0.077 |
| | | (0.160) | | (0.225) | | (0.195) | | (0.164) |
| 1940 share pop white | | 0.089 | | -0.024 | | -0.230* | | 0.113 |
| | | (0.084) | | (0.118) | | (0.103) | | (0.086) |
| 1940 median school women 25+ | | 0.001 | | -0.004 | | 0.060*** | | -0.012 |
| | | (0.012) | | (0.017) | | (0.015) | | (0.012) |
| 1940 female LFP rate | | 0.126 | | 0.202 | | 0.345 | | 0.996*** |
| | | (0.158) | | (0.222) | | (0.192) | | (0.162) |
| R2 | 0.43 | 0.55 | 0.01 | 0.05 | 0.18 | 0.54 | 0.05 | 0.57 |
| N | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* See the data appendix for additional detail on data construction. WMC dependent variables are the same as in Table 2. USES fem place is total USES female placements 1942-1944 divided by the female population aged 16 or older and % place fem is the female share of total placements over the same period.

Table 4: **State-level: Mobilization and Female Wartime Employment**

| | WMC fem emp | | % WMC emp fem | | USES fem place | | % place fem | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Mobilization | 0.694** | -0.297 | -0.183 | -0.061 | 0.576 | -0.291 | 0.317 | -0.280 |
| | (0.227) | (0.306) | (0.240) | (0.398) | (0.290) | (0.366) | (0.259) | (0.289) |
| 1940 share emp manufacturing | | 0.572** | | -0.097 | | 0.196 | | 0.095 |
| | | (0.167) | | (0.218) | | (0.200) | | (0.158) |
| 1940 share pop white | | 0.070 | | -0.017 | | -0.250* | | 0.126 |
| | | (0.091) | | (0.118) | | (0.109) | | (0.086) |
| 1940 median school women 25+ | | 0.020 | | -0.005 | | 0.079*** | | -0.008 |
| | | (0.014) | | (0.018) | | (0.017) | | (0.013) |
| 1940 female LFP rate | | 0.169 | | 0.201 | | 0.389 | | 1.008*** |
| | | (0.171) | | (0.223) | | (0.205) | | (0.162) |
| R2 | 0.17 | 0.47 | 0.01 | 0.05 | 0.08 | 0.49 | 0.03 | 0.58 |
| N | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* See the data appendix for additional detail on data construction. Dependent variables are identical to Table 3. Mobilization is the share of draft registrants in a state who served in the armed forced, the same measure used in Acemoglu, Autor & Lyle (2004).

Table 5: **Impact of Wartime Work on Female Labor Force Participation in 1950**

A. All Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| WMC female emp / 1940 female pop · 1950 | -0.025 | 0.017 | 0.055 | 0.052 | | | | |
| | (0.038) | (0.029) | (0.030) | (0.048) | | | | |
| Share WMC emp female · 1950 | | | | | -0.018 | 0.005 | 0.017* | 0.032 |
| | | | | | (0.012) | (0.009) | (0.009) | (0.031) |
| BPL, age, marital status dummies | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| 1940 controls | No | No | Yes | Yes | No | No | Yes | Yes |
| N | 1937642 | 1937642 | 1937642 | 1937642 | 1937642 | 1937642 | 1937642 | 1937642 |
| R2 | 0.02 | 0.24 | 0.24 | 0.24 | 0.02 | 0.24 | 0.24 | 0.24 |
| First-stage F | | | | 107.39 | | | | 48.95 |

B. White Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| WMC female emp / 1940 female pop · 1950 | -0.053 | 0.025 | 0.067* | 0.091* | | | | |
| | (0.041) | (0.027) | (0.028) | (0.042) | | | | |
| Share WMC emp female · 1950 | | | | | -0.026* | 0.006 | 0.020* | 0.057 |
| | | | | | (0.013) | (0.008) | (0.008) | (0.030) |
| BPL, age, marital status dummies | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| 1940 controls | No | No | Yes | Yes | No | No | Yes | Yes |
| N | 1710340 | 1710340 | 1710340 | 1710340 | 1710340 | 1710340 | 1710340 | 1710340 |
| R2 | 0.02 | 0.26 | 0.26 | 0.26 | 0.02 | 0.26 | 0.26 | 0.26 |
| First-stage F | | | | 119.73 | | | | 48.96 |

C. Black Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| WMC female emp / 1940 female pop · 1950 | -0.014 | 0.090 | 0.100 | -0.112 | | | | |
| | (0.092) | (0.095) | (0.081) | (0.193) | | | | |
| Share WMC emp female · 1950 | | | | | -0.011 | 0.025 | 0.025 | -0.057 |
| | | | | | (0.028) | (0.028) | (0.026) | (0.097) |
| BPL, age, marital status dummies | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| 1940 controls | No | No | Yes | Yes | No | No | Yes | Yes |
| N | 217218 | 217202 | 217202 | 217202 | 217218 | 217202 | 217202 | 217202 |
| R2 | 0.05 | 0.19 | 0.19 | 0.19 | 0.05 | 0.19 | 0.19 | 0.19 |
| First-stage F | | | | 24.73 | | | | 20.05 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* Sample includes all female individuals aged 14 to 64 and not working in farming occupations and industries (IPUMS1950 occupation codes 100, 123, 810, 820, 830, 840 and industry codes 105-126). BPL, age, martial status dummies are indicator variables for reach place of birth, integer age and marital status category in the sample. As shown in Equation 1, all variables (except commuting zone fixed effects) are interacted with an indicator for year = 1950. Observations are weighed using the IPUMS person weights. Standard errors are clustered at the commuting-zone level.

Table 6: **CZ Level Impacts by Industry**

A. All Women

| | (1) WMC / fpop | (2) WMC fem share | (3) IV WMC / fpop | (4) IV WMC fem share |
|---|---|---|---|---|
| Manufacturing | 0.0947*** | 0.0175*** | 0.113*** | 0.0695*** |
| | (0.0141) | (0.00390) | (0.0170) | (0.0179) |
| Non-durables | -0.0478* | -0.00683 | -0.0705* | -0.0435 |
| | (0.0200) | (0.00487) | (0.0334) | (0.0253) |
| Transport, telecom, utilities | 0.00645 | -0.000306 | -0.00435 | -0.00268 |
| | (0.00482) | (0.00159) | (0.00905) | (0.00545) |
| Wholesale, retail trade | -0.0165 | -0.00577 | 0.00316 | 0.00195 |
| | (0.0136) | (0.00391) | (0.0209) | (0.0130) |
| Finance and business | 0.0120 | 0.00687*** | -0.0147 | -0.00908 |
| | (0.00653) | (0.00195) | (0.00817) | (0.00554) |
| Personal services | -0.0297 | -0.0108* | -0.0483 | -0.0298 |
| | (0.0153) | (0.00481) | (0.0272) | (0.0153) |
| Government | 0.0146 | 0.00679** | 0.0330* | 0.0204* |
| | (0.0106) | (0.00228) | (0.0132) | (0.00915) |

B. White Women

| | (1) WMC / fpop | (2) WMC fem share | (3) IV WMC / fpop | (4) IV WMC fem share |
|---|---|---|---|---|
| Manufacturing | 0.107*** | 0.0195*** | 0.127*** | 0.0798*** |
| | (0.0161) | (0.00440) | (0.0190) | (0.0213) |
| Non-durables | -0.0513** | -0.00993 | -0.0623 | -0.0391 |
| | (0.0180) | (0.00520) | (0.0328) | (0.0243) |
| Transport, telecom, utilities | 0.00741 | -0.000818 | -0.00270 | -0.00170 |
| | (0.00549) | (0.00181) | (0.00985) | (0.00609) |
| Wholesale, retail trade | -0.0236* | -0.00949* | -0.000667 | -0.000419 |
| | (0.0120) | (0.00410) | (0.0186) | (0.0117) |
| Finance and business | 0.0128 | 0.00739** | -0.0166 | -0.0104 |
| | (0.00801) | (0.00227) | (0.00912) | (0.00652) |
| Personal services | -0.0229 | -0.00227 | -0.0375 | -0.0235 |
| | (0.0117) | (0.00372) | (0.0202) | (0.0121) |
| Government | 0.0166 | 0.00677** | 0.0379** | 0.0238* |
| | (0.00928) | (0.00242) | (0.0125) | (0.00930) |

B. Black Women

| | (1) WMC / fpop | (2) WMC fem share | (3) IV WMC / fpop | (4) IV WMC fem share |
|---|---|---|---|---|
| Manufacturing | 0.0116 | 0.00675 | -0.00139 | -0.000710 |
| | (0.0245) | (0.00416) | (0.0515) | (0.0263) |
| Non-durables | -0.0462 | -0.000687 | -0.194 | -0.0986 |
| | (0.0633) | (0.00960) | (0.115) | (0.0702) |
| Transport, telecom, utilities | -0.000366 | 0.00178 | -0.0266 | -0.0136 |
| | (0.00648) | (0.00162) | (0.0175) | (0.00987) |
| Wholesale, retail trade | 0.0541 | 0.0185* | 0.0441 | 0.0225 |
| | (0.0329) | (0.00798) | (0.0641) | (0.0338) |
| Finance and business | -0.00909 | 0.000962 | -0.0221 | -0.0113 |
| | (0.0105) | (0.00275) | (0.0180) | (0.00983) |
| Personal services | 0.0974 | -0.0184 | 0.200 | 0.102 |
| | (0.0966) | (0.0254) | (0.195) | (0.113) |
| Government | -0.00818 | 0.00248 | -0.0220 | -0.0112 |
| | (0.0301) | (0.00334) | (0.0371) | (0.0189) |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* Each cell displays the coefficient and standard error for the relevant employment measure (listed as the column header) in a separate estimation of Specification 1. Columns (1) and (2) present OLS estimates, while columns (3) and (4) present IV estimates CZ construction and sample definition is the same as Table 5. Industries are categorized using the first digit of IPUMS 1950 industry codes.

Table 7: **Impact of Inductions and War Deaths on Female Labor Supply in 1950**

| | All women | | White women | | Black women | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Inductions · 1950 | 0.038 | | 0.015 | | -0.012 | |
| | (0.049) | | (0.052) | | (0.109) | |
| War deaths · 1950 | | 0.321 | | -0.457 | | 1.427 |
| | | (0.939) | | (0.934) | | (1.874) |
| BPL, age, marital status dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| 1940 controls | Yes | Yes | Yes | Yes | Yes | Yes |
| R2 | 0.25 | 0.24 | 0.26 | 0.26 | 0.20 | 0.19 |
| N | 1120083 | 1937642 | 958131 | 1710340 | 157871 | 217202 |

Standard errors in parentheses

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

*Notes:* Sample and specification are identical to Table 5, except explanatory variables are either inductions or war deaths. Inductions is total inductions divided by the 1940 male population aged 21-54, and war deaths is total war deaths divided by the same measure. See the data appendix for additional detail on data construction. Regressions are weighted by total population in 1940. Only commuting zones with all constituent counties falling in states where at least 80% of known total inductions are captured are included in regressions using inductions as an explanatory variable.

Table 8: **Impact of Dependent Variable Choice on Mobilization Estimates**

A. All Women

| | Weeks Worked | | | Weeks Worked > 0 | | | LFP | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Mobilization · 1950 | 14.996*** | 16.053*** | 6.102** | 0.107 | 0.182* | 0.056 | -0.034 | 0.003 | -0.022 |
| | (1.715) | (2.103) | (2.137) | (0.064) | (0.070) | (0.072) | (0.045) | (0.053) | (0.056) |
| 1940 share emp farm · 1950 | | | 0.222 | | | 0.088** | | | 0.116*** |
| | | | (1.094) | | | (0.031) | | | (0.026) |
| 1940 share pop white · 1950 | | | 2.368* | | | 0.011 | | | 0.034 |
| | | | (1.147) | | | (0.033) | | | (0.022) |
| 1940 median school women 25+ · 1950 | | | 0.406** | | | 0.020*** | | | 0.013*** |
| | | | (0.128) | | | (0.003) | | | (0.002) |
| BPL, age, marital status dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| R2 | 0.01 | 0.19 | 0.19 | 0.02 | 0.19 | 0.19 | 0.01 | 0.24 | 0.24 |
| N | 593944 | 593944 | 593944 | 593944 | 593944 | 593944 | 593944 | 593944 | 593944 |

B. White Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Mobilization · 1950 | 11.202*** | 11.823*** | 6.090** | 0.061 | 0.136 | 0.052 | -0.142** | -0.107* | -0.018 |
| | (1.842) | (2.079) | (2.264) | (0.064) | (0.070) | (0.074) | (0.043) | (0.049) | (0.054) |
| 1940 share emp farm · 1950 | | | 0.103 | | | 0.085** | | | 0.123*** |
| | | | (1.063) | | | (0.030) | | | (0.026) |
| 1940 share pop white · 1950 | | | 0.356 | | | -0.010 | | | -0.008 |
| | | | (1.185) | | | (0.033) | | | (0.022) |
| 1940 median school women 25+ · 1950 | | | 0.423** | | | 0.020*** | | | 0.012*** |
| | | | (0.128) | | | (0.003) | | | (0.002) |
| BPL, age, marital status dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| R2 | 0.01 | 0.21 | 0.21 | 0.02 | 0.20 | 0.20 | 0.01 | 0.25 | 0.25 |
| N | 537101 | 537101 | 537101 | 537101 | 537101 | 537101 | 537101 | 537101 | 537101 |

C. Black Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Mobilization · 1950 | 8.992 | 11.953* | -2.155 | -0.265* | -0.176 | -0.082 | -0.003 | 0.082 | -0.045 |
| | (5.515) | (5.529) | (4.764) | (0.131) | (0.123) | (0.144) | (0.145) | (0.145) | (0.187) |
| 1940 share emp farm · 1950 | | | 3.977 | | | 0.145* | | | 0.118* |
| | | | (2.440) | | | (0.066) | | | (0.055) |
| 1940 share pop white · 1950 | | | 7.262* | | | 0.062 | | | 0.009 |
| | | | (3.104) | | | (0.078) | | | (0.056) |
| 1940 median school women 25+ · 1950 | | | -0.247 | | | -0.001 | | | 0.020* |
| | | | (0.443) | | | (0.011) | | | (0.008) |
| BPL, age, marital status dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| R2 | 0.01 | 0.14 | 0.14 | 0.02 | 0.14 | 0.14 | 0.02 | 0.18 | 0.18 |
| N | 54894 | 54894 | 54894 | 54894 | 54894 | 54894 | 54894 | 54894 | 54894 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* Sample is restricted to women ages 14 to 65, not living in Alaska, Hawaii, Nevada or the District of Columbia, which were omitted from Acemoglu, Autor & Lyle (2004) either because they were not states at the time or due to large population shifts over the period. Farm employment (IPUMS1950 occupation codes 100, 123, 810, 820, 830, 840 and industry codes 105-126) is excluded. BPL, age, martial status dummies are indicator variables for reach place of birth, age and marital status category in the sample. As shown in Equation 1, all variables (except state fixed effects) are interacted with an indicator for year = 1950. In 1950, weeks worked last year was asked only to sample line respondents, so 1950 observations are weighted using sample line weights. 1940 observations are weighted using standard IPUMS sample weights. Standard errors are clustered at the state-year level.

# A Data Appendix

## A.1 Female wartime employment

I digitized data on total, female, and nonwhite reported employment, as well as number of reporting establishments, by metro area from ES-270 summaries from July, September and November 1943, June, July and September 1944, and January and March 1945. Some metro areas reported lie in multiple states. In these cases, I assign the recorded employment counts to both states for analyses at that level of aggregation. Results are robust to dropping these areas, which account for less than a third of reported employment. I also recorded reported aggregate total and female employment by industry. I use the data from July 1944, when aggregate female employment was roughly at its peak, but have also considered the average employment in all data collected.

I collected data from USES reports on total, female, veteran and World War II veteran placements by state for 37 months between 1942 and early 1946. Not all months from 1942-1946 are included due to gaps in the reported information and changes in reports' layout. There is continuous data on total and female placements by state for 1943 and the second half of 1944 through 1946. Aggregate female and total placements are available continuously. The precise set of variables recorded varies over time. Beginning in 1944, the data contain information on total new job applications by state. In 1946, new female job applications are reported. In addition to the state-level data, I collected information on placements for men and women in 37 detailed industry categories from November 1944 to April 1946. In analyses using state-level information on total female placements, I sum total placements over 1943 and the second half of 1944 through 1945, omitting the first half of 1944 because the data is missing. Results are robust to several variations, including dropping 1943 data.

## A.2 Manpower mobilization

Inductions data come primarily from the National Archive's online database of Army Enlistment Records. The full database includes records for 9,200,232 total observations. From these, I identified 8,361,427 records with valid state and county of residence fields after dropping Alaska and Hawaii, records with corrupt or missing data. For a small subset of records with missing state of residence data, I replaced the field using the state of enlistment. I then summed total enlistment counts by 1990 commuting zone and state and divided by the 1940 male population aged 21-54 to form the primary measure of induction intensity.

Casualty data primarily come from the Army and Army Air Forces "Honor Roles of Dead and Missing." These documents list the total Army and Army Air Force deaths in the line of duty for each state and county and cover the period May 27, 1941 through January 31, 1946. These figures include those killed in action, deaths from wounds or injuries, non-battle deaths, missing men, and all others determined dead by law. For each death, the War Department also reported a location. This location corresponds to either the solider's home upon induction or, if he gave no address when inducted, the address of his next-of-kin. If neither of these addresses were available, the reports list the location of the solider's draft board. Failing that, soldiers are listed as "State at Large" (War Department: The Adjutant Generals' Office 1946).[11] I digitized these records to obtain county-level sums.

I then added total deaths from lists of War Casualties for the Navy, Marine Corps, and Coast Guard, which comprised roughly (25%) of the total fighting force. These records list individuals killed in the service and their home address. Addresses were digitized and geocoded, yielding a roughly 93% match rate. After throwing out corrupted and missing entries, the combined induction and casualty data record information for 3,064 counties. This includes the distribution of 368,592 deaths.

Casualties are a strong predictor of inductions in areas where the induction data is high quality, as shown in Figure 8. The figure is a binned scatter plot of inductions (i.e., mobilization rates) against war deaths as a fraction of military aged males for commuting zones in all states where at least 80% of known induction totals are captured.

# B Appendix Figures and Tables

[11] A negligible number of soldiers fall into this category.

Figure 8: **Casualties vs. Inductions**

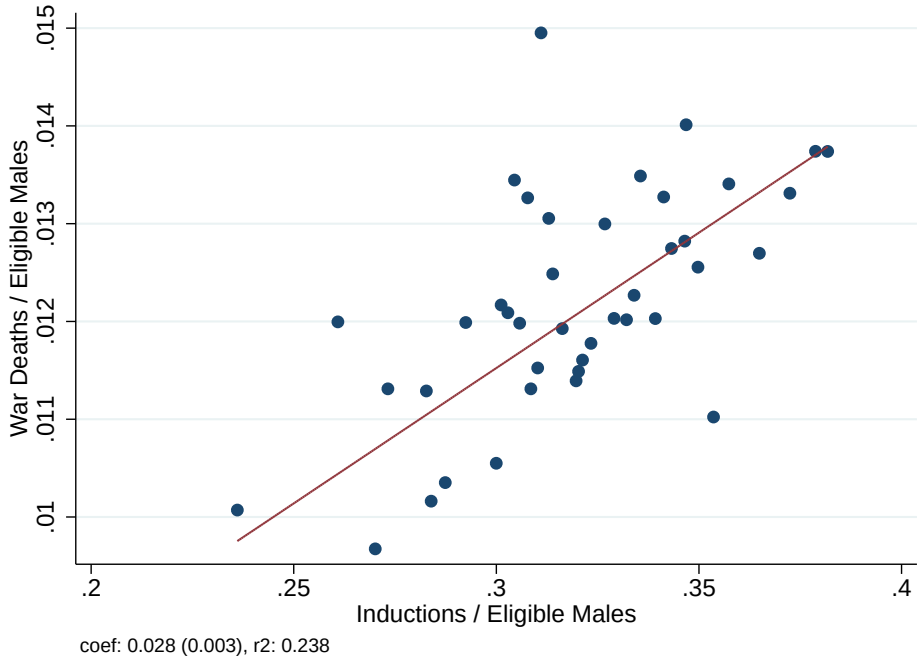


Table 9: **Summary of WMC and USES Data by State (1)**

| | WMC Employment July 1944 (multistates double counted) | | | | Total USES Placements | | | |
|---|---|---|---|---|---|---|---|---|
| state | Total ('000) | Female ('000) | % female | Female / 1940 fem. pop | Total ('000) | Female ('000) | % female | Female / 1940 fem. pop |
| AL | 227.4 | 65.81 | 0.289 | 0.0708 | 528.6 | 152.6 | 0.289 | 0.164 |
| AR | 42.87 | 20.92 | 0.488 | 0.0332 | 315.5 | 78.45 | 0.249 | 0.124 |
| AZ | 19.84 | 7.332 | 0.370 | 0.0490 | 151.9 | 44.64 | 0.294 | 0.298 |
| CA | 1005 | 308.6 | 0.307 | 0.126 | 2639 | 807.5 | 0.306 | 0.329 |
| CO | 61.25 | 21.11 | 0.345 | 0.0573 | 252.5 | 60.05 | 0.238 | 0.163 |
| CT | 381.7 | 140.1 | 0.367 | 0.222 | 312.0 | 112.4 | 0.360 | 0.178 |
| DE | 50.02 | 14.42 | 0.288 | 0.148 | 59.92 | 20.79 | 0.347 | 0.214 |
| FL | 129.6 | 36.70 | 0.283 | 0.0542 | 503.1 | 173.5 | 0.345 | 0.257 |
| GA | 225.7 | 86.58 | 0.384 | 0.0818 | 611.3 | 210.6 | 0.344 | 0.199 |
| IA | 147.1 | 47.18 | 0.321 | 0.0522 | 322.6 | 118.8 | 0.368 | 0.131 |
| ID | 6.667 | 2.255 | 0.338 | 0.0145 | 95.75 | 20.24 | 0.211 | 0.130 |
| IL | 1263 | 417.3 | 0.330 | 0.143 | 1166 | 316.4 | 0.271 | 0.108 |
| IN | 670.4 | 198.4 | 0.296 | 0.159 | 745.8 | 268.8 | 0.360 | 0.216 |
| KS | 174.8 | 66.08 | 0.378 | 0.103 | 332.0 | 96.21 | 0.290 | 0.150 |
| KY | 298.8 | 98.43 | 0.329 | 0.105 | 419.1 | 106.5 | 0.254 | 0.114 |
| LA | 126.4 | 30.73 | 0.243 | 0.0383 | 246.9 | 58.77 | 0.238 | 0.0733 |
| MA | 697.7 | 267.3 | 0.383 | 0.163 | 666.9 | 284.5 | 0.427 | 0.173 |
| MD | 362.2 | 104.3 | 0.288 | 0.161 | 395.4 | 160.9 | 0.407 | 0.248 |
| ME | 91.00 | 24.93 | 0.274 | 0.0847 | 157.7 | 51.39 | 0.326 | 0.175 |
| MI | 1099 | 327.6 | 0.298 | 0.181 | 881.5 | 247.5 | 0.281 | 0.136 |
| MN | 131.6 | 39.89 | 0.303 | 0.0412 | 480.4 | 135.3 | 0.282 | 0.140 |
| MO | 339.1 | 115.3 | 0.340 | 0.0835 | 689.2 | 209.2 | 0.303 | 0.151 |
| MS | 11.30 | 3.930 | 0.348 | 0.00556 | 280.4 | 94.87 | 0.338 | 0.134 |
| MT | 4.328 | 1.017 | 0.235 | 0.00587 | 78.39 | 11.43 | 0.146 | 0.0660 |
| NC | 138.1 | 59.52 | 0.431 | 0.0519 | 544.5 | 197.0 | 0.362 | 0.172 |
| NE | 53.61 | 21.18 | 0.395 | 0.0462 | 175.0 | 42.50 | 0.243 | 0.0927 |
| NH | 63.13 | 20.86 | 0.331 | 0.117 | 65.82 | 29.01 | 0.441 | 0.163 |
| NJ | 1283 | 418.6 | 0.326 | 0.264 | 854.3 | 329.8 | 0.386 | 0.208 |
| NM | 3.055 | 1.296 | 0.424 | 0.00817 | 85.12 | 14.89 | 0.175 | 0.0939 |
| NV | 7.681 | 2.230 | 0.290 | 0.0760 | 94.75 | 19.48 | 0.206 | 0.664 |
| NY | 1166 | 384.6 | 0.330 | 0.0760 | 2779 | 1113 | 0.401 | 0.220 |
| OH | 1075 | 336.4 | 0.313 | 0.132 | 1634 | 552.6 | 0.338 | 0.217 |
| OK | 86.79 | 33.18 | 0.382 | 0.0431 | 311.6 | 72.16 | 0.232 | 0.0937 |
| PA | 1448 | 387.1 | 0.267 | 0.109 | 1381 | 452.2 | 0.328 | 0.127 |
| RI | 130.2 | 55.88 | 0.429 | 0.207 | 166.9 | 70.35 | 0.422 | 0.261 |
| SC | 108.0 | 38.72 | 0.358 | 0.0644 | 298.9 | 112.5 | 0.376 | 0.187 |
| SD | 5.304 | 2.158 | 0.407 | 0.0106 | 46.33 | 13.65 | 0.295 | 0.0670 |
| TN | 190.1 | 68.72 | 0.361 | 0.0688 | 519.5 | 155.7 | 0.300 | 0.156 |
| TX | 358.3 | 95.00 | 0.265 | 0.0458 | 1466 | 369.1 | 0.252 | 0.178 |
| UT | 44.27 | 16.60 | 0.375 | 0.0967 | 195.5 | 52.62 | 0.269 | 0.306 |
| VA | 196.0 | 62.12 | 0.317 | 0.0695 | 478.1 | 171.0 | 0.358 | 0.191 |
| WA | 333.3 | 97.25 | 0.292 | 0.168 | 779.5 | 213.7 | 0.274 | 0.370 |
| WI | 362.5 | 106.8 | 0.295 | 0.0979 | 544.7 | 202.7 | 0.372 | 0.186 |
| WV | 156.9 | 31.34 | 0.200 | 0.0516 | 260.9 | 64.96 | 0.249 | 0.107 |
| WY | 3.437 | 1.646 | 0.479 | 0.0214 | 52.11 | 8.714 | 0.167 | 0.113 |
| DC | 50.97 | 12.73 | 0.250 | 0.0503 | 135.1 | 70.82 | 0.524 | 0.280 |
| ND | 0 | 0 | 0 | 0 | 46.29 | 13.34 | 0.288 | 0 |
| OR | 139.0 | 39.44 | 0.284 | 0.106 | 482.5 | 139.6 | 0.289 | 0.374 |
| VT | 13.20 | 3.391 | 0.257 | 0.0280 | 32.60 | 11.48 | 0.352 | 0.0948 |

*Notes:* Table displays raw state-level measures of total employment / placements, female employment / placements, female shares, and female employment / placements normalized by each state's 1940 female population 16+ years old. The left-hand side of the table uses WMC data for July 1944 with geographies that lie in multiple states are assigned to both states (double counted). The right-hand side uses USES placement data for 1943 and the second half of 1944 through 1945, which represents all data available from Pearl Harbor to VJ day.

Table 10: **Summary of WMC and USES Data by State (2)**

| | WMC Employment July 1944 (multistates dropped) | | | | USES Placements 1944q3 | | | |
|---|---|---|---|---|---|---|---|---|
| state | Total ('000) | Female ('000) | % female | Female / 1940 fem. pop | Total ('000) | Female ('000) | % female | Female / 1940 fem. pop |
| AL | 191.5 | 49.68 | 0.259 | 0.0534 | 73.82 | 22.61 | 0.306 | 0.0243 |
| AR | 27.34 | 14.99 | 0.548 | 0.0238 | 35.23 | 9.158 | 0.260 | 0.0145 |
| AZ | 19.84 | 7.332 | 0.370 | 0.0490 | 17.68 | 5.980 | 0.338 | 0.0399 |
| CA | 954.0 | 295.9 | 0.310 | 0.120 | 362.4 | 109.6 | 0.303 | 0.0446 |
| CO | 61.25 | 21.11 | 0.345 | 0.0573 | 30.68 | 7.500 | 0.244 | 0.0204 |
| CT | 381.7 | 140.1 | 0.367 | 0.222 | 39.62 | 14.33 | 0.362 | 0.0227 |
| DE | 50.02 | 14.42 | 0.288 | 0.148 | 7.128 | 3.032 | 0.425 | 0.0312 |
| FL | 129.6 | 36.70 | 0.283 | 0.0542 | 58.48 | 20.88 | 0.357 | 0.0309 |
| GA | 147.0 | 53.77 | 0.366 | 0.0508 | 98.94 | 38.49 | 0.389 | 0.0364 |
| IA | 55.04 | 17.90 | 0.325 | 0.0198 | 54.07 | 22.37 | 0.414 | 0.0248 |
| ID | 6.667 | 2.255 | 0.338 | 0.0145 | 12.04 | 3.366 | 0.280 | 0.0217 |
| IL | 811.5 | 295.0 | 0.364 | 0.101 | 212 | 40.03 | 0.189 | 0.0137 |
| IN | 291.7 | 101.1 | 0.347 | 0.0812 | 98.85 | 31.88 | 0.322 | 0.0256 |
| KS | 60.99 | 23.54 | 0.386 | 0.0367 | 39.01 | 12.89 | 0.330 | 0.0201 |
| KY | 8.031 | 2.968 | 0.370 | 0.00316 | 58.07 | 17.45 | 0.301 | 0.0186 |
| LA | 126.4 | 30.73 | 0.243 | 0.0383 | 34.79 | 7.269 | 0.209 | 0.00907 |
| MA | 582.0 | 215.5 | 0.370 | 0.131 | 84.32 | 35.81 | 0.425 | 0.0218 |
| MD | 230.0 | 69.24 | 0.301 | 0.107 | 72.13 | 32.55 | 0.451 | 0.0501 |
| ME | 67.11 | 19.46 | 0.290 | 0.0662 | 18.74 | 6.230 | 0.333 | 0.0212 |
| MI | 965.9 | 285.7 | 0.296 | 0.158 | 110.1 | 28.10 | 0.255 | 0.0155 |
| MN | 108.7 | 36.73 | 0.338 | 0.0380 | 63.60 | 22.45 | 0.353 | 0.0232 |
| MO | 9.121 | 3.587 | 0.393 | 0.00260 | 89.33 | 24.23 | 0.271 | 0.0175 |
| MS | 11.30 | 3.930 | 0.348 | 0.00556 | 39.70 | 14.52 | 0.366 | 0.0205 |
| MT | 4.328 | 1.017 | 0.235 | 0.00587 | 10.85 | 1.629 | 0.150 | 0.00941 |
| NC | 138.1 | 59.52 | 0.431 | 0.0519 | 83.64 | 31.68 | 0.379 | 0.0277 |
| NE | 11.82 | 5.690 | 0.481 | 0.0124 | 21.60 | 6.054 | 0.280 | 0.0132 |
| NH | 26.04 | 12.01 | 0.461 | 0.0673 | 7.640 | 3.801 | 0.498 | 0.0213 |
| NJ | 689.9 | 245.8 | 0.356 | 0.155 | 112.3 | 44.55 | 0.397 | 0.0281 |
| NM | 3.055 | 1.296 | 0.424 | 0.00817 | 10.45 | 1.818 | 0.174 | 0.0115 |
| NV | 7.681 | 2.230 | 0.290 | 0.0760 | 8.386 | 2.083 | 0.248 | 0.0710 |
| NY | 1133 | 372.2 | 0.328 | 0.0735 | 312.7 | 121.5 | 0.389 | 0.0240 |
| OH | 725.9 | 234.1 | 0.322 | 0.0921 | 220.9 | 75.22 | 0.341 | 0.0296 |
| OK | 86.79 | 33.18 | 0.382 | 0.0431 | 47.54 | 10.30 | 0.217 | 0.0134 |
| PA | 683.1 | 165.3 | 0.242 | 0.0466 | 192.1 | 62.51 | 0.325 | 0.0176 |
| RI | 14.54 | 4.005 | 0.276 | 0.0148 | 22.32 | 12.12 | 0.543 | 0.0449 |
| SC | 96.27 | 34.12 | 0.354 | 0.0568 | 52.85 | 18.95 | 0.359 | 0.0315 |
| SD | 5.304 | 2.158 | 0.407 | 0.0106 | 5.253 | 2.058 | 0.392 | 0.0101 |
| TN | 127.1 | 43.57 | 0.343 | 0.0436 | 82.68 | 22.30 | 0.270 | 0.0223 |
| TX | 342.8 | 89.07 | 0.260 | 0.0430 | 199.0 | 41.88 | 0.210 | 0.0202 |
| UT | 44.27 | 16.60 | 0.375 | 0.0967 | 24.11 | 8.666 | 0.359 | 0.0505 |
| VA | 164.0 | 49.05 | 0.299 | 0.0549 | 86.28 | 31.62 | 0.367 | 0.0354 |
| WA | 194.3 | 57.81 | 0.298 | 0.100 | 100.2 | 27.52 | 0.275 | 0.0476 |
| WI | 322.2 | 98.17 | 0.305 | 0.0899 | 68.05 | 24.56 | 0.361 | 0.0225 |
| WV | 60.28 | 7.038 | 0.117 | 0.0116 | 42.35 | 8.506 | 0.201 | 0.0140 |
| WY | 3.437 | 1.646 | 0.479 | 0.0214 | 6.178 | 1.151 | 0.186 | 0.0150 |
| DC | . | . | . | . | 29.28 | 16.36 | 0.559 | 0.0646 |
| ND | . | . | . | . | 4.846 | 1.281 | 0.264 | 0 |
| OR | . | . | . | . | 56.75 | 16.28 | 0.287 | 0.0436 |
| VT | . | . | . | . | 4.738 | 1.645 | 0.347 | 0.0136 |

*Notes:* Table displays raw state-level measures of total employment / placements, female employment / placements, female shares, and female employment / placements normalized by each state's 1940 female population 16+ years old. The left-hand side of the table uses WMC data for July 1944 with geographies that lie in multiple states are dropped entirely. The right-hand side uses USES placement data for the third quarter of 1944, which was a peak in female wartime employment.

Table 11: **State level Impact of Wartime Employment on Female Labor Force Participation in 1950**

A. All Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WMC female emp / 1940 female pop · 1950 | -0.050 | -0.032 | 0.029 | | | | | | | | | |
| | (0.045) | (0.044) | (0.047) | | | | | | | | | |
| Share WMC emp female · 1950 | | | | 0.020 | 0.021 | 0.008 | | | | | | |
| | | | | (0.023) | (0.024) | (0.019) | | | | | | |
| USES female placements / 1940 female pop · 1950 | | | | | | | 0.005 | 0.008 | -0.003 | | | |
| | | | | | | | (0.029) | (0.031) | (0.041) | | | |
| Share USES placements female · 1950 | | | | | | | | | | -0.138*** | -0.120*** | -0.046 |
| | | | | | | | | | | (0.026) | (0.031) | (0.032) |
| BPL, age, marital status dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| 1940 controls | No | No | Yes | No | No | Yes | No | No | Yes | No | No | Yes |
| R2 | 0.01 | 0.24 | 0.24 | 0.01 | 0.24 | 0.24 | 0.01 | 0.24 | 0.24 | 0.01 | 0.24 | 0.24 |
| N | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 | 1025049 |

B. White Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WMC female emp / 1940 female pop · 1950 | -0.102* | -0.080 | 0.032 | | | | | | | | | |
| | (0.044) | (0.042) | (0.051) | | | | | | | | | |
| Share WMC emp female · 1950 | | | | 0.029 | 0.029 | -0.001 | | | | | | |
| | | | | (0.028) | (0.027) | (0.021) | | | | | | |
| USES female placements / 1940 female pop · 1950 | | | | | | | -0.011 | -0.009 | -0.008 | | | |
| | | | | | | | (0.026) | (0.029) | (0.040) | | | |
| Share USES placements female · 1950 | | | | | | | | | | -0.159*** | -0.136*** | -0.049 |
| | | | | | | | | | | (0.029) | (0.034) | (0.032) |
| BPL, age, marital status dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| 1940 controls | No | No | Yes | No | No | Yes | No | No | Yes | No | No | Yes |
| R2 | 0.01 | 0.25 | 0.25 | 0.01 | 0.25 | 0.25 | 0.01 | 0.25 | 0.25 | 0.01 | 0.25 | 0.25 |
| N | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 | 914640 |

C. Black Women

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WMC female emp / 1940 female pop · 1950 | -0.033 | 0.047 | 0.099 | | | | | | | | | |
| | (0.059) | (0.063) | (0.066) | | | | | | | | | |
| Share WMC emp female · 1950 | | | | 0.035 | 0.043 | 0.019 | | | | | | |
| | | | | (0.055) | (0.049) | (0.040) | | | | | | |
| USES female placements / 1940 female pop · 1950 | | | | | | | -0.028 | -0.025 | -0.058 | | | |
| | | | | | | | (0.062) | (0.073) | (0.117) | | | |
| Share USES placements female · 1950 | | | | | | | | | | -0.126* | -0.124 | -0.070 |
| | | | | | | | | | | (0.059) | (0.067) | (0.063) |
| BPL, age, marital status dummies | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| 1940 controls | No | No | Yes | No | No | Yes | No | No | Yes | No | No | Yes |
| R2 | 0.02 | 0.17 | 0.17 | 0.02 | 0.17 | 0.17 | 0.02 | 0.17 | 0.17 | 0.02 | 0.17 | 0.17 |
| N | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 | 106378 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Notes:* Sample is the same as in Table 8, but includes non-sample line individuals in 1950 since the outcome variable is labor force participation, which was asked of all respondents. 1940 controls consist of the three variables included in Table 8: 1940 shares of employment in farming, population white, and median schooling for women aged 25+. Standard errors are clustered at the state-year level.

Table 12: **Detailed Industry Placement Declines**

| | 1945 Jan-Mar to Sep-Nov change | | 1945 Jan-Mar total |
|---|---|---|---|
| Industry | Share female | Total placements | Female placements |
| Total | -0.00401 | -0.428 | 883300 |
| Aircraft and parts | -0.132 | -0.940 | 55712 |
| Apparel and related products | 0.0571 | -0.285 | 48051 |
| Automobiles and automobile equipment | -0.0822 | -0.482 | 6080 |
| Chemicals | -0.102 | -0.656 | 25853 |
| Contract construction | -0.0226 | -0.356 | 6942 |
| Electrical machinery | -0.101 | -0.680 | 54804 |
| Establishments, n.e.c. | -0.0951 | -0.774 | 1979 |
| Finance, insurance and real estate | 0.00908 | -0.178 | 9033 |
| Food and kindred products | -0.0592 | 0.754 | 49685 |
| Forestry and fishing | -0.0286 | 1.018 | 99 |
| Furniture and finished lumber products | -0.0372 | -0.472 | 11138 |
| Interstate railroads | -0.0216 | -0.607 | 4581 |
| Iron and steel and their products | -0.0689 | -0.569 | 33066 |
| Leather and leather products | 0.0797 | -0.240 | 11589 |
| Lumber and timber basic products | -0.0399 | -0.517 | 3951 |
| Metal working machinery | -0.0335 | -0.724 | 7355 |
| Mining | -0.00567 | -0.576 | 1219 |
| Miscellaneous manufacturing | -0.0237 | -0.325 | 18169 |
| Nonferrous metals and their produts | -0.00944 | -0.643 | 11250 |
| Ordnance and accessories | -0.190 | -0.947 | 69583 |
| Other machinery | -0.0860 | -0.564 | 21633 |
| Other public utilities | -0.0385 | -0.565 | 24317 |
| Other transportation equipment | -0.0918 | -0.369 | 463 |
| Paper and allied products | -0.0555 | -0.403 | 12909 |
| Printing, publishing and allied industries | 0.0423 | -0.179 | 5244 |
| Private households | -0.0277 | 0.444 | 73496 |
| Products of petroleum and coal | -0.0274 | -0.682 | 2536 |
| Railroad equipment | -0.0801 | -0.644 | 1275 |
| Regular government establishments | -0.0527 | -0.550 | 62936 |
| Rubber products | -0.172 | -0.561 | 12640 |
| Service industries except private households | 0.0186 | -0.189 | 63849 |
| Ship and boat building and repairing | -0.0502 | -0.832 | 17086 |
| Special government projects | -0.0213 | -0.765 | 755 |
| Stone, clay and glass products | -0.0921 | -0.346 | 10288 |
| Textile-mill products | -0.0131 | -0.598 | 46468 |
| Tobacco manufactures | -0.0122 | -0.764 | 6813 |
| Wholesale and retail trade | 0.00280 | -0.136 | 90453 |

*Notes:* Table displays the data underlying Figure 6 Panel C. See the notes to that table for additional details.