The Intergenerational Transmission of World War I on Female Labor

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Abstract

This article explores the pathways that underlie the diffusion of women's participation in the labor force across generations. I exploit a severe exogenous shock to the sex ratio, World War I in France, which generated a large inflow of women in the labor force after the war. I show that this shock to female labor transmitted to subsequent generations until today. Three mechanisms of intergenerational transmission account for this result: transmission through parents, through marriage, and through local social interactions. Beyond behaviors, the war also permanently altered beliefs toward the role of women in the labor force. (*JEL* J16, J22, N34, Z13)

*Toulouse School of Economics (TSE) and Institute for Advanced Study in Toulouse (IAST), University of Toulouse Capitole, Toulouse, France (email: victor.gay@tse-fr.eu). This article previously circulated under the title "The Legacy of the Missing Men. The Long-Run Impact of World War I on Female Labor Force Participation." The Online and Data Appendices are available at victorgay.me. I am extremely grateful to Richard Hornbeck for his guidance and support, as well as to James Robinson, Steven Levitt, and Derek Neal. This article has also benefited from fruitful discussions with Ran Abramitzky, Jessica Bean, Michael Becher, Jörn Boehnke, Oliver Browne, Eszter Czibor, Raquel Fernández, Alicia Marguerie, Saurabh Pant, Leah Rosenzweig, Mohamed Saleh, and Estefania Santacreu-Vasut. I thank seminar participants at Chapman, Chicago, the Harris School of Public Policy, Northwestern, PSE, SDU, Stanford, Toronto, TSE, the 2017 EHA, 2018 Galatina, 2019 EHS, and 2019 SYME meetings for helpful comments. I gratefully acknowledge the CISSR and the Department of Economics at the University of Chicago, as well as the ANR under grant ANR-17-EURE-0010 (Investissements d'Avenir program) for financial support.

1. Introduction

World War I profoundly altered the role of women in the French society. When 3.7 million men were incorporated into the army in August 1914, representing 30 percent of the male labor force, as many women immediately took up new roles to compensate for this sudden loss of manpower, both in the fields and in the factories (Downs, 1995; Thébaud, 2013 [1986]). While contemporaries soon speculated on the liberating consequences of female wartime employment on the place of women in the post-war society (McMillan, 1988), the demobilization of women at the end of the war was brutal and characterized by strong antifeminism (Thébaud and Bard, 1999). Still, demographic changes induced by the 1.3 million men who had died during the war pushed millions of women into the waged labor force during the interwar period (Boehnke and Gay, 2022). Was this series of events a watershed that propelled the revolution of female labor about to come?

Indeed, women's involvement in labor markets increased dramatically across industrialized economies after World War II (Olivetti and Petrongolo, 2016). In France, labor force participation rates of women aged 30 to 49 rose from 40 percent in the early 1960s to 90 percent today. Traditional explanations for this revolution have emphasized the role of technological change in increasing both the demand and supply of female labor (Goldin, 2006).[1] More recently, intergenerational transmission mechanisms have been pointed out as instrumental to this secular transformation (Hazan and Maoz, 2002; Fernández, Fogli and Olivetti, 2004; Fogli and Veldkamp, 2011; Fernández, 2013; Hiller and Baudin, 2016). Despite growing consensus that intergenerational transmission mechanisms constitute an important explanation for the revolution of female labor, there is still little empirical evidence that these channels were simultaneously at work throughout the revolutionary period. The main reason concerns challenges to identification. First, most factors that initially induced women to enter the labor force, such as technological change,

[1] Technological explanations include greater availability and declining prices of labor-saving consumer durable goods (Greenwood, Seshadri and Yorukoglu, 2005), oral contraceptives (Bailey, 2006), the fall in child care cost induced by the marketization of home production (Attanasio, Low and Sánchez-Marcos, 2008), improvements to maternal health (Albanesi and Olivetti, 2016), and the structural transformation (Ngai and Petrongolo, 2017). Goldin (1990; 2006; 2014) provides comprehensive accounts of the mechanisms underlying long-run trends in female labor force participation in the United States. For a historical perspective on France, see Maruani and Meron (2012).

are strongly persistent. As a result, the working behaviors of women across generations remain largely codetermined. Moreover, the massive entrance of women in the labor force might have altered local labor markets permanently, making it challenging to identify intergenerational transmission channels independent from these confounding changes.

In this article, I explore the intergenerational transmission of World War I in France on female labor force participation. In particular, I analyze the pathways that underlie the diffusion of women's working behaviors across generations following this historical event and provide direct empirical evidence that three mechanisms of intergenerational transmission were simultaneously at work: transmission from parents to children, transmission from husbands to wives, and transmission through local social interactions. My empirical strategy exploits the war as a severe exogenous shock to the adult sex ratio. Of 8 million French men drafted throughout the conflict, 1.3 million died because of the war; a military death rate of 16 percent. As a result, it was not until the 1950s that the adult sex ratio recovered its balance (Figure 1).[2] This disruption induced millions of women to enter the waged labor force shortly after the war due to limited pensions to war widows in the 1920s and deteriorated marriage market conditions (Abramitzky, Delavande and Vasconcelos, 2011; Boehnke and Gay, 2022).

Did this generation of newly working women pave the way to later generations of women? This article uncovers the channels of intergenerational transmission of this exogenous shock to female labor throughout the second half of the twentieth century, long after sex ratios had reverted to balance. To identify intergenerational transmission independent from confounding changes to local labor market structures induced by the war, I use an empirical strategy that relies on the working behaviors of women who make decisions under similar local labor market conditions but whose geographical origins differ in their exposure to the war. This approach implies comparing women born in counties (*départements*) that experienced different military death rates during the war—the ratio of deceased soldiers to the size of the drafted population—and therefore different historical shocks to female labor supply, but who reside in the same county and therefore face similar local institu-

[2]World War II affected the adult sex ratio in France only marginally as 115 thousand French soldiers died because of the war, a military death rate of 1.5 percent (Lagrou, 2002).

tional constraints when making decisions.[3] To assess the long-run effect of WWI on female labor force participation through intergenerational transmission, I apply this approach to individual-level census data from 1962 to 2012, complemented with labor force survey data from 1982 to 2012. I find that women born in counties that experienced 20 rather than 10 percent military death rates—equivalent to switching from the 25th to the 75th percentile of the distribution—were 5 percentage points more likely to be working, explaining half of the overall long-run impact of WWI military fatalities on female labor force participation.

To account for this finding, I open the black box of intergenerational transmission and explore three channels: transmission through parents, through marriage, and through local social interactions. To identify parental transmission, I use the extended annual labor force surveys 2005–2012 and compare women born and residing in the same county but whose parents were born in counties that experienced different military death rates. I find evidence for a strong mother-to-daughter transmission channel: women with mothers born in counties that experienced 20 rather than 10 percent military death rates were 11 percentage points more likely to be working. I also find evidence for a father-to-daughter transmission channel, though its magnitude is smaller. Next, I explore transmission through marriage and compare women born in the same county but whose husbands were born in different counties. I find that women married with men born in counties that experienced 20 rather than 10 percent military death rates were 2 to 5 percentage points more likely to be working. Consistent with this result, comparing women born in the same county and whose husbands and own parents were born in the same county but whose mothers-in-law were born in different counties, I find strong evidence for a mother-in-law to daughter-in-law transmission channel. Finally, using municipality-level variation in the exposure to WWI military fatalities among local populations' lineage, I find that this historical shock to female labor transmitted locally and persisted through social interactions. A comparison of these results suggests that mothers and mothers-in-law were of primary importance in the transmission of the legacy of the missing men.

[3]Départements represent the second level of subnational government, between *régions* and *arrondissements*. Metropolitan France was divided into 87 départements before the war, and 90 after the war. These were further subdivided into 95 départements later on. Throughout this article, I use the term *county* to designate *départements*.

To provide a rationale for the long-run impact of WWI military fatalities on female labor force participation, I argue that women induced to enter the labor force during the interwar period altered preferences and beliefs toward female labor of their daughters, sons, and social relationships, and that these changes translated into the working behaviors of women in subsequent generations. Since individuals form preferences and beliefs early in life from learning and socializing with their parents, peers, and neighbors (Hauk and Saez-Marti, 2002; Bisin and Verdier, 2011; Fogli and Veldkamp, 2011; Fernández, 2013; Olivetti, Patacchini and Zenou, 2020), men and women who grew up with a working mother, or in an environment in which many women worked, should form more progressive attitudes toward female labor.[4] Consistent with this argument, I find that men and women born in counties that experienced greater military death rates hold more progressive attitudes toward the role of women in the labor force today.

Related Literature and Contributions. To account for the revolution of female labor, models of intergenerational transmission typically highlight one specific mechanism—e.g. transmission from mothers to daughters (Fernández, 2011), from mothers-in-law to daughters-in-law (Fernández, Fogli and Olivetti, 2004), or through local information diffusion (Fogli and Veldkamp, 2011). This article is the first to provide comprehensive empirical evidence that these mechanisms were simultaneously at work throughout the revolutionary period, over three generations. For instance, Fernández, Fogli and Olivetti (2004) argue that one explanation for the revolution of female labor is the increasing number of men who grew up with a working mother. They show that women's wartime employment during WWII in the United States, which they proxy by wartime mobilization, propagated to

[4]Many studies find a correlation between both beliefs toward female labor and the working behaviors of mothers and their daughters', of mothers-in-law and their daughters-in-laws', and of mothers and their daughters' peers. Farre and Vella (2013) show that US mothers' attitudes toward gender roles and their working behaviors are correlated with their daughters' attitudes when young and working behaviors when adults, a phenomenon corroborated for Great Britain (Johnston, Schurer and Shields, 2014) and Mexico (Campos-Vazquez and Velez-Grajales, 2014), but not in Egypt (Miyata and Yamada, 2016). Olivetti, Patacchini and Zenou (2020) show that the working behaviors of mothers of a woman's friends when growing up affect her own working behavior later in life. Transmission from mothers-in-laws' labor choices to their daughters-in-laws' has been found for Japan (Kawaguchi and Miyazaki, 2009), Switzerland (Bütikofer, 2013), the United States (Morrill and Morrill, 2013), and China (Chen and Ge, 2018; Li and Liu, 2018).

their daughters-in-law after the war—though Rose (2018) nuances these findings.[5] Consistent with this study, I find evidence for a mother-in-law to daughter-in-law transmission channel. But this mechanism constitutes only one among those I am able to identify.[6] Importantly, in contrast to this study and the broader literature, the empirical strategy I use enables to identify intergenerational transmission independent from confounding changes to local labor market structures. Furthermore, using WWI rather than WWII as a source of variation provides the opportunity to investigate the diffusion dynamics of women's working behaviors across three generations, from the beginning to the end of the revolution of female labor. The case of WWI in France is also particularly advantageous to explore these mechanisms compared to the case of WWII in the U.S. because American black male labor alleviated the consequences of the war on female labor force participation (Ferrara, 2022).

This article also uncovers mechanisms of historical persistence for which the evidence is still scarce. Due to the methodological focus of the literature on a location-based aspect of history—how historical events in a location shape long-run outcomes in that location—domestic institutions have been pointed out as primary channels of historical persistence (Acemoglu, Johnson and Robinson, 2005; Nunn, 2014; Michalopoulos and Papaioannou, 2017). Partly because of a lack of appropriate data, a crucial vehicle of historical persistence has received less attention: individuals. Understanding how individuals transmit legacies of history across generations requires moving from a location-based approach to a lineage-based approach. Applying this methodology, Michalopoulos, Putterman and Weil (2019) show that pre-modern economic lifeways in Africa still affect individuals' economic outcomes today.[7] Alesina, Giuliano and Nunn (2013, p. 524) find that half of the overall impact of historical plough use on contemporaneous gender-role attitudes is due to the transmission of cultural norms from ancestors to descen-

[5] A large empirical literature suggests that wartime mobilization in WWII U.S. generated an increase in female labor supply after the war (Acemoglu, Autor and Lyle, 2004; Goldin and Olivetti, 2013; Doepke, Hazan and Maoz, 2015; Brodeur and Kattan, 2022). Using more accurate measurement, Rose (2018) nuances these findings and shows that manpower mobilization and WWII military fatalities had limited effects on post-war female labor force participation.

[6] For instance, Fernández, Fogli and Olivetti (2004, p. 1266–1267) find no evidence for a mother-to-daughter transmission channel.

[7] Nunn and Wantchekon (2011) and Teso (2019, p. 26–28) use a similar approach.

dants rather than to long-run changes to institutional structures. Using a more systematic approach, I show that lineage aspects also account for half of the long-run impact of WWI military death rates on female labor force participation. This implies an important role for individuals relative to local institutional structures in generating historical persistence. My results further suggest that local social interactions are not to be neglected to understand how history transmits through individuals. Additionally, another novelty of this article is the use of a lineage approach *within* a country's *regions* to study the transmission of a historical shock. For instance, some specifications compare second-generation internal migrants that originate from neighboring counties. This reduces potential biases that might arise when comparing movers to stayers, which is oftentimes an issue for studies using a lineage approach.

Finally, this article complements the literature that investigates how cultural norms emerge and change over time (Giuliano and Nunn, 2021). Various studies show that historical shocks alter the economic roles of women in subsequent generations, particularly shocks to sex ratios (Giuliano, 2017, p. 20–23). Teso (2019) finds that sex ratio imbalances generated by the transatlantic slave trade induced current generations of women to enter the labor force. Grosjean and Khattar (2019) show that the scarcity of women in nineteenth-century Australia due to the arrival of predominantly male British convicts had adverse long-run consequences for women's position in the labor force and for attitudes toward gender roles today. A strand of recent studies further explores the long-run consequences of historical shocks to sex ratios on gender roles today, such as the repercussions of the Tripe Alliance War of 1864–1870 in Paraguay (Alix-Garcia et al., 2020; Boggiano, 2020) or of the Portuguese Colonial War of 1961–1974 (Cardoso and Morin, 2018). I similarly find that historical sex ratio imbalances had permanent implications for the economic roles of women. However, in contrast to these studies, the historical shock I consider is sharper—it was generated over a period of four years—which enables to rule out alternative channels through which it might have translated over the long run. More importantly, two elements differ substantially in the analysis offered in this article compared to the broader literature. First, the empirical strategy based on contrasting the roles of geographical origins from that of incentives arising from local labor market structures enables to disentangle the role of culture from that

of institutions.[8] Second, by examining outcomes continuously over time from the initial shock to the present, the long-run exclusion restriction necessary for this type of analysis is much more likely to be satisfied. In particular, results imply that the persistence of the implications of the war has been constant over time and is not dependent upon the time-point selected for the analysis.[9]

In the remainder of the article, I describe the short-run impact of WWI on female labor in the interwar period (Section 2). Then, I describe the datasets combined for this article (Section 3) and show that this shock persisted (Section 4) through mechanisms of intergenerational transmission (Section 5). In Section 6, I show that it also altered attitudes toward female labor. Section 7 concludes.[10]

2. World War I and Female Labor in the Interwar Period

2.1. World War I Military Fatalities

To construct a county-level measure of WWI military death rates, I collected the individual military records of all 1.3 million French soldiers who died because of the war and extracted their counties of birth.[11] The military death rate in a county is then defined as the ratio of deceased soldiers born in the county to the size of its drafted population, which is captured by its male population aged 15 to 44 in the census of 1911, the last census before the war, as conscription was universal for all men aged 20 to 48.[12] The distribution of county-level military death rates in 1914 geography is displayed in Figure 2. They average 15 percent and range from

[8] Although Alix-Garcia et al. (2020) and Boggiano (2020) use a relatively sharp shock to sex ratios, and Teso (2019, p. 26–28) uses a comparable empirical strategy as in this article.

[9] Several recent studies have highlighted how the past might have time-dependent implications on the present, such as Ochsner and Roesel (2019), Cantoni, Hagemeister and Westcott (2020), and Fouka and Voth (2020).

[10] Throughout the article, Figures and Tables indexed by a letter are available in the Online Appendix. A Data Appendix is also available on the author's webpage.

[11] Military records are from the *Mémoire des Hommes* (MDH) archive held by the Ministry of Defense. The Data Appendix provides more details on the construction of this dataset. This measure based on individual-level military records improves upon previous measures used in Abramitzky, Delavande and Vasconcelos (2011) and Vandenbroucke (2014), which are based on aggregates from Huber (1931) at the level of 21 regions.

[12] While conscription was universal, 21 percent of men aged 15 to 44 were initially exempted due to poor health conditions (Huber, 1931, p. 93). Nevertheless, local health conditions are entirely captured by the measures of rurality controlled for throughout the analysis in this article (Boehnke and Gay, 2022, Appendix F).

6 percent in Belfort to 29 percent in Lozère. Throughout the analysis, I interpret regression coefficients by comparing differences in outcomes across counties that experienced 20 rather than 10 percent military death rates during the war, which corresponds to switching from the 25th to the 75th percentile of the distribution. Echoing the national trends displayed in Figure 1, disruptions to sex ratios due by WWI military fatalities remained limited to the interwar period (Figure A.1).

Two elements explain the systematic part of the variation in military death rates across counties: the territorial organization of military recruitment and the industrial war effort. The territorial organization of the military structured both recruitment and army corps, which initially comprised soldiers from the same military region.[13] Soldiers from the same region were therefore sent to the same battlefields at the beginning of the war.[14] However, as military fatalities soon accumulated, the military command changed its allocation policy: after five months into the war, soldiers were allocated to depleted army corps by priority, effectively pooling soldiers from different regions (Boulanger, 2001, p. 253). As a result, military death rates varied greatly across counties, even within regions—military region fixed effects explain only 16 percent of the variation in military death rates across counties.

As the war lingered, the military command's plan to supply troops with war matériel proved dramatically insufficient (Porte, 2005; Bostrom, 2016).[15] To cope with the ongoing war effort, the Ministry of War soon recalled soldiers with manufacturing skills so that up to 12 percent of soldiers were employed in war factories during the conflict. An additional 8 percent were employed in military administration.[16] As a result, soldiers from industrial and urban areas were less likely to die in combat than those from rural areas. This pattern clearly emerges when regressing military death rates on pre-war county characteristics (Table 1): rural counties

[13]This territorial structure was inherited from the reorganization of the army after the Franco-Prussian War of 1870. The structure in place in 1914 was defined by the law of December 22, 1913 (Boulanger, 2001, p. 16–24).

[14]The mobilization plan—the *Plan XVII*—designed in 1912, assigned each army corps to a specific area after invasion by German troops. The structure of this plan was predetermined by the railway network (Gonzalez-Feliu and Parent, 2016).

[15]For example, the Plan XVII procured 13,600 75mm shells per day. Nearly 40,000 were used daily during the Race to the Sea in October 1914. By then, half of the stock of 75mm shells had been depleted (Bostrom, 2016, p. 264). See also Porte (2005, p. 73–82).

[16]This allocation policy was enacted by the Dalbiez bill of August 17, 1915. Soldiers were also allocated to steel production and harvesting from 1917 onward.

experienced greater military death rates, where rurality is captured by the share of rural population and the share of population born in the county.[17] Rurality explains 75 percent of the variation in military death rates (column 1). Determinants of subsequent female labor force participation available in historical statistics—pre-war female labor force participation, female education, total fertility, personal wealth per inhabitant—as well as additional characteristics do not appear correlated with military death rates, and only explain an additional 8 percent of their variation (column 2).[18] Including 20 military region fixed effects explains an additional 6 percent (column 3). I further show in Appendix G that pre-war attitudes toward gender roles are not correlated with military death rates, although measuring these accurately remains challenging. Throughout the analysis, I rely on the residual variation in military death rates following the specification in column 3. I interpret this residual variation as non-systematic and related to the randomness at which soldiers encountered violence on the battlefield. Panel A of Table A.1 provides summary statistics for these pre-war county-level characteristics.

2.2. Female Labor during the Interwar Period

To assess the short-run effect of WWI military death rates on women's working behaviors in the interwar period, Boehnke and Gay (2022) exploit differential changes in female labor force participation rates before and after the war across counties that experienced different military death rates. Their results imply that in counties that experienced 20 rather than 10 percent military death rates, female labor force participation rates were 4 percentage points higher during the interwar period, an increase of 12 percent relative to pre-war levels.

This inflow of women in the labor force occurred *after* rather than *during* the war, as counties with greater female wartime employment did not experience a post-war rise in female labor force participation. Instead, it was driven by increased labor

[17] The census of 1911 defines the share of rural population as the share of population that resides in municipalities with fewer than 2,000 inhabitants. The share of population born in the county is tied to fundamental aspects of French rurality as a measure of the intensity of the rural exodus during the late nineteenth century.

[18] These additional characteristics include the share of active population in the agricultural sector, in the industrial sector, average height, total population, the share of literate population, and average direct taxes per inhabitant. Note that this lack of correlation could also result from a lack of statistical power due to the low number of observations.

supply by war widows, whose pensions remained limited until the early 1930s, as well as by young single women, who had to enter the labor force and become secondary earners in their families while searching longer for a husband.[19] In contrast, labor demand factors were of second-order importance: comparing female wages across sectors with different degrees of substitutability between male and female labor, Boehnke and Gay (2022) find that substitution of firms from male labor to female labor was likely limited.

3. Data

To assess the long-run implications of WWI beyond the interwar period, I combine several datasets that capture female labor force participation and beliefs toward female labor throughout the second half of the twentieth century: the population censuses 1962–2012, the labor force surveys 1983–2012, the extended labor force surveys 2005–2012, and the Generation and Gender Survey 2005. The Data Appendix provides extensive details on the construction of these datasets.

The Population Censuses 1962–2012. The main analyses in this article rely on the combination of eight individual-level population censuses through 2012, starting with the earliest available in 1962.[20] These censuses represent 20 to 25 percent samples of the population, except those of 1962 and 1999, which are 5 percent samples. They provide respondents' city of residence, county and year of birth, position in the labor force, occupation, educational attainment, and marital status. The availability of household identifiers further enables to construct a proxy for fertility through the number of children present in the household.

The population of interest consists in married women aged 30 to 49, born and residing in metropolitan France—about 10 million respondents. I focus on this age

[19] Perturbed conditions on the marriage market were however temporary and circumscribed to the interwar period. Using the family survey of 1954 and the census of 1968, Boehnke and Gay (2022, Appendix H) show that while women of the cohorts 1899–1908 in counties with higher military death rates married older and had slightly less children, they had similar rates of definitive singlehood by the end of their lives, suggesting that they only delayed marriage due to the war.

[20] Census years are 1962, 1968, 1975, 1982, 1990, 1999, 2007, and 2012. From 2004 onward, censuses are conducted yearly on a rotating basis for a fifth of the French population. Rigorous comparisons across censuses can therefore only be made five years apart after 2004 (Brilhault and Caron, 2016).

group to ensure that human capital investments are completed and to abstract from retirement decisions. I restrict the sample to married women because their entrance in the labor force represented the core of the revolution of female labor: the share of working women in this sample increased from 30 percent in the early 1960s to 80 percent in the late 2000s. Panel B of Table A.1 provides summary statistics and Figure A.2 displays sample means for labor, fertility, and education outcomes over time.

The Labor Force Surveys 1982–2012. To corroborate results obtained with the censuses, I further combine thirty-one annual labor force surveys from 1982 to 2012. Labor force surveys present both drawbacks and advantages over the censuses. On the one hand, information about respondents' counties of birth is not available in the surveys prior to 1982, while it is available from 1962 onward in the censuses. Moreover, the sample size of the surveys is smaller than that of the censuses: while most censuses represent 20 to 25 percent samples of the population, the surveys represent 1.5 to 3 percent samples. On the other hand, the labor force surveys provide a wider range of labor market outcomes: weekly hours worked, ever worked status, time since in current firm, and monthly wage rate. Therefore, the use of the labor force surveys enables to extend the main analysis thanks the richer labor information they provide.

The Extended Labor Force Surveys 2005–2012. Then, to explore intergenerational transmission from parents to children, I use the extended annual labor force surveys 2005–2012. Compared to the regular labor force surveys, starting in 2005, their extended versions have the feature of additionally containing the counties of birth of respondents' parents as well as other parental information, including the labor status of respondents' parents during their childhood. This provides a unique opportunity to analyze the role of parental origins in the intergenerational diffusion process of the war. Panel C of Table A.1 provides summary statistics.

The Generation and Gender Survey 2005. Finally, to assess the long-run implications of WWI on attitudes and specialization within the family, I use the Generation and Gender Survey of 2005 (Régnier-Loilier, 2016). It provides information about respondents' attitudes toward gender roles, religion, the family, and

marriage, as well as information about the distribution of household tasks and child care within the family. Importantly, it is the only survey available that provides both respondents' counties of birth and of residence, which is necessary to implement the empirical strategy.[21] Details of survey questions and summary statistics are discussed in Section 6.

4. The Overall Intergenerational Effects of WWI on Female Labor

4.1. Empirical Strategy

To assess the long-run effect of WWI military death rates on female labor force participation, a first approach is to compare labor force participation rates of married women aged 30 to 49 across counties and estimate the following specification separately for each census between 1962 and 2012:

$$\texttt{employed}_{irt} = \beta\, \texttt{death\_rate}_r + \boldsymbol{\alpha}\mathbf{X}'_{1911,r} + \boldsymbol{\theta}_{i;1914,r} + \boldsymbol{\varepsilon}_{irt}. \tag{1}$$

where $\texttt{employed}_{irt}$ is an indicator variable that denotes whether woman i residing in county r in year t is employed. $\mathbf{X}_{1911,r}$ is a set of county-level pre-war controls that capture the systematic determinants of military death rates and subsequent female labor force participation.[22] To make tighter comparisons within groups of women with similar characteristics and reinforce the credibility of the conditional independence assumption, I further include a set of cohort by military region fixed effects, $\boldsymbol{\theta}_{i;1914,r}$, as soldiers from the same military region were initially sent to the same battlefields, making the distribution of military death rates more likely to be idiosyncratic within these regions.[23] I cluster standard errors at the level of counties. In this specification, β is identified from variations in the working behaviors of married women of the same cohort and residing in neighboring counties

[21] Two other datasets with information on cultural beliefs are the opinion barometer of the DRESS and the International Social Survey (ISSP), but they do not provide respondents' counties of birth.

[22] $\mathbf{X}_{1911,r}$ contains the share of rural population, the share of population born in the county, female labor force participation, a measure of female education, total fertility, and personal wealth per inhabitant, all measured in 1911.

[23] There were 20 military regions in 1914, containing 5 counties on average—they would be fairly close-by, if not strictly neighboring in most cases (Figure 2). This strategy generates 400 comparison groups with 450–2,800 observations per group on average, depending on the census.

that experienced different military death rates.

Differences in female labor force participation rates across counties identified through the above strategy could be resulting from two channels: intergenerational cultural transmission, which is the focus of this article, but also changes to local labor markets structures. Indeed, interwar changes in female labor force participation were driven by increased female labor supply, which slightly depressed female wages in counties that were relatively more affected by the war (Boehnke and Gay, 2022, p. 21–23). Lower female wages might have incentivized firms to specialize in female labor-intensive activities. Had these changes persisted, the incentive structure faced by women would differ systematically across counties that experienced different military death rates, explaining why labor force participation rates of women are higher in these counties. To isolate the role of intergenerational cultural transmission from such institutional factors, I use an empirical strategy that relies on the working behaviors of women who make decisions under similar local labor market conditions but whose geographical origins differ in their exposure to the war.[24] I implement this strategy by comparing internal migrant married women women aged 30 to 49 residing in the same county but born in counties that experienced different military death rates:

$$\texttt{employed}_{ibrt} = \beta\, \texttt{death\_rate}_b + \boldsymbol{\alpha}\mathbf{X}'_{1911,b} + \boldsymbol{\theta}_{i;r;1914,b} + \boldsymbol{\varepsilon}_{ibrt}, \tag{2}$$

where $\boldsymbol{\theta}_{i;r;1914,b}$ are cohort by military region of birth by county of residence fixed effects.[25] I use two-way clustering and cluster standard errors at the levels of counties of birth and of residence. Here, β is identified from variations in the working behaviors of women of the same cohort and residing in the same county, but born in different though neighboring counties. By fixing variations arising from differences in local labor market structures, β solely captures intergenerational cultural transmission channels.

[24] This approach is sometimes called the "epidemiological approach" to culture (Fernández, 2011). It has been used for instance to identify the role of culture for labor choices of immigrant women to the U.S. (Fernández and Fogli, 2009; Blau, Kahn and Papps, 2011; Gay et al., 2018).

[25] This strategy generates 36,800 comparison groups with 4–17 observations per group on average, depending on the census year.

4.2. Results

The simple cross-county approach following Specification 1 implies that women residing in counties that experienced 20 rather than 10 percent military death rates were 7 to 10 percentage points more likely to be working between 1962 and 2012 (Figure 3). Now, focusing on internal migrant women and holding constant their counties of residence following Specification 2 reveals that intergenerational transmission channels account for half of this overall effect: estimates reported in Figure 4 imply that women residing in the same county but born in counties that experienced 20 rather than 10 percent military death rates were 5 percentage points more likely to be working between 1962 and 2012. These estimates are significant at the 1 percent level and stable across time, and they represent 47 to 62 percent of overall cross-county estimates of Figure 3. Since base rates increased from 30 percent in the early 1960s to 80 percent in the late 2000s, their relative size declined from 14 percent of the mean in 1962 to 5 percent in 2012 (Figure A.5).

4.3. Robustness

I perform a series of robustness checks that support the credibility of baseline estimates reported in Figure 4. The full set of results summarized below are discussed in details in Appendix B. I also show in Appendix C that World War II military fatalities and destruction do not affect the results.

Alternative Specifications. Estimates are robust to the choice of regression model: marginal coefficients from Probit and Logit models are identical to OLS coefficients. They are also similar when the outcome is a labor force participant indicator, when widening age bounds to 25 to 59, and when including women of all marital statuses.

Selective Migration Patterns. Because coefficients are identified from behaviors of internal migrants, selective migration might account for the results if outmigration patterns were correlated with both military death rates and labor market outcomes. I show that it is unlikely to be the case. First, half of married women

aged 30 to 49 were internal migrants as of 2012.[26] Moreover, trends in the proportion of married women among internal migrant women are identical to trends in the proportion of married women among all women (Figure A.4). Importantly, internal migrant and non-migrant women are broadly alike along observable characteristics: regressing observable characteristics on a migration status indicator reveals that internal migrant women are equally likely to be working, were born in counties with similar military death rates, and have the same number of children. They are, however, slightly positively selected in terms of education. This source of selection might bias the results if it was operating differently across individuals that originate from counties that experienced low and high military death rates. However, including an interaction term between the internal migrant indicator and the military death rate of respondents' counties of birth reveals that selection along all observable characteristics—including education—does not operate systematically differently across counties of birth. These tests suggest that this source of selection cannot account for the main results.

Beyond selection through out-migration patterns, results might be biased through selective in-migration patterns, that is, through the destination location of internal migrants. In particular, individuals born in counties that experienced greater military death rates might settle in more dynamic labor markets. However, removing the ten most urban counties of destination from the sample leaves the results unchanged. Still, in-migration selection might operate within destination counties, with those born in counties that experienced greater military death rates sorting systematically into the more dynamic local labor markets of these counties. Comparing internal migrants within their local labor market of residence through employment zones and city fixed effects also leaves baseline estimates unchanged, suggesting that in-migration sorting does not account for the results.

To further alleviate potential issues of selective migration patterns, I control for the relative attractiveness of origin and destination counties through dyadic measures that capture pull and push forces between each pair of counties, together

[26] Counties are relatively small, with a median radius of 43 kilometers. The median migration distance is 150 kilometers. The *Geographical Mobility and Urban Concentration* study of 1961 reports that among married women aged 30 to 49, the primary migration motive is family related for two-fifths of them and work related for another two-fifths (Girard, Bastide and Pourcher, 1964).

with the distance between them. I also restrict the sample to individuals who migrated at least one decade earlier—the one-and-a-half generation—since they might be subject to less biases due to recent migration. Both strategies generate estimates that are slightly lower than the baseline, though not statistically different. Overall, these robustness checks suggest that selective migration cannot account for the results.

Inaccurate Assignment of Military Death Rates. The empirical strategy used throughout this article requires regressors to be assigned at the level of geographical origin, i.e., the county in which internal migrants' ascendants were residing during the interwar period. However, censuses do not provide ascendants' counties of birth. I am therefore constrained to assume that counties of birth and of origin are identical. Here, I relax this assumption by repeating the analysis on the extended labor force surveys 2005–2012, which provide parental counties of birth. I restrict the regression sample to internal migrants born before the mid-1960s in the same county as both their parents. These restrictions ensure that these individuals' parents were likely born in the 1920s and mid-1930s and that their counties of birth trace to the interwar period.[27] Estimates are slightly inflated compared to the baseline—though not significantly different—suggesting that inaccurate assignment of military death rates in the censuses creates some attenuation bias through measurement error. A related concern is that counties of birth and childhood might differ. Comparing women with similar migration histories generates results identical to the baseline.

Education and Fertility. Labor market outcomes are endogenous to human capital investment and fertility choices. As a result, these decisions might mediate the relationship between women's working behaviors and WWI military death rates. Controlling for educational attainment and number of children leaves results unchanged, suggesting that the long-run impact of WWI military death rates was direct rather than mediated by education and fertility choices.

[27]The share of French men born in France that remained in their county of birth was 75.0 percent in 1921, 74.7 percent in 1926, 74.2 percent in 1931, and 73.2 percent in 1936 according to the censuses, suggesting limited migration movements between the end of the war and the mid-1930s. For women, these figures are 75.2, 74.9, 73.5, and 73.2, respectively.

4.4. Further Results

Further results are reported in Appendix D. Herein, I show that women born in counties that experienced greater military death rates do not make different fertility or education choices, corroborating that these decisions are not mediators of the effects identified above. Moreover, they do not hold more male-biased occupations, suggesting that the war did not have a long-lasting implications on gender occupational segregation. Also, these women do not marry at different rates, and when they marry, their husbands do not differ along observable characteristics. This suggests that marriage market desequilibria due to the war highlighted by Abramitzky, Delavande and Vasconcelos (2011) remained circumscribed to the interwar period. I also find little heterogeneity across women with different number of children, education, age, or marital status. In particular, life-cycle patterns in labor force participation are not affected by WWI military death rates. I further provide cohort-specific estimates and a placebo test using the male sample.

Next, I combine the thirty-one annual labor force surveys from 1982 to 2012 and run a reproduction exercise that corroborates results obtained with the censuses.[28] The analysis of labor force surveys further reveals that women born in counties that experienced greater military death rates are more attached to the labor force, but that this influence on the extensive margin does not translate to the intensive margin, as they work shorter hours. A final concern is that although there is no evidence of a mediating role of observable educational attainment, results might still be driven by *unobserved* heterogeneity in human capital. Should this be the case, it would be reflected in wage rates. However, I find that women born in counties that experienced greater military death rates do not earn higher wages.

5. Intergenerational Transmission Mechanisms

To account for the overall intergenerational effects of the war on female labor identified above, I explore three mechanisms of intergenerational transmission: transmission through parents (Section 5.1), transmission through marriage (Section 5.2), and transmission through local social interactions (Section 5.3).

[28] I run the same specification as the baseline on a different sample of the same underlying population. In that sense, this is a reproduction test (Clemens, 2017, p. 327).

5.1. Transmission Through Parents

5.1.1. Empirical Strategy

To isolate intergenerational transmission from parents to daughters, I use the same strategy as before, only one generation earlier: I compare the working behaviors of women who make decisions under similar local labor market conditions but whose parents' geographical origins differ in their exposure to the war. I now focus on the sample of second-generation internal migrant married women aged 30 to 59 in the extended labor force surveys 2005–2012, which provides the counties of birth of respondents' parents. In particular, I restrict second-generation internal migrants to women who reside in their county of birth but whose mothers and fathers were both born in another county.[29] Focusing on second- rather than first-generation internal migrants improves the credibility of identification as a typical respondent in the sample has parents born during the 1930s. Their counties of birth therefore plausibly trace to the war (see Footnote 27). Moreover, since the location of second-generation internal migrants was determined prior to their births, results are further less likely to be driven by selective migration.[30]

I first explore the role of mothers' origins. To that end, I compare second-generation immigrant women whose mothers were born in different counties:

$$(3)\quad \texttt{employed}_{imfr} = \beta\, \texttt{death\_rate}_{m} + \boldsymbol{\alpha}\mathbf{X}'_{1911,m} + \boldsymbol{\gamma}_i + \boldsymbol{\delta}_r + \boldsymbol{\mu}_{1914,m} + \boldsymbol{\omega}_f + \boldsymbol{\varepsilon}_{imfr},$$

where military death rates $\texttt{death\_rate}_m$, historical controls $\mathbf{X}_{1911,m}$, and military region fixed effects $\boldsymbol{\mu}_{1914,m}$ are assigned at the level of mothers' counties of birth. $\boldsymbol{\gamma}_i$ is a set of year of birth and survey year indicators. Consistent with the empirical strategy, I include county of residence fixed effects, $\boldsymbol{\delta}_r$. To neutralize the influence of fathers' origins, I further include fathers' county of birth fixed effects $\boldsymbol{\omega}_f$. This enables to compare women whose fathers were born in the same counties.[31] I

[29] In the extended labor force surveys, 19 percent of married women aged 30 to 59 who reside in their county of birth have mothers born outside their county of birth, 20 percent have fathers born outside their county of birth, and 9 percent have both parents born outside their county of birth.

[30] Second-generation migrants and natives are broadly alike: they are equally likely to be employed, have the same number of children, and their mothers were born in counties with similar military death rates. Second-generation migrants are slightly more educated in general, but not differentially so when from counties that experienced greater military death rates (Table A.2).

[31] Because the sample size for the extended labor surveys is rather limited—15,095 second-

cluster standard errors at the levels of counties of residence and mothers' counties of birth. In this specification, β is identified from variations in the working behaviors of second-generation internal migrant married women of the same cohort, born and residing in the same county, whose fathers were born in the same county, but whose mothers were born in neighboring counties that experienced different military death rates. I then explore the role of fathers by estimating a specification analogous to Specification 3 in which variables are assigned at the level of fathers' counties of birth, and where I include mothers' county of birth fixed effects instead of fathers'. Finally, to assess the relative role of each parent directly, I run Specification 3 without parental origins fixed effects but including historical variables relative to both parents, distinguishing between women whose parents were born in the same county from those whose parents were born in different counties through the indicators $\texttt{same}_{mf}$ and $\texttt{different}_{mf}$, where m indexes mothers, and f, fathers:

$$
\begin{aligned}
\texttt{employed}_{imfr} &= \beta_1\, \texttt{same}_{mf} \cdot \texttt{death\_rate}_m + \beta_2\, \texttt{different}_{mf} \cdot \texttt{death\_rate}_m \\
&+ \beta_3\, \texttt{different}_{mf} \cdot \texttt{death\_rate}_f \\
&+ \boldsymbol{\alpha}_1 \mathbf{X}'_{1911,m} + \boldsymbol{\alpha}_2 \mathbf{X}'_{1911,f} + \boldsymbol{\gamma}_i + \boldsymbol{\delta}_r + \boldsymbol{\varepsilon}_{imfr},
\end{aligned} \tag{4}
$$

where I use three-way clustering and cluster standard errors at the levels of counties of residence and mothers' as well as fathers' counties of birth.

5.1.2. Results

I report results for the mother-to-daughter transmission channel in Table 2.[32] In column 1, the estimate is significant at the 1 percent level and implies that women whose mothers were born in counties that experienced 20 rather than 10 percent military death rates were 11 percentage points more likely to be working, which represents 13 percent of the outcome mean. Including fathers' county of birth fixed effects to further isolate the role of mothers' origins decreases the estimate only slightly, suggesting a primary role of maternal relative to paternal transmission (column 2). Restricting the identifying variation to mothers born in neighboring counties through mothers' military region of birth fixed effects similarly has little

generation internal migrant married women aged 30 to 59—I do not include interacted fixed effects. Doing so would generates more than 3,000 comparison groups, leaving too little residual variation for identification.

[32]Results are similar when the outcome is a labor force participant indicator (Table A.3).

impact on the estimate (column 3). Finally, I include controls for husband and household characteristics, parental characteristics, as well as respondents' education and number of children (column 4).[33] Again, the estimate changes little, which increases the credibility that economic factors potentially correlated with mothers' origins are not driving the results.

In column 5, I reproduce the estimate of column 3 using an alternative definition of second-generation internal migrants: I include women whose mothers were born in another county, but not necessarily their fathers. The resulting estimate is slightly lower than the baseline. Given that more than half of women in this sample had fathers born in their own county of birth, these "half-natives" probably assimilated the local culture of their county, making the impact of their mothers' origins less influential.

Next, I reproduce the above analysis with paternal origins and find that women whose fathers were born in counties that experienced 20 rather than 10 percent military death rates were 8 percentage points more likely to be working (Table A.4, column 1). Once fixed effects for maternal origins are included along with fathers' military regions of birth fixed effects and parental, individual, and household characteristics, the estimate is still positive but declines substantially and is rather imprecise (columns 2–4). Such lesser role of paternal relative to maternal origins can be rationalized by the fact that while fathers are primary role models for their sons, they are less so for their daughters, especially when it comes to gender roles (Farre and Vella, 2013).

The role of fathers nevertheless obtains to some extent once both parental origins are simultaneously considered (Table A.5). Estimates in column 1 imply that women with parents born in the same county that experienced 20 rather than 10 percent military death rates were 12 percentage points more likely to be working. Coefficients on mothers' and fathers' independent origins add up to the coefficient when both were born in the same county, suggesting that the impact of each parental origin cumulates linearly, with maternal origins being more important. Including parental regions of birth fixed effects along with various controls does not alter the

[33]Husband and household characteristics consist of husbands' incomes, age, age squared, education, an indicator for home ownership, and the number of rooms in the home; parental characteristics include indicators for parents' occupational status and mothers' labor status; education controls consist of indicators for educational attainment.

results (columns 2 and 3).

Overall the analysis in this section highlights the primary role of mothers in transmitting the legacy of the war to their daughters: the war induced many mothers to enter the labor force, who then in turn provided a progressive role model to their daughters when growing up, transmitting this behavior across generation.[34]

5.2. Transmission Through Marriage

5.2.1. Empirical Strategy

After parental transmission, I explore a second channel: transmission through marriage, that is, from husbands to wives, and by extension, from mothers-in-law to daughters-in-law. Fernández, Fogli and Olivetti (2004) argue that sons of working mothers hold more progressive attitudes toward female labor than sons of stay-at-home mothers, making these men less averse to having a working wife, thereby incentivizing women to enter the labor force. Following this line of reasoning, since men born in counties that experienced greater military death rates are more likely to have grown up with a working mother, they should be more likely to have a working wife. Women whose mothers-in-law were born in counties that experienced greater military death rates should also be more likely to work.

Two alternative mechanisms could account for these implications, beyond the transmission argument. First, reverse causation and assortative matching: women from counties that experienced greater military death rates might be more likely to marry with men from similar counties because of their higher initial propensity to work and these men's preference toward having working wives. Although I provide evidence of some degree of homogamy in military death rates in Appendix E, in the analysis below I make sure to compare wives that reside and were born in the same county through wives' county of birth fixed effects. This ensures that I am comparing women who carry a similar legacy of the war in their initial propensity to work. Second, these men might assume a larger share of household production,

[34]This intuition is confirmed when estimating Specification 3 on the sample of second-generation internal migrant married women aged 30 to 59 with the following outcome: whether a respondent's mother was working while she was growing up. Estimates in Table A.6 are significant at the 1 percent level and imply that mothers born in counties that experienced 20 rather than 10 percent military death rates were 14 percentage points more likely to have been working when their daughters were growing up.

thereby freeing some time for their wives to enter the labor force. In Appendix F, I use data from the Generation and Gender Survey of 2005 to show that husbands of women from counties that experienced greater military death rates do not perform more household and childcare tasks.

Concretely, to assess the role of husbands' origins, I regress women's working behaviors on the military death rates exposure of their husbands' counties of birth. Importantly, I isolate the role of husbands' origins from that of their wives' by including wives county of birth fixed effects. This enables to compare women born in the same county but whose husbands were born in different counties. Using the censuses 1962 to 2012, I restrict the sample to women aged 30 to 49 married with first-generation internal migrant men and estimate:

$$\texttt{employed}_{ihbrt} = \beta\, \texttt{death\_rate}_{h} + \boldsymbol{\alpha}\mathbf{X}'_{1911,h} + \boldsymbol{\theta}_{i;r;b} + \boldsymbol{\varepsilon}_{ihbrt}, \tag{5}$$

where $\texttt{death\_rate}_h$ denotes the military death rates exposure of the county of birth of husband h with wife i. $\boldsymbol{\theta}_{i;r;b}$ are cohort by wives' county of birth by county of residence fixed effects. Here, β is identified from variations in the working behaviors of married women of the same cohort who reside and were born in the same county, but whose husbands were born in counties that experienced different military death rates.

Next, to explore the relative role of a woman's origins vis-à-vis her husband's directly, I distinguish between women whose husbands were born in the same county from those whose husbands were born in a different county through indicators $\texttt{same}_{bh}$ and $\texttt{different}_{bh}$. Because this analysis applies the empirical strategy to both husbands and wives, I estimate the following specification on the sample of internal migrant women aged 30 to 49 married with internal migrant men:

$$\begin{aligned} \texttt{employed}_{ibhrt} &= \beta_1\, \texttt{same}_{bh} \cdot \texttt{death\_rate}_{h} + \beta_2\, \texttt{different}_{bh} \cdot \texttt{death\_rate}_{b} \\ &+ \beta_3\, \texttt{different}_{bh} \cdot \texttt{death\_rate}_{h} \\ &+ \boldsymbol{\alpha}_1\mathbf{X}'_{1911,b} + \boldsymbol{\alpha}_2\mathbf{X}'_{1911,h} + \boldsymbol{\theta}_{i;r} + \boldsymbol{\varepsilon}_{ibhrt}, \end{aligned} \tag{6}$$

where $\boldsymbol{\theta}_{i;r}$ are cohort by county of residence fixed effects. I use three-way clustering and cluster standard errors at the levels of counties of residence and each spouse's county of birth.

Finally, I explore the role of mothers-in-law in transmitting the legacy of the war

to their daughters-in-law through their sons by reproducing the analysis of parental transmission and Specification 3 on the sample of second-generation internal migrant married women aged 30 to 59. To further isolate the role of mothers-in-law from that of own parents and husbands, I augment Specification 3 with fixed effects for both parents' and husbands' counties of birth. This strategy enables to compare women who reside and were born in the same county, whose husbands and parents were born in the same county, but whose mothers-in-law were born in counties that experienced different military death rates.

5.2.2. Transmission from Husbands to Wives

I report coefficients from estimating Specification 5 in Figure 5.[35] First, I do not include wives county of birth fixed effects. Estimates are significant at the 1 percent level and imply that women whose husbands were born in counties that experienced 20 rather than 10 percent military death rates were 4 to 7 percentage points more likely to be working between 1962 and 2012. Including wives county of birth fixed effects to further compare women with identical origins decreases estimates by 11 to 41 percent, suggesting a limited role for homogamy in military death rates and assortative matching. Including husband and household controls as well as fertility and education barely affects the results (Figure A.7). Moreover, restricting the sample to internal migrant women married with internal migrant men generates similar estimates (Figure A.8).

Next, I explore the relative role of a woman's origins vis-à-vis her husband' and estimate Specification 6. I report estimates in Figure A.9. Focusing on estimates when spouses' origins are different reveals that women's own origins are quantitatively twice as important as those of their husbands'.

5.2.3. Transmission from Mothers-In-Law to Daughters-In-Law

I now explore directly the role of mothers-in-law by reproducing the analysis of maternal transmission on the sample of second-generation internal migrant married women aged 30 to 59 along with fixed effects for both parents' and husbands' counties of birth. I report results in Table 3. The coefficient in column 1 im-

[35]Results are similar when the outcome is a labor force participant indicator (Figure A.6).

plies that women whose mothers-in-law were born in counties that experienced 20 rather than 10 percent military death rates were 13 percentage points more likely to be working. Including own parents' counties of birth fixed effects and restricting the identifying variation to mothers-in-law born in neighboring counties slightly increases the estimate to 1.5 (columns 2 and 3). Including controls for husband and household characteristics, parental characteristics, as well as respondents' education and number of children further increases the estimate to 1.6 (column 4).

Estimates in Tables 2 and 3 suggest that mothers and mothers-in-law were equally important agents of intergenerational transmission of the war. Comparing their relative roles more directly by including military death rates of mothers' and mothers-in-law's origins together through a specification analogous to that of Table A.5 confirms this interpretation. I report results in Table A.7. Estimates in column 1 imply that women with mothers and mothers-in-law born in the same county that experienced 20 rather than 10 percent military death rates were 24 percentage points more likely to be working. Coefficients on mothers' and mothers-in-law's independent origins add up to the coefficient when both come from the same county, suggesting again that the impact of each parental origin cumulates linearly. While both maternal origins appear important, estimates for mothers-in-law are slightly larger than those for own mothers, although they are not significantly different.[36] This result complements those of Fernández, Fogli and Olivetti (2004), who find that mothers-in-law rather than own mothers explain the impact of WWII mobilization rates on female labor force participation in the United States.

5.3. Transmission Through Local Social Interactions

5.3.1. Empirical Strategy

The third set of mechanisms I explore is horizontal and oblique transmission through local social interactions. Culture is a locally embedded process and social interactions in culture might materialize in two ways: first, the cultural composition of a neighborhood might affect the relative importance of an individual's own culture as individuals surrounded by many with identical origins might find it easier—or feel pressured—to preserve their culture of origin. Conversely, the cultural composition

[36]The difference between both coefficients in column 1 is 0.05 with a standard error of 0.88; the difference in column 3 is 0.36 with a standard error of 0.73.

of a neighborhood might affect individuals' beliefs through a process of cultural assimilation.

I first explore whether the legacy of the war diffused through cultural assimilation at the local level. For each census and municipality, I construct a measure of cultural composition in military death rates.[37] It is the weighted average military death rates exposure of counties of birth among residents in a municipality: $\texttt{death\_rate}_m = \sum_o \texttt{sh\_res}_{o,m} \times \texttt{death\_rate}_o$, where $\texttt{sh\_res}_{o,m}$ denotes the share of residents in municipality m born in county o. Then, I estimate the following specification on the sample of first-generation internal migrant married women aged 30 to 49:

$$\texttt{employed}_{ibmlt} = \beta\, \texttt{death\_rate}_m + \boldsymbol{\alpha}\mathbf{X}'_{1911,m} + \boldsymbol{\gamma}_i + \boldsymbol{\delta}_l + \boldsymbol{\omega}_b + \boldsymbol{\varepsilon}_{ibmlt}, \tag{7}$$

where $\mathbf{X}_{1911,m}$ contains pre-war characteristics and is constructed in the same way as $\texttt{death\_rate}_m$. To compare individuals across neighboring municipalities and alleviate potential issues of spatial sorting, I include local labor market fixed effects $\boldsymbol{\delta}_l$.[38] I further include county of birth fixed effects $\boldsymbol{\omega}_b$ to ensure that cultural origins are not driving the results. I cluster standard errors at the levels of counties of birth and residence. Here, β is identified from variations in the working behaviors of first-generation internal migrant married women of the same cohort, born in the same county, but residing in neighboring municipalities characterized by different cultural compositions in military death rates.

Next, I analyze whether the legacy of the war was culturally preserved because of geographic clustering of individuals with similar origins. Again, I restrict the identifying variation to neighboring municipalities and estimate:

$$\begin{aligned} \texttt{employed}_{ibmlt} &= \beta\, \texttt{sh\_res}_{b,m} \times \texttt{death\_rate}_b + \alpha\, \texttt{sh\_res}_{b,m} \\ &+ \boldsymbol{\gamma}_i + \boldsymbol{\delta}_l + \boldsymbol{\omega}_b + \boldsymbol{\varepsilon}_{ibmlt}, \end{aligned} \tag{8}$$

[37] Censuses contain information on individuals in up to 26 thousand municipalities—there are 36 thousand municipalities in France but the remaining 10 thousand municipalities are too small to be sampled in the censuses as they contain less than 200 residents.

[38] Because the independent variable varies at the municipality level, I can use a narrow definition of local labor markets, with the identifying variation restricted to neighboring municipalities. Specifically, I use *canton* fixed effects. Cantons represent the fourth level of subnational government, between *arrondissements* and *communes*. There were about four thousand cantons before 2013, containing nine municipalities on average.

where $\texttt{sh\_res}_{b,m}$ denotes the share of residents in municipality m born in county b, the same as the respondent's. This specification includes county of birth fixed effects $\boldsymbol{\omega}_b$ so that the coefficient on the interaction term β is identified from variations in the working behaviors of first-generation internal migrant married women of the same cohort, born in the same county, but residing in neighboring municipalities. It indicates whether the impact of WWI military death rates was relatively stronger among women surrounded by more people from their own county of birth.

5.3.2. Results

I report results for the cultural diffusion channel in Panel a of Figure 6. Estimates imply that women who reside in a municipality in which the average military death rates composition was one percentage point higher were 1 to 3 percentage points more likely to be working between 1968 and 2012.[39] Including controls for husband and household characteristics as well as respondents' education and number of children has little effect on the estimates (Figure A.10, Panel a).

I report results for the cultural preservation channel in Panel b of Figure 6. Estimates imply that women born in the same county who reside in a municipality in which the share of residents from their own counties of birth was one percentage point higher were 1 to 2 percentage points more likely to be working. Again, including controls has little effect on the estimates (Figure A.10, Panel b).

Results in this section highlight the role of local social interactions for long-run historical processes. While cultural assimilation affects the diffusion aspect of history, cultural preservation affects its persistence. Both channels empirically work toward the manifestation of the legacy of the war in contemporaneous France. These channels need not oppose each other however: merging specifications 7 and 8 together results in estimates that change little, suggesting some degree of orthogonality between the two processes (Figure A.11). These results shed a new light on the dichotomy between culture and institutions. Given the local embeddedness of culture and mechanisms of horizontal transmission through local social

[39]The coefficient is close to zero and not significant for the census of 1999, the census that contains the least observations in the sample. Because preferences and beliefs are formed while growing up, I assign the cultural composition using the previous census, so the census of 1962 is not part of the analysis. Using contemporaneous measures or a lag of two censuses generates similar results.

interactions, estimates from a naïve cross-county approach might partly capture implications of the local embeddedness of culture rather than solely differences in inherited institutional structures.

6. Changes to Preferences and Beliefs Toward Female Labor

To account for the above results on working behaviors, I argue that women induced to enter the labor force during the interwar period because of WWI altered preferences and beliefs toward female labor of their daughters, sons, and social relationships, and that these changes translated into the working behaviors of women in subsequent generations. Since individuals form preferences and beliefs early in life from learning and socializing with their parents, peers, and neighbors (Bisin and Verdier, 2011; Fogli and Veldkamp, 2011; Fernández, 2013; Olivetti, Patacchini and Zenou, 2020), men and women who grew up with a working mother, or in an environment in which many women worked, should form more progressive attitudes toward female labor. To explore the validity of this argument, I analyze the long-run implications of WWI military death rates for attitudes toward gender roles.[40]

6.1. Data and Empirical Strategy

Respondents to the Generation and Gender Survey of 2005 were proposed three statements related to the role of women in the labor force and asked whether they "agree," "somewhat agree," "do not agree nor disagree," "somewhat disagree," or "disagree." Statements were (1) "If a woman earns more than her partner, it is bad for their relationship," (2) "Women should not be able to decide how to spend the money they earned without asking their partners," and (3) "In an economic crisis, men should keep their jobs in priority." I assign 0 to "agree" and 1 to "disagree," and use 0.25-point increments for responses in between, so that higher values indicate more progressive attitudes toward gender roles. Then, I aggregate statements using a three-point scale, which I standardize to a one-point scale. Since I study preferences and beliefs rather than behaviors, I do not place age or gender restrictions

[40]Before delving into contemporaneous data, it is worth noting that there were no pre-WWI differences in attitudes toward female labor across counties that experienced different military death rates (see Appendix G for details).

on the regression sample, though I still focus on internal migrant respondents.[41] I report average responses for men and women separately in Table A.9. According to the above coding scheme, respondents "somewhat disagree" with the statements on average with an index at 0.75, with no difference between men and women. The survey also contains questions related to preferences and beliefs about religion, marriage, and family. I report average responses relative to these statements in Tables A.10 to A.12.

Applying the same approach as before, I isolate intergenerational cultural transmission by comparing respondents who reside in the same county but were born in counties that were differentially affected by the war:

$$\begin{aligned} \texttt{values}_{ibr} &= \beta_1 \, \texttt{death\_rate}_b + \beta_2 \, \texttt{female}_i + \beta_3 \, \texttt{death\_rate}_b \times \texttt{female}_i \\ &+ \boldsymbol{\alpha} \mathbf{X}'_{1911,b} + \boldsymbol{\gamma}_i + \boldsymbol{\delta}_r + \boldsymbol{\varepsilon}_{ibr}, \end{aligned} \tag{9}$$

where $\texttt{values}_{ibr}$ denotes the one-point scale gender values index for respondent i, born in county b, and residing in county r. Historical controls $\mathbf{X}_{1911,b}$ are assigned at the level of counties of birth. Consistent with the empirical strategy, I include county of residence fixed effects $\boldsymbol{\delta}_r$. I cluster standard errors at the levels of counties of birth and residence. Here, β_1 is identified from variations in attitudes held by respondents of the same cohort, who reside in the same county, but were born in counties that experienced different military death rates.

6.2. Results

I report results in Table 4. When the interaction term is not included, the coefficient of interest is significant at the 1 percent level and implies that respondents born in counties that experienced 20 rather than 10 percent military death rates hold more progressive attitudes toward female labor (column 1): the index is 11 percentage points higher in this case, which corresponds to 15 percent of the mean. Adding the interaction term does not affect this estimate but reveals a

[41] As with the censuses, there is no correlation between migration status and origin county military death rates, employment status, or fertility. However, internal migrants are more educated than non-migrants, as well as slightly more progressive. As before, including an interaction term between the internal migrant indicator and the military death rate of respondents' counties of birth reveals that selection along all observable characteristics does not operate differently across counties of origin (Table A.8).

slightly stronger response of women's attitudes, though the coefficient is not significant (column 2). Adding parental and household controls and controlling for respondents' employment status, education, and fertility, does not change results substantially (columns 3–5).

Estimating Specification 9 separately for each component of the gender values index reveals that the effect of military death rates on preferences and beliefs is driven by two of its three components (Table A.13): whether respondents disagree with the statements according to which "if a woman earns more than her partner, it is detrimental for their relationship"—a strong marker of gender identity norms in relation with female labor supply (Bertrand, Kamenica and Pan, 2015)—and "in an economic crisis, men should keep their jobs in priority"—another important marker of gender norms (Alesina, Giuliano and Nunn, 2013, p. 524–527).

Finally, to assess whether these results simply reflect more progressive attitudes in general, I reproduce the analysis for attitudes related to religion, marriage, and the family (Table A.14). Consistent with my argument, WWI military death rates did not impact attitudes beyond those specifically related to the role of women in the labor force.

To take stock of the set of findings in this article and put their magnitudes into perspective, I report the main estimates altogether in Table 5, where I display their median whenever there are multiple estimates over time for a given specification. Finding a common ground for comparison is challenging as samples and sources of identification differ throughout. One possibility is to standardize estimates in terms of residual standard deviations. That is, rely on the effective variation in the treatment variable used for identification once fixed effects are taken into account, multiply raw estimates with these residual standard deviations, then divide them with the residual standard deviation of the outcome variable calculated in the same way (Mummolo and Peterson, 2018). To make this exercise somewhat meaningful, I compare regression coefficients estimated across samples of the same generation: first-generation internal migrants in Panel A and second-generation internal migrants in Panel B.

Comparing magnitudes of the overall effect of the war to those holding constant counties of residence confirms that about half of the legacy of the war operated

through intergenerational transmission rather than through changes to local labor market structures, echoing results from Alesina, Giuliano and Nunn (2013, p. 524). Focusing first on results relying on first-generation internal migrants, marriage appears an important mechanism of persistence, as the magnitude of coefficients identified through husbands' origins is substantial. Both mechanisms of social interactions appear equally important for persistence—though their source of variation remains markedly different from that of other analyses in this article, as it relies on variation in cross-municipality population composition. Finally, magnitudes on preferences and beliefs are large, suggesting that changes to attitudes of both men and women are an important precondition for changes to behaviors. Turning to analyses relying on second-generation migrants, magnitudes of estimates on mothers and mothers-in-law confirm that they were equally important agents in the transmission of the legacy of the war, echoing results in Fernández, Fogli and Olivetti (2004).[42] In contrast, fathers appear to play a limited role in this transmission process.

7. Conclusion

One century after the First World War, its legacy on female labor is still vivid. Comparing women who reside under similar institutional conditions but were born in counties that experienced different military death rates, I provide empirical evidence for a persistent and continued impact of World War I on women's working behaviors. I uncover three channels of intergenerational transmission: transmission through parents, transmission through marriage, and transmission through local social interactions. Consistent with models of intergenerational transmission, I find that men and women born in counties that experienced greater military death rates hold more progressive attitudes toward the role of women in the labor force today.

Findings in this article elucidate the intergenerational diffusion pathways of women's labor market involvement over the long run. They suggest that the entrance of women in the labor force in the period directly preceding revolution of female labor paved the way for subsequent generations of women. I interpret results in this article as evidence for a process of cultural diffusion and change by which

[42]The fact that these are larger than "overall" effects might be the result of the smaller amount of measurement error in these analyses, as results in Table B.2 attest.

women induced to enter the labor force during the interwar period because of World War I altered preferences and beliefs about female labor of their daughters, sons, and social relationships, and that these changes translated into the working behaviors of women in subsequent generations. Providing direct empirical evidence for this feedback process is challenging as no survey traces back to the interwar period. Finding innovative ways to build measures of preferences and beliefs toward female labor far back in the past to explore further this process of cultural change is a promising avenue of research.

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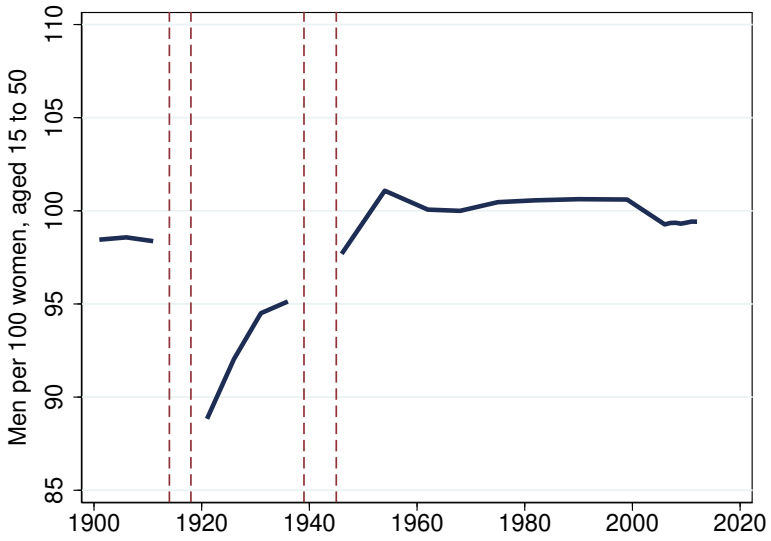


Figure 1. Adult Sex Ratio (1900–2012)

Notes: This figure displays the sex ratio among French adults aged 15 to 50. Data are from the censuses 1901–2012. Vertical lines indicate WWI (1914–1918) and WWII (1939–1945).

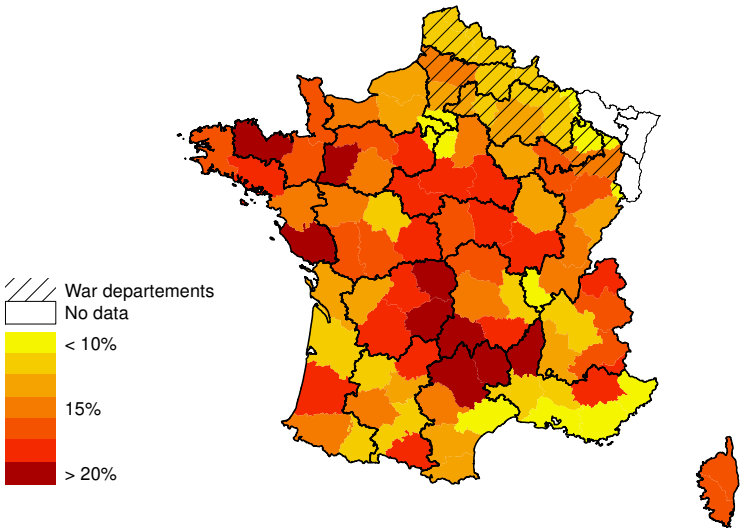


Figure 2. The Distribution Military Death Rates Across Counties

Notes: Data are missing for the three counties that belonged to Germany before WWI—Bas-Rhin, Haut-Rhin, and Moselle. Shaded areas indicates counties in which war combats occurred. Darker lines indicate military region boundaries. Shapefiles for the 1914 geography of counties and military regions are from Gay (2021).

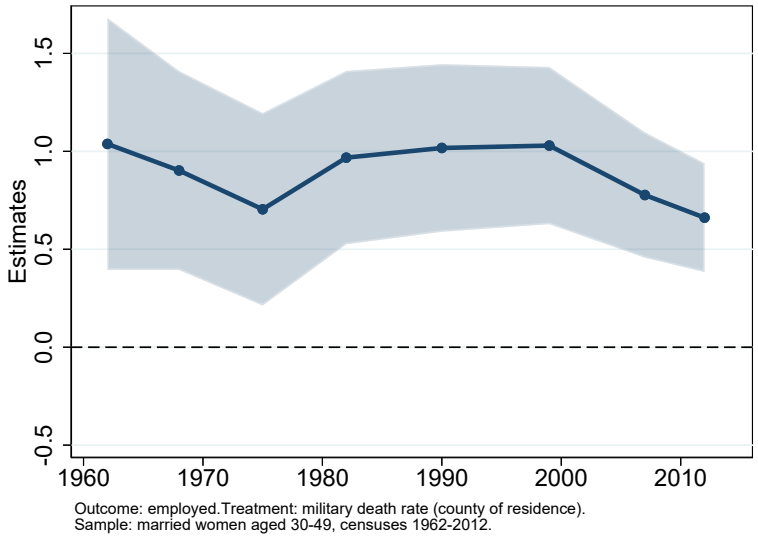


Figure 3. The Effect of WWI Military Death Rates on Female Labor Force Participation Across Counties

Notes: This figure displays OLS coefficients from estimating Specification 1 along with 95 percent confidence intervals on the sample of married women aged 30 to 49 in the censuses 1962–2012. They result from regressing an employed indicator on the military death rate of respondents' counties of residence, along with county-level pre-war controls and cohort by military region fixed effects. Estimates are computed using the sample weights provided in the censuses. Standard errors are clustered at the level of counties of residence.

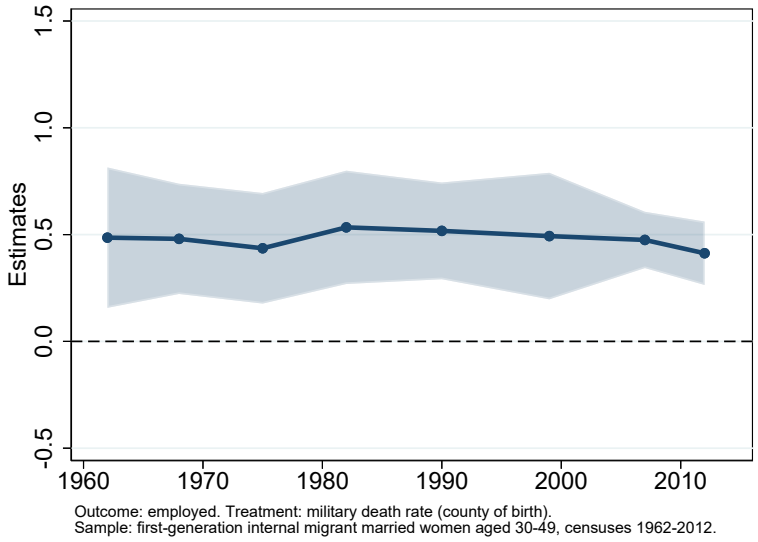


Figure 4. The Effect of WWI Military Death Rates on Female Labor Force Participation Across Counties of Birth, Holding Counties of Residence Constant

Notes: This figure displays OLS coefficients from estimating Specification 2 along with 95 percent confidence intervals on the sample of internal migrant married women aged 30 to 49 in the censuses 1962–2012. They result from regressing an employed indicator on the military death rate of respondents' counties of birth, along with county-level pre-war controls and cohort by military region by county of residence fixed effects. Estimates are computed using the sample weights provided in the censuses. Standard errors are clustered at the level of counties of residence and birth.

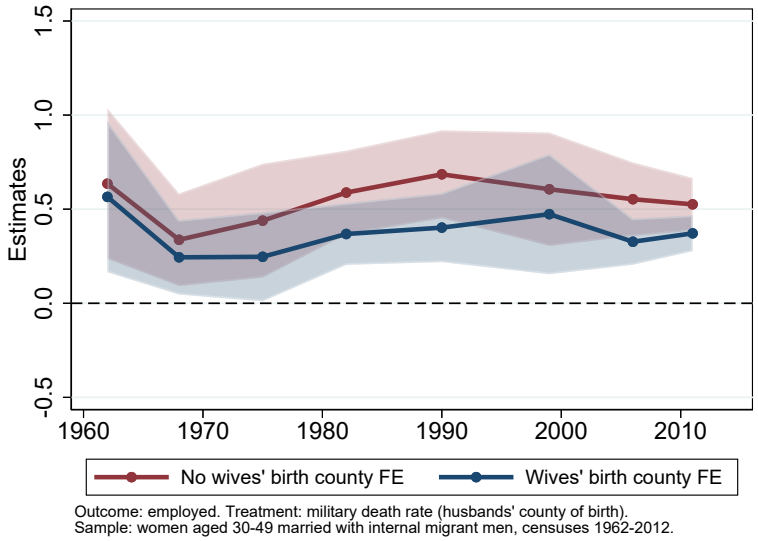
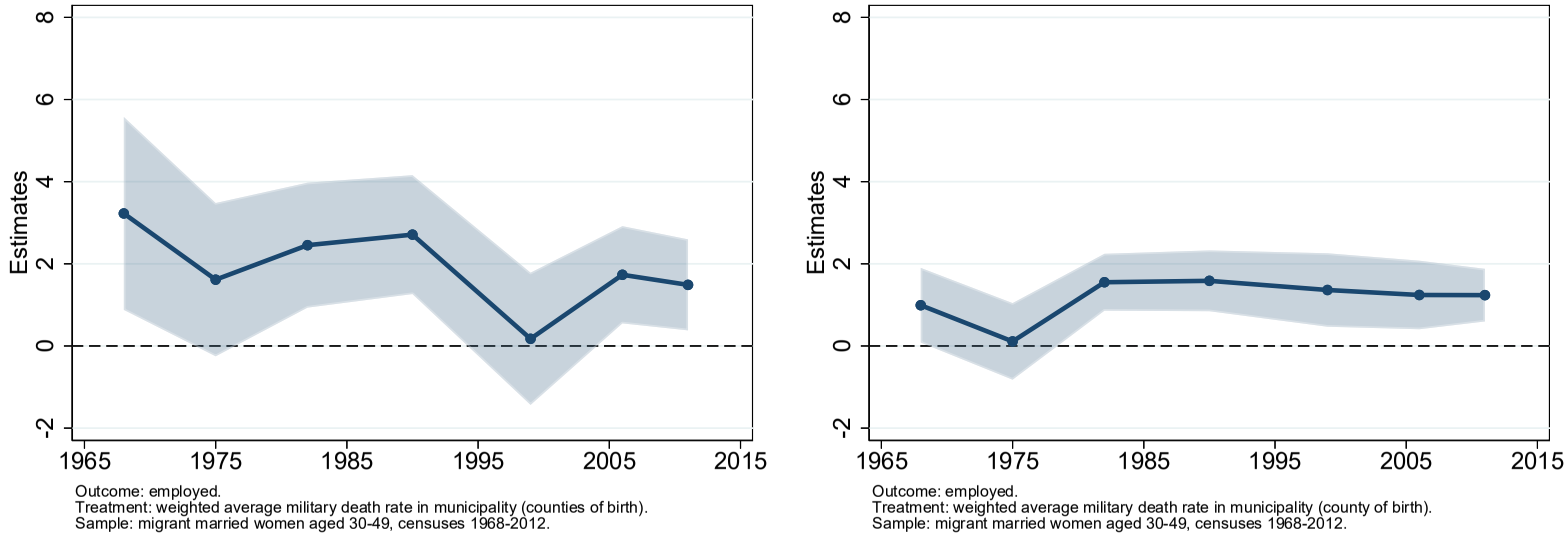


Figure 5. The Effect of Husbands' Birth County Military Death Rates on Their Wives' Labor Force Participation

Notes: This figure displays OLS coefficients from estimating Specification 5 along with 95 percent confidence intervals on the sample of women aged 30 to 49 that are married with internal migrant men in the censuses 1962–2012. They result from regressing an employed indicator on the military death rate of respondents' husbands' counties of birth, along with county-level pre-war controls and cohort by wives' county of birth by county of residence fixed effects. Estimates are computed using the sample weights provided in the censuses. Standard errors are clustered at the level of counties of residence and birth.



(a) Diffusion Through Assimilation

(b) Diffusion Through Preservation

Figure 6. The Local Effects of WWI Military Death Rates on Female Labor Force Participation

Notes: Panel a reports OLS coefficients on $\texttt{death\_rate}_m$ from estimating Specification 7, and Panel b, OLS coefficients on the interaction $\texttt{sh\_res}_{b,m} \times \texttt{death\_rate}_b$ from estimating Specification 8, along with 95 percent confidence intervals on the sample of internal migrant married women in the censuses 1968–2012. Standard errors are clustered at the level of respondents' counties of birth and residence. Estimates are computed using the sample weights provided in the censuses.

Table 1. Military Death Rates and Pre-War County Characteristics

Dependent variable	Military death rate		
	(1)	(2)	(3)
Share rural population	0.12***	0.12***	0.14***
	[0.01]	[0.02]	[0.03]
Share born in county	0.12***	0.13***	0.16***
	[0.03]	[0.03]	[0.04]
Female labor force participation		-0.02	0.04
		[0.04]	[0.04]
Share girls aged 5–19 in school		0.09	0.10
		[0.07]	[0.08]
Total fertility rate		0.01*	0.02*
		[0.01]	[0.01]
Personal wealth (10,000 francs)		0.04**	0.03
		[0.02]	[0.03]
Other characteristics	No	Yes	Yes
Military region FE	No	No	Yes
Counties	87	87	87
R^2	0.745	0.825	0.887

Notes: This table reports OLS coefficients from regressing military death rates on various pre-war county characteristics measured in 1911. *Other characteristics* include average height, population, the share of men working in industry, in agriculture, the share of the literate population, and the average direct taxes per inhabitant. Robust standard errors are in brackets. *** Significant at the 1 percent level. ** 5 percent level. * 10 percent level.

Table 2. The Effect of Mothers' Birth County Military Death Rates on Their Daughters' Labor Force Participation

Dependent variable	Employed				
	(1)	(2)	(3)	(4)	(5)
Military death rate (mother)	1.05***	0.93**	1.11***	1.24***	0.94***
	[0.37]	[0.40]	[0.40]	[0.35]	[0.34]
Father birth county FE	No	Yes	Yes	Yes	Yes
Mother birth region FE	No	No	Yes	Yes	Yes
Other controls	No	No	No	Yes	No
Clusters					
Own birth-residence county	95	95	95	95	95
Mother birth county	95	95	95	95	95
Observations	15,095	15,095	15,095	15,095	32,099
Outcome mean	0.81	0.81	0.81	0.81	0.79
Outcome s.d.	0.39	0.39	0.39	0.39	0.40

Notes: This table reports the OLS coefficients from estimating Specification 3 on the sample of non-migrant married women aged 30 to 59 whose mothers and fathers were born in another county in columns 1–4, and whose mothers (but not necessarily fathers) were born in another county in column 5. They result from regressing an employed indicator on the military death rate of respondents' mothers' counties of birth, including cohort, own county of birth and residence, and survey-year fixed effects, as well as the set of historical controls measured at the level of respondents' mothers' counties of birth. *Other controls* include parental, husband, and household characteristics, and the respondent's education and number of children. Standard errors are clustered at the level of counties of residence and mothers' counties of birth. Estimates are computed using the sample weights provided in the extended labor force surveys 2005–2012.

*** Significant at the 1 percent level. ** 5 percent level.

Table 3. The Effect of Mothers-In-Law's Birth County Military Death Rates on Their Daughters-In-Law's Labor Force Participation

Dependent variable	Employed			
	(1)	(2)	(3)	(4)
Military death rate (mother-in-law)	1.28*	1.20*	1.48**	1.64**
	[0.75]	[0.61]	[0.65]	[0.66]
Own parents birth county FE	No	Yes	Yes	Yes
Mother-in-law birth region FE	No	No	Yes	Yes
Other controls	No	No	No	Yes
Clusters				
Own birth-residence county	94	94	94	94
Mother-in-law birth county	94	94	94	94
Observations	13,389	13,389	13,389	13,389
Outcome mean	0.81	0.81	0.81	0.81
Outcome s.d.	0.39	0.39	0.39	0.39

Notes: This table reports the OLS coefficients from estimating Specification 3 on the sample of non-migrant married women aged 30 to 59 whose mothers and fathers were born in another county. They result from regressing an employed indicator on the military death rate of respondents' mothers-in-law's counties of birth, including cohort, own county of birth and residence, husband county of birth, and survey-year fixed effects, as well as the set of historical controls measured at the level of respondents' mothers-in-law's counties of birth. *Other controls* include parental, husband, and household characteristics, and the respondent's education and number of children. Standard errors are clustered at the level of counties of residence and mothers-in-law's counties of birth. Estimates are computed using the sample weights provided in the extended labor force surveys 2005–2012.
** Significant at the 5 percent level. * 10 percent level.

Table 4. The Effect of WWI Military Death Rates on Beliefs About Female Labor

Dependent variable	Gender values index (one-point scale)				
	(1)	(2)	(3)	(4)	(5)
Military death rate	1.14***	1.04***	0.95***	0.96***	1.00***
	[0.21]	[0.31]	[0.32]	[0.32]	[0.33]
Female	0.02*	-0.01	-0.01	-0.01	-0.01
	[0.01]	[0.03]	[0.03]	[0.03]	[0.03]
Military death rate × Female		0.16	0.20	0.17	0.22
		[0.21]	[0.20]	[0.20]	[0.21]
Controls					
Parental	No	No	Yes	Yes	Yes
Household	No	No	No	Yes	Yes
Individual	No	No	No	No	Yes
Clusters					
Residence counties	95	95	95	95	95
Birth counties	88	88	88	88	88
Observations	2,688	2,688	2,688	2,688	2,688
Outcome mean	0.75	0.75	0.75	0.75	0.75

Notes: This table reports the OLS coefficients from estimating Specification 9 on the sample of internal migrant respondents in the GGS 2005. All regressions contain cohort and county of residence fixed effects, as well as the set of historical controls measured at the level of respondents' counties of birth in 1911. Household controls include an indicator for whether the respondent's home is a house rather than an apartment, the number of rooms in the home, an indicator for whether the respondent owns her housing, and an indicator for whether the respondent has a partner present in the household. Parental controls include the labor status of the respondent's mother, and educational attainment indicators for both parents. Individual controls include employment status, educational attainment, and the number of children in the household. Standard errors are clustered at the level of counties of birth and of residence. Estimates are computed using the sample weights provided in the GGS.

*** Significant at the 1 percent level.

Table 5. Estimates Magnitudes

A. First-Generation Internal Migrants

				Estimate			
Analysis	Dataset	Year	Source of variation	Raw	Standardized	Residual	Reference
Baseline	Censuses	1962–2012	Birth county	0.48***	0.046***	0.011***	Figure 4, Panel b
Husbands	Censuses	1962–2012	Husband birth county	0.37***	0.036***	0.006***	Figure 5, Panel b
Assimilation	Censuses	1968–2012	Residence city	1.73***	0.113***	0.006***	Figure 6, Panel a
Preservation	Censuses	1968–2012	Residence city	1.24***	0.037***	0.009***	Figure 6, Panel b
Attitudes	GGS	2005	Birth dép.	1.04***	0.196***	0.066***	Table 4, Column 2

B. Second-Generation Internal Migrants

				Estimate			
Analysis	Dataset	Year	Source of variation	Raw	Standardized	Residual	Reference
Mother	Labor surveys	2005–2012	Mother birth county	1.10***	0.120***	0.030***	Table 2, Column 3
Father	Labor surveys	2005–2012	Father birth county	0.51	0.054	0.015	Table A.4, Column 3
Mother-in-law	Labor surveys	2005–2012	Mother-in-law birth county	1.48**	0.145**	0.029**	Table 3, Column 3

Notes: This table reports the main estimates in this article. *Standardized estimates* correspond to raw estimates multiplied by the sample standard deviation in the independent variable, then divided by the sample standard deviation in the dependent variable. *Residual estimates* correspond to raw estimates multiplied by the residual standard deviation in the independent variable, then divided by the residual standard deviation in the dependent variable. Variables are residualized with respect to specification-specific fixed effects. When multiple estimates are available for a given specification, due to multiple time points, estimates correspond to the median.
*** Significant at the 1 percent level. ** Significant at the 5 percent level.