The Heritage of WWII on Women's Work: The Italian Case

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Abstract

We study the impact of World War II on women's labor market outcomes in Italy, in the short and long run, using a novel dataset that combines information on war fatalities with employment records from the Italian Social Security Institute and Census data. To conduct the analysis, we exploit the exogenous variation at the provincial level of male military fatalities. First, we estimate through a difference-in-differences analysis the short and long-run effects of male soldiers' mortality during the war on women's labor force participation. Then, we check whether WWII had long-lasting effects on wages and the number of worked weeks in the period covered by our sample of administrative data, 1980-1997. Our findings suggest that WWII had both an immediate and persisting impact on female labor force participation and a long-run positive effect on worked weeks. The impact of the war on women's wages remains instead unclear.

1 Introduction

Wars are shocks that could permanently change gender roles in societies. During World War II in the United States, about 16 million men were mobilized in the military forces, and more than seven million women entered the labor force, marking a 50 percent increase in female employment. However, the literature, mainly on the US, does not agree on whether the impact of the war on female labor supply was permanent. According to Rose (2018), for instance, the shock was quickly reabsorbed; Acemoglu et al. (2004) find an effect on female labor supply and wages only in the 1950s, but not afterward; Goldin (1991) argues that more than half of the women who joined the labor force during the war exited by the end of the 1940s; while Goldin and Olivetti (2013) find persistent effects in the longer-run.

In Italy, almost 3.5 million men were mobilized during WWII, and about 330,000 soldiers died. The number of deaths amounted to 1.1 percent of the 1939 population, the same order of magnitude as in France and Belgium but higher than in the States (0.32 percent).[1] The extent to which the jobs of mobilized men in 1940-1945 were replaced by women in Italy is unknown, because of a lack of systematic data and studies on this subject. The Italian case is interesting because, in addition to the traditional view that expected women to work at home, the fascist propaganda that had permeated the country for the twenty years before the war required women to be wives and mothers rather than workers,[2] a view largely shared by the Church (see, for instance, the encyclical *Casti connubi*, in December 1930). Despite the "Sacchi Law" (Law 1179/1919), establishing gender equality for professional and public employment (except for the judiciary system, politics, and the Army), for various reasons (e.g., WWI-industry demobilization, job reclamation by veterans,[3] fascism) in the 1920s and 1930s several measures were taken to keep women outside the labor market.[4] However, despite the fascists' effort to confine women to domestic, or, if at all, rural work, female

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[1] World War II casualties (2024, June 15), Wikipedia.

[2] Mussolini's idea was that women should work when "it is not a direct impediment, distracts from conception. It forms an independence and consequent physical and moral habits contrary to childbearing" (Mussolini, B., "Macchina e donna", Opera omnia, xxvi, 311).

[3] According to De Grand (1976) during WWI women had replaced soldiers' work positions to a large extent, especially in the munitions industry (up to 70 percent of the jobs), in the Ministry of War, in public education and the postal services; however, after the end of the war thousands of women left employment because of the return of veterans into the labor market.

[4] In the 1920s the majority of limitations regarded the sphere of education: women were initially forbidden to teach some subjects (Italian, Latin, Philosophy, and Political economy) in high schools, but four years later they were forbidden to teach altogether (except for the teaching diplomas; Royal Decree no. 2480/1926); and they were also precluded from school management (Royal Decree no. 1054/1923). In the 1930s limitations regarded the public sector: women could not freely compete in State civil service examinations, they were excluded from various public administration positions (Law no. 22/1934) and from "morally dangerous" jobs (Law no. 653/1934); finally, it was decreed that women's work positions could not exceed 10 percent of each firm's employees (except for jobs that were considered particularly "suitable" for women; Royal Decree no. 1514/1938).

employment steadily rose in the industrial and service sectors.[5] Many firms were willing to employ women, who were less costly than men (Musso (1980), p. 150; Alberti (2024)).

To our knowledge, this is the first paper that analyzes the impact of WWII on female participation in the labor force in Italy. Similarly to the previous literature (e.g., Acemoglu et al., 2004 and Goldin and Olivetti, 2013), the mechanism underlying this study is based on the idea that the wartime mobilization of men, leading to the temporary departure of millions of male workers from their jobs, required the integration of women into the labor force to cover up for this shortfall. However, since WWII's veterans reclaimed their former occupations at the end of the war, we argue that the post-war net impact on female labor force participation ultimately depends on the proportion of mobilized men who did not return to work after the war ended. Thus, instead of measuring the impact of WWII with the male mobilization rate,[6] we construct a new indicator based on male military casualties at the provincial level (see Figure A1). Our identification strategy then exploits the geographical variation in the distribution of casualties over the Italian provinces. We argue that the distribution of casualties over the Italian territory is reasonably exogenous to provinces' pre-war labor market characteristics, as these casualties are due to military strategies that are unlikely to be correlated with provinces' labor market conditions. Our "treatment" variable, shown in Figure 1, is the Province's number of military fatalities weighted by male labor supply in 1931 (which we digitize from the last Census that contains activity levels by gender before the war hit). Our research design rests on the idea that as a consequence of unevenly distributed fatality rates, women had different chances of retaining the jobs they acquired during the war to replace conscripted men, depending on their province of work.

In this paper, we examine the effects of WWII male fatality rates on both the extensive margin of women's work, namely the female labor force participation and the intensive margin, i.e., the number of worked weeks; we also study the impact of the war on wages. Although the overall participation of women in the labor force has risen after the war in Italy (excluding the primary sector, which was already undergoing historical structural transformations), we examine whether this increase was higher in the provinces that were more exposed to the treatment than in others. We undertake this analysis both at the macro and at the micro level, both in the short- and long-run. The mechanism we have in mind for the supply side in the short run is that the provinces with a higher incidence of war fatalities had a higher number of women affected by

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[5]In contrast, between 1936 and 1951 the number of women employed in the primary sector declined by about 650,000 units (-12 percent of the active women in 1936 from Census data; Figure A2 in the Appendix). This decline was more pronounced than men's (-2 percent of the male active population) and was only partly offset by the substantial increase in the number of women employed in the secondary and tertiary sectors.

[6]I.e., the Provinces's number of men who served in the military divided by the number of registered men.

husbands' losses, which may have pushed them to remain or to enter the labor market after the war ended. Moreover, even in families without male losses, women who worked during the war may have developed a desire for economic independence. In addition, these women may have also acquired skills, thanks to their work experience during the war, that made them more requested in the job market. On the demand side, the greater shortage of male manpower in the provinces with higher war casualties may have led employers to search for female workers to a greater extent than in the other provinces. The idea that a war effect persisted over time rests instead on the hypothesis that experiencing employment during WWII permanently changed women's culture and preferences, which was reinforced by an intergenerational transmission, especially from mothers to daughters.

For the empirical investigation, we use two main sources of data. First, we study whether WWII had a shorter- and/or a longer-term impact on women's labor market participation with a difference-in-differences approach using Census data at the provincial level, comparing pre-war (1931) to post-war figures (1951, 1961, and 1971). To this aim, we digitize provincial-level data from various volumes of the National Institute of Statistics (ISTAT) on both active and inactive population by gender in 1931, 1951, 1961, and 1971.[7] Results confirm both short-term and permanent effects. The difference-in-differences exercise shows that after the war the number of active women increased disproportionally in the provinces mostly hit by war fatalities. Surprisingly, the effect increases over time, possibly due to a reinforcing mechanism through generations.

Second, we employ administrative microdata from the Italian Social Security Institute (Istituto Nazionale della Previdenza Sociale, INPS) for the period 1980-1997 to examine whether women residing in the provinces with the highest incidence of fatality rates due to WWII exhibit a significantly different number of worked weeks and weekly salary 3-to-5 decades after the ending of the war. To control for pre-war provincial characteristics, we digitize some statistics from the 1931 Census: present population and illiteracy rates by gender, the share of active female labor supply, and the total active labor supply. Results were obtained by pooling together the years 1980-1997 and show that the women working in the provinces more intensively hit by the war work a higher number of weeks than their counterfactuals in the provinces less severely impacted by the war. On the other hand, evidence is rather unclear on wages.

This paper contributes to the literature on the effect of wars on economic outcomes. Wars can, in fact, trigger mechanisms that crucially affect the long-run economic performance of a country. Gross and Sampat (2023), for example, shows how WWII was one of the most consequential shocks in US history on innovation. Technologies that were developed during the war ultimately led to a tremendous growth in total factor

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[7]Note that in Italy all Census micro-data for the years preceding 1971 have been destroyed by ISTAT. Moreover, we do not use aggregate data from the 1936 Census since it does not report the relevant figures by gender.

productivity. Among other aspects related to long-run economic effects, wars can impact the level and the composition of the labor force. The closest studies to ours analyze the impact of WWII in the US. Fernandez et al. (2004), focusing on cultural aspects, find that men whose mothers worked during wartime were more likely to marry working wives. Goldin and Olivetti (2013), show that WWII led to a significant increase in women's labor force participation and weeks worked. However, the authors notice that the impact of the war was only significant for the upper half of the educational distribution of women.[8] A potential explanation for this finding is that more educated women were disproportionally drawn into white-collar jobs, whereas less-educated ones took blue-collar jobs (mainly in the manufacturing sector) during the war. This latter group of women was less likely to retain their jobs once the war ended, as the manufacturing industry often preferred male workers. However, Bellou and Cardia (2016), studying the impact of WWII in the US three decades after its end, claims that the war caused a permanent shift away from white-collar jobs and towards blue-collar ones, which seems to conflict with the results in Goldin and Olivetti (2013). Acemoglu et al. (2004) used changes in sex ratios related to WWII and state differences in war mobilization to identify how women drawn into the labor force affected the wage structure. The authors find that the increase in female labor supply reduced both female and male wages. Similar results have been found when considering the impact of the First World War on female labor market outcomes. Gay (2023), examining the French case, claims that WWI also had a lasting impact on the role of women in the labor market. One of the main contributions of this work is establishing that the war effects on female labor were transmitted mainly via family ties to subsequent generations. Boehnke and Gay (2022), analogously to much of the literature mentioned above, shows that military fatalities in France led to a scarcity of men, thus generating an upsurge in female labor force participation. This shift was mainly due to worsening conditions for single women in the marriage market and adverse income shocks to war widows, which induced many women to look for jobs. Finally, some studies cast doubts on both the short- and long-run impacts of the war on female work. Rose (2018), finds that: i) female wartime employment had effects on post-war female labor force participation only as a sectorial reallocation of female jobs; ii) the correlation between female wartime employment and war mobilization is weak; iii) there is no relationship between WWII military fatalities and post-war female labor force participation. Differently from this latter study, we do find instead a strong relationship between war military fatalities and female labor force participation, both in our short-run and long-run analysis. In addition, as opposed to Acemoglu et al. (2004) and Goldin and Olivetti (2013), we use fatality rates instead of the military mobilization rates as a measure of the impact of the war on Italian local

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[8]On a side note, analyzing the effects of WWII on women's education, Jawroski (2014) documents that the war caused lower levels of educational attainment (recovered in the 70s) among women exposed to higher rates of men mobilization.

labor markets. To us, this seems a more sensible choice since, in Italy, veterans had the right to take back their former job positions at the end of the war. Finally, this paper fills a gap in the Italian literature, being, to the best of our knowledge, the first study to investigate the impact of WWII on the Italian female labor market.

This paper is structured as follows: the next section presents an overview of women's work during Fascism and the Second World War; Section 3 describes the datasets, the variable of interest, and presents some key descriptive statistics; Section 4 illustrates the empirical strategy; Section 5 presents the findings. Finally, the last section concludes.

2 Women's work during the Second World War

The Second World War represents a crucial turning point in the process of female emancipation (Pescarolo, 2019). Many narratives on the work of women during the war document that the necessity for a salary to fulfill their families' primary needs pushed many women to look for a job, and abandon their traditional role of wives and mothers that fascism tried to impose on them.

Since 1941, women began to be hired in many economic sectors, often with fixed-term contracts, to replace their husbands at the war front. These contracts were meant to be terminated as soon as the war was over and men could return to their normal jobs. The process that led women's work to fill the gap for men shortages was partly spontaneous and partly mandatory, linked to the complex process of mobilization. In the next subsections, we will shortly present these aspects, tracing the possible impacts of the war and mobilization on female labor market participation.

2.1 Abolishing women's work: the cultural legacy of fascism

Fascists never liked women working.[9] With a series of decrees starting in 1923, women were prohibited from being hired in several job positions. For instance, women could not become principals of schools. They could work in hospitals as nurses but not as doctors. In factories where female labor was traditionally prevalent, such as in the textile sector, only men could reach the top qualifications and wages. An agreement reached in 1934 between fascist unions and employers limited women's work to those occupations that were deemed to be "more appropriate" to female labor. Women's work, even when allowed, was debased (Mafai, 2022; Pescarolo, 1996; Groppi, 1996). Ceilings were placed in the presence of female staff that could not be exceeded: 5% in management roles, 20% in the lower levels of public administration, 12% in banks, 15%

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[9]As Mussolini said to a French journalist: "I recognize that many women find themselves under the pressure of difficult economic conditions and are therefore forced to look for work outside their home. But their real task is that of wives and mothers, and their true place is and remains within the walls of the home."

in insurance (Alberti, 2024). With a decree in 1938, it was established that in public and private jobs, women could only cover up to 10% of the positions, and within a maximum of three years, women would have had to be replaced by men to comply with this rule.

Nevertheless, these impositions were immediately relaxed in 1939 when a series of exemptions were introduced to allow for the hiring of female personnel in professions that were considered suitable to women, such as for instance, typewriters, telephone operators, radio announcers, and cashiers. Furthermore, the above-mentioned restrictions were almost completely lifted when Italy joined the Second World War (Musso, 2004).[10]

If one of the objectives of the fascist regime was to favor male employment to the detriment of female work, this policy resulted in a substantial failure. As a matter of fact, many entrepreneurs had experienced the convenience of employing a workforce that was equally productive compared to men but much less expensive (Musso, 1980).[11] Moreover, war inflicted the final blow to the effective implementation of the 1938 laws, with women finding themselves to be essential to replace men at the war front.

2.2   Military and civil mobilization

The entry of women into the labor market during the war was intertwined with the complex process of mobilization. With the term "mobilization," we do not refer exclusively to military duties but also to all those economic sectors that were involved in the war effort. On a military level, mobilization consists of all those acts that bring the armed forces to war. Civil mobilization is instead the reorganization of a country's production needs in support of the war economy (Ferrazza, 1999).

As regards the military mobilization during WWII, the official data are much less complete and exhaustive than those relating to the 1915-18 war (Ilari, 1990). However, it is known that the mobilization potential in 1940 was higher than that of the 1915-18 war when only 2.2 million men had performed military service and could, therefore, be considered trained for war. The most reliable data reports that, considering the Army, the Navy, and the Air Force, in 1940-43, 5.4 million men were actually militarily mobilized.

A relevant question for the purpose of this study concerns the impact that the provision of compulsory military service had on the conscripts' employment status. Former legislation at that time[12] expressly configured (unless agreed otherwise) that

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[10]Albeit somewhat maintained where high male unemployment had been present.

[11]On January 20, 1927, Mussolini halved women's salaries. For example, in mechanical factories that produced precision equipment, the male wage ranged from a maximum of four lire per hour to a minimum of 2.50 lire, while women received one lira and 50 per hour.

[12]Art. 16 of the Royal Decree 13 November 1924 n. 1825 (private employment law) and subsequently art. 2111 civil code.

the call to arms would cause the automatic termination of the employment contract of the drafted. However, a new law enacted in 1940 (10 June 1940 n. 653) established the opposite principle, stating the right to keep one's job in the event of a call to arms. The employment relationship can be suspended only until the end of the military duties. Employers were also allowed to temporarily replace the absent workers through fixed-term employment contracts.

At the beginning of 1943, the number of individuals mobilized for civil (or labor) service was 5.24 million, of which 1.2 were women. Overall, they were distributed as follows: 971 thousand in public administrations, 142 thousand in agriculture, 8.2 thousand in banks and insurance bodies, 4 million in the war industry, and 26.7 thousand in other sectors. Thus, between the military mobilization and the civil one, around a quarter of the Italian population (11 million, 10% of which were women) was actively involved in the war effort. Over time, the bodies responsible for military and civilian recruitment began to compete for men to the point that the shortage of manpower, both unskilled and qualified, generated increases in wages and the strengthening of workers' bargaining positions. To respond to this labor shortage, firms were thus willing to hire women, who, starting from March 1942, were also allowed to reach the positions of "qualified workers" (Ferrazza, 1999).[13]

3 Data

To construct our measure that conveys the impact of the Second World War on the Italian labor market, we make use of two sources. The first one is Istat (1957), from which we extract the number of military fatalities by province. The second is the 1931 Italian Census, from which we retrieve data on the active male labor force participation by province. We then attach this measure to two additional datasets extracted from the following sources: i) four Italian Censuses (1931, 1951, 1961, 1971), one before the war began and three after its conclusion; ii) administrative data from the Italian Social Security Institute (INPS), which covers the years 1980-1997, and include all private-sector employees working in firms interviewed by the Bank of Italy in the INVIND survey. We use INPS data to get estimates on wages and weeks worked, while we employ the data coming from the Censuses to investigate female labor market participation.

3.1 Fatality rates

In 1957, ISTAT published a document reporting data on the number of WWII-related fatalities. Casualties were categorized by either province of residence or birth and

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[13]Circular from Fabbriguerra, 27 March 1942, in ACS, Ingravalle, b. 1, fasc. 10.

by gender, distinguishing between members of the military forces and civilians.[14] To construct our measure of the effect of WWII on the Italian labor market, we draw the number of WWII-related fatalities at the provincial level from Istat (1957)[15] and the pre-war male active population by province from the 1931 Census. We exclude the three provinces that, following WWII, ceased to belong to Italy (Fiume, Zara, and Pola). We proxy the impact of WWII on the Italian labor supply using the ratio between the number of military deaths due to the war over the active male labor supply by province in 1931 (which is the latest available statistics by gender antecedent to the war). This indicator should faithfully convey a measure of the effect of WWII on each province's labor supply. We show the geographical representation by province of this indicator in Figure 1.

Figure 1: Percentage of soldiers' fatalities over male labor supply in 1931
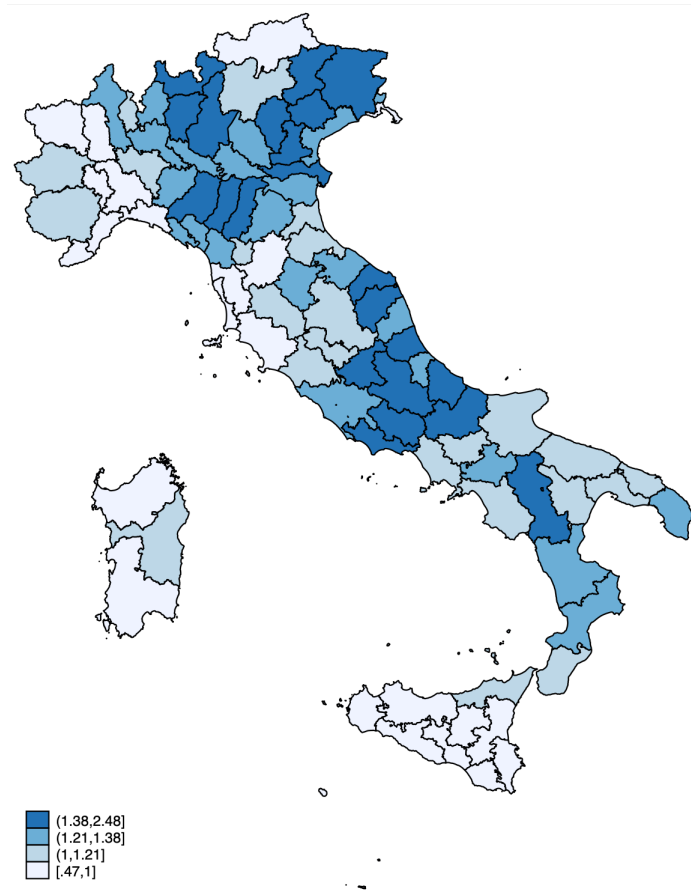
Sources: i) ISTAT, "Morti e dispersi per cause belliche negli anni 1940-45". Individuals are distributed over provinces according to their province of residence; ii) Italian Census, 1931.

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[14]Notice that the category of civilians includes "partisans," i.e., those who carried out insurrections against the fascist regime. Also, the military might incorporate a few women (soldiers, auxiliary soldiers, and Red Cross nurses), but up to a negligible extent.

[15]We retrieved the data from Table 3.3, pp. 50-53.

3.2 Census data

To investigate the extensive margin and the possible short-to-long-run impact of the war on female employment, we digitize female activity levels and resident population from four Italian Censuses: 1931, 1951, 1961, and 1971.[16]

We always reconstruct the provincial borders to those of the 91 provinces existing in 1931, which allows us to analyze a period that spans over 40 years, without any loss of precision in the definition of our geographical units. Incorporating data from 1921 instead would have implied a substantial loss of information, as there were only 69 provinces in Italy in 1921. During the fascist regime, the number of provinces rose to 94 (including Zara, Pola, and Fiume) and remained relatively constant until the 1970s.[17] The drawback of leaving out the 1921 Census is that we can only use data from one single Census before the beginning of the war, which makes it difficult to judge the presence of possible pre-trends before the treatment's occurrence.

3.3 Administrative social security data

To analyze the impact of the war on the intensive margin of female employment, namely, weeks worked and wages, we use Social Security administrative data registered by INPS. The dataset covers employees in the manufacturing sector, who worked over the period 1980-1997 in firms with more than 50 employees that were interviewed by the Bank of Italy in the INVIND survey.

This dataset (henceforth INPS-INVIND) provides us with the employment history of about 1.7 million workers, for whom we have information on age, gender, province of birth, and province of work, in addition to some characteristics of the job, like work status, the number of weeks worked each year, and annual income (including cost-of-living allowances and the social security contributions due by the worker). In our final dataset, we include only working-age individuals (15-64 years old), and we re-assign the provinces that were created after the war to their former borders in 1931.[18] We then transform the structure of the data, which reports all employment spells within any given year for each worker, into a yearly panel dataset. If employees have multiple work spells or transition between jobs within the same year, we select the "main" occupation in that year. To this aim, we rank job records according to the following orderly criteria, keeping the record in which the employee: i) worked for the highest number of weeks;

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[16]Note that for 1931 we use present population because the resident population by province was not available in that Census.

[17]Caserta was created in 1945 as a detachment of the province of Napoli, whereas Isernia and Pordenone were created respectively in 1970 and 1968 as a detachment of the provinces of Campobasso and Udine.

[18]We also exclude observations that reported anomalies or missing information and dropped the individuals who earn more than 150,000 euros but are not managers, which could signal misreporting of information.

ii) earned the most; iii) had the highest work status. We discard all "secondary jobs" from the sample, but only after computing total income (earnings) and number of weeks worked across all jobs. Furthermore, we winsorize the dataset, excluding extreme values in the 0.5% bottom and upper tails of the distribution of weekly wage, and excluded all observations pertaining to individuals who worked more than two jobs at once. Finally, we convert these income and earnings into real euros using the HICP index (taking 1980 as the base year).

Our final sample consists of about 19 million observations and 1.7 million workers. Summary statistics are displayed in Tables 1 and 2. As reported in Table 1, only slightly more than one-fifth of the total number of observations pertain to female employees. Table 2 compares the samples of the women who lived in the provinces that experienced an above- or below-median fatality rate due to WWII. These tables show that women earn, on the 1980-1997 average, about 160 euros per week, respectively,[19] and work about 46 weeks in above median provinces, and 45 weeks in below median ones. The majority of women employees are blue-collar workers, with this percentage being slightly higher in provinces with a below-median fatality rate, 59 vs 58 percent. White-collar employees are instead more prevalent in highly-impacted provinces, being 38% of the total, while this percentage decreases to 37% in less impacted provinces. Only 0.4% of women in the sample are managers. On average, women living in the provinces most affected by war mortality work one week more than their counterparts.

Table 1: Summary statistics

	Mean	SD
Weeks	47.28	13.03
Weekly wage	198.43	90.16
Female	.22	.41
Age	37.60	10.32
Trainee	.02	.139
Blue collar	.64	.479
White collar	.31	.46
Manager	.02	.139
Other qualification	.01	.097
Male illiteracy rate 1931	.176	.143
Female illiteracy rate 1931	.247	.196
Share active pop 1931	.538	.053
Share active female pop 1931	.232	.075

Source: INPS - Italian Social Security Institute.

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[19] Notice that this figure only encompasses the base salary, i.e., it does not comprehend extra income coming, for example, from overtime work or the thirteen monthly salary.

Table 2: Summary statistics for women workers living in provinces with an above (left) and below (right) median death rate during WWII

	Mean	SD		Mean	SD
Weeks	46.03	13.63	Weeks	44.86	14.62
Weekly wage	159.65	58.94	Weekly wage	160.36	55.90
Age	34.68	9.86	Age	36.05	9.67
Trainee	.025	.157	Trainee	.02	.123
Blue collar	.58	.493	Blue collar	.59	.491
White collar	.38	.485	White collar	.37	.482
Manager	.004	.064	Manager	.004	.064
Other qualification	.01	.101	Other qualification	.02	.157
Male illiteracy rate 1931	.121	.106	Male illiteracy rate 1931	.254	.196
Fem illiteracy rate 1931	.185	.172	Fem illiteracy rate 1931	.217	.085
Share active pop 1931	.558	.039	Share active pop 1931	.533	.062
Share active fem pop 1931	.265	.039	Share active fem pop 1931	.217	.085

Source: INPS - Italian Social Security Institute.

4 Empirical analysis

Our analysis is structured into two parts. First, we aim to assess the impact of the war on female labor force participation in Italy over the short and long term using a difference-in-differences approach. Our identification leverages the heterogeneous distribution of WWII's military fatality rates across Italian provinces. Our research design relies then on the assumption that provinces with higher (namely, those carrying higher military fatality rates) and lower wartime casualties were following parallel trends in female participation rates before the war. This pattern would not have changed in the absence of the war.

We thus regress female activity rates (the level of female active labor market participation over the total female population)[20] on our continuous treatment variable, shown in equation 2. Furthermore, we refine this outcome variable by excluding workers employed in the primary sector. The rationale behind this choice is that the primary sector was undergoing historical structural changes since 1861, which were even more accentuated in the three decades after the war ended (see Figure A2 in the Appendix).

$$Y_{jt} = \alpha + \sum_t \beta_t FR_j * time_t + \sum_t \theta_t R_j * time_t + \gamma_j + \delta_t + \varepsilon_{jt} \tag{1}$$

where:

$$FR_j = FatalityRate_j = \frac{Number\ of\ WWII\ soldier\ fatalities_j * 100}{Active\ male\ population\ in\ 1931_j} \tag{2}$$

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[20]Clearly, this is a proxy for the denominator we would like to have, which is the female working age population, i.e., females within 15 and 64 years of age. Nevertheless, this measure conveys a reasonable indication of women's activity rates by province

Y_{jt} is women's activity rate in province j and year $t = 1931, 1951, 1961, 1971$ and γ_j are provinces' fixed effects. We also control for macro-regional-time trends ($R_j * time_t$). β_t is our parameter of interest and represents the effect of one additional percentage point in the male military fatality rate during WWII on provinces' female activity rates. Finally, standard errors are clustered at the provincial level.

Secondly, we test the impact of WWII on women's weekly wages and the number of weeks worked using the INPS-INVIND dataset that covers the period 1980-1997. Since we pool together all the years, we effectively measure the war's effect on female work 35-to-52 years after its ending. The empirical model that we employ is the following:

$$Y_{ij} = \alpha + \beta_1 FR_j * female_i + \beta_2 FR_j + \beta_3 female_i + (\mathbb{1} + female_i) \times (\gamma age_i + \theta X_j + \eta_1 R_j + \eta_2 T_i) + \varepsilon_{ij} \quad (3)$$

where Y represents, alternatively, employees' number of weeks worked per year or their weekly wage. Regressions are estimated for each individual i working in province j. Our variable of interest is again the *Fatality Rate*, already described in equation 2, and its interaction term with the female dummy. X_j is a vector of 1931 observable characteristics at the provincial level capturing cross-sectional differences that may pollute our estimates: the share of female active population, the total activity rate, female and male illiteracy rates, and population above 10 years of age present in the province. We also control for workers' age (age_i), year, and macro-regional dummies of work (i.e., North-Est, North-West, Center, and South), respectively T and R. Standard errors are clustered at the provincial level.

We estimate this equation both on the entire sample and on the sub-sample of women. In the latter case, obviously, we exclude all interaction terms from equation 3 and the female dummy.

5 Results

5.1 Female labor market participation

We first present the results for the difference-in-differences estimation, which are displayed in Figure 2 below.[21]

All estimates are positive and statistically significant, indicating a substantial and persistent impact of the war on female labor market participation over the 25 years following its end. Provinces that were more severely hit by the war thus exhibit higher female activity rates, both in the short run and in the longer run. More specifically, a one percentage point increase in military fatality rates due to WWII caused female

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[21]The results are also reported in Table A1 in the Appendix.

Figure 2: WWII's impact on female labor market participation rate
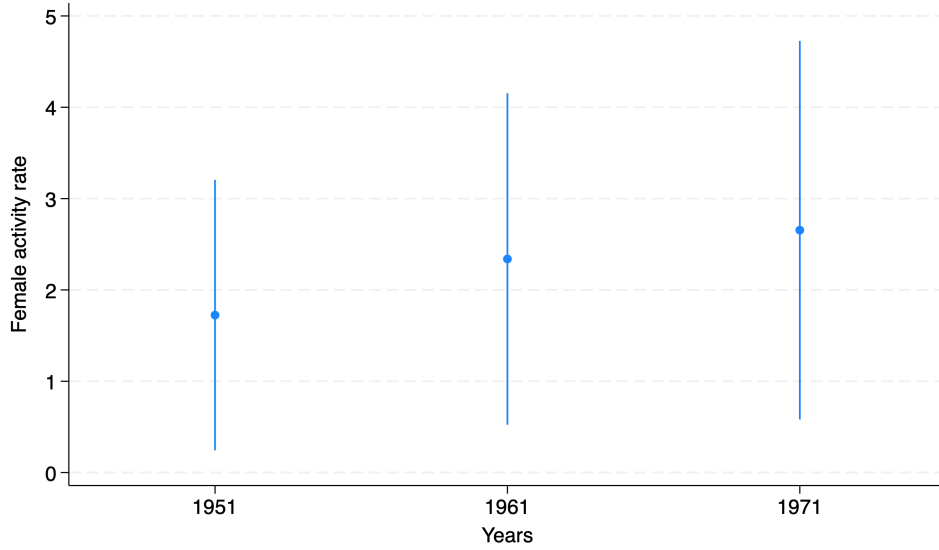
Notes: The outcome variable is the female labor market activity rate, computed by dividing the female active population by the total female population residing in each province. Vertical lines represent confidence intervals, which are computed using a 95% confidence level.

activity rates to increase by approximately 1.7 percentage points in 1951. This effect rose to 2.3 percentage points in 1961 and stabilized at around 2.65 percentage points in 1971.

5.2 Intensive margin and wages

Table 3 presents the results stemming from the estimation of equation 3 for the subset of women included in the INPS-INVIND sample. In particular, we are interested in the coefficients pertaining to the fatality rate variable, which are those reported at the top of the table. The first two columns display estimates retrieved using age, macro-regions, and year dummies as control variables. The third and fourth columns extend these specifications to include province characteristics in 1931 (X_j in equation 3). These estimates reveal that women employed in provinces more heavily affected by military casualties work about 2 weeks more per year compared to their counterparts in other provinces (column 3). Additionally, these women earn approximately 10 euros less per week than those employed in provinces less affected by military casualties (column 4).

In the next step, we analyze the differential impact of our variable of interest on women with respect to men. To this purpose, we re-estimate equation 3, this time including all the relevant interaction terms and expanding our sample to also include male workers. Compared to the previous analysis, this specification allows us to distinguish between the common effect of the war on both sexes (the fatality rate) and the

Table 3: Pooled OLS regression on the female sub-sample, 1980-1997

Variables	(1) Worked Weeks	(2) Weekly wage	(3) Worked Weeks	(4) Weekly wage
Fatality Rate	1.305*	-14.275***	2.011**	-9.951**
	(0.68)	(4.13)	(0.88)	(4.34)
Prov characteristics			✓	✓
Constant	37.498***	124.066***	34.407***	90.260**
	(0.89)	(8.11)	(3.90)	(38.78)
Observations	4,141,921	4,141,921	4,141,921	4,141,921
R-squared	0.032	0.073	0.033	0.092

Clustered standard errors at the prov level in parentheses
***p<0.01, **p<0.05, *p<0.1

Source: ISTAT, "Morti e dispersi per cause belliche negli anni 1940-1945". Individuals are assigned to their province of residence. Our treatment variable is the ratio between the provinces' number of WWII military fatalities and the 1931 male activity level.

differential effect on women (captured by the interaction between the fatality rate and the female dummy). Our hypothesis is that the jobs that were not reclaimed by men after the end of the conflict were retained by the women who held those occupations during the war. If this is the case, we would expect the coefficient of the interaction term to be statistically significant and meaningful in magnitude, while we would expect a more modest or null impact to show up in the common term. The estimates displayed in columns 3 and 4 of Table 4 indicate that the war differentially increased the number of weeks worked by women by approximately 1.5 weeks. The common term (shown in the second row of the table), is also significant, but its effect amounts to only roughly one-fourth of the total impact on women, suggesting that the impact of the war on provinces more intensively hit was more relevant for the female labor supply rather than the overall one. On the other hand, the war appears to have negatively affected the wages of both male and female employees, while the differential impact is, in this case, negligible.

One possible explanation for these findings might be that province differentials in the number of hours worked and weekly wages may be due to the fact that the workers living in provinces more hit by war casualties might be employed in unskilled jobs that make them work more intensively but earn less. Thus, we finally add qualification dummies (i.e., indicators for employees' work status: trainee, blue collar, white collar, manager, and a miscellaneous category) to specification 3. The results are reported in Table 5. These latter estimates show that the impact on worked weeks not only persists but becomes even quantitatively larger. Conversely, the previously observed differential effect on weekly wages disappears entirely. These results indicate that controlling for workers' qualifications fully accounts for the effects on wages previously found. How-

Table 4: Pooled OLS regression, 1980-1997

Variables	(1) Worked Weeks	(2) Weekly wage	(3) Worked Weeks	(4) Weekly wage
Female	-3.665***	5.566	-2.282	22.536
	(0.83)	(4.73)	(3.74)	(22.20)
Fatality Rate	0.323	-15.867***	0.563*	-9.392*
	(0.25)	(4.55)	(0.29)	(5.39)
FR × Female	0.981	1.592	1.448*	-0.559
	(0.62)	(2.55)	(0.80)	(3.34)
Prov characteristics			✓	✓
Constant	41.163***	118.501***	36.689***	67.724
	(0.52)	(9.62)	(1.33)	(41.49)
Observations	19,167,543	19,167,543	4,141,921	4,141,921
R-squared	0.063	0.564	0.054	0.342

Clustered standard errors at the prov level in parentheses
***p<0.01, **p<0.05, *p<0.1

Source: ISTAT, "Morti e dispersi per cause belliche negli anni 1940-1945". Individuals are assigned to their province of residence. Our treatment variable is the ratio between the provinces' number of WWII military fatalities and the 1931 male activity level.

ever, it is important to notice differential achievements in qualifications may be, in and of themselves, an outcome of the war. We have not included them in the main specifications as covariates to avoid potential biases arising from adding potentially bad controls. With this caveat in mind, these results should be viewed as a complementary analysis, suggesting that the initial findings on wages might be driven by the omission of a crucial variable accounting for important heterogeneous features in the sample. Because of this reason, we remain cautious in claiming that the war had a negative effect on women's salaries.

6   Conclusions

Massively disruptive events, such as wars, have the power to reshape social norms profoundly. This paper studies whether the wartime mobilization of men, which forced male workers to abandon their jobs, had a positive side effect on women's entrance into the labor market. In particular, we investigate whether World War II had short- and long-run effects on female labor force participation in Italy.

To shed light on this issue, we use a novel dataset that combines information on war fatalities with employment records from the Italian Social Security Institute and Census data. Our identification strategy exploits the geographical variation in the distribution of military casualties over the Italian provinces. We thus examine whether the increase in women's labor force participation was higher in the provinces that were more affected

Table 5: Pooled OLS regression, including qualification dummies, 1980-1997

Variables	(1) Worked Weeks	(2) Weekly wage	(3) Worked Weeks	(4) Weekly wage
Female	-15.318***	-120.991***		
	(3.95)	(15.36)		
Fatality Rate	0.870***	-0.268	2.566***	-0.255
	(0.31)	(2.82)	(0.91)	(2.29)
FR × Female	1.696**	0.013		
	(0.83)	(1.94)		
Prov characteristics			✓	✓
Constant	40.981***	142.324***	28.933***	48.214**
	(1.53)	(18.64)	(4.05)	(18.98)
Observations	19,167,543	19,167,543	19,167,543	19,167,543
R-squared	0.035	0.140	0.036	0.146

Clustered standard errors at the prov level in parentheses
***p<0.01, **p<0.05, *p<0.1

Source: ISTAT, "Morti e dispersi per cause belliche negli anni 1940-1945". Individuals are assigned to their province of residence. Our treatment variable is the ratio between the provinces' number of WWII military fatalities and the 1931 male activity level.

by military fatalities than in others. Our research design is based on the idea that after the war ended, as a consequence of unevenly distributed death rates, women had different chances of retaining the jobs they were offered to replace conscripted men during the war. Our analysis of short-run effects questions whether provinces with a higher incidence of war fatalities exhibit a higher participation of women in the labor force right after the end of the war. On the other hand, the idea that these effects persisted over time rests on the hypothesis that WWII persistently changed the culture and women's life choices.

To empirically test these questions, we first adopt a difference-in-differences approach to study whether WWII had a shorter- and a longer-term impact on women's labor market participation, using Census data and comparing pre-war (using 1931 as the last Census year) to post-war figures (1951, 1961, and 1971). This exercise shows that after the war, the number of active women increased disproportionally in the provinces mostly hit by war fatalities. Notably, the effect slightly increases over time, suggesting the possibility of a reinforcing mechanism through generations.

Second, we employ administrative microdata from INPS for the period 1980-1997 to examine whether the women residing in the provinces with the highest incidence of fatality rates exhibited a significantly different number of worked weeks and weekly salaries 3 to 5 decades after the end of the war. Results show that women working in the provinces more intensively hit by the war work a higher number of weeks than their counterfactuals working in the provinces less severely impacted. The evidence

of our findings on weekly wages is, instead, not conclusive. War seems to have had a depressing impact on wages. However, once we control for the work status, the effect is no longer significant, suggesting that the initial findings on wages might be driven by the omission of a crucial variable accounting for important heterogeneous features in the sample.

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A Appendix

Figure A1: Total number of soldiers' casualties by province of residence
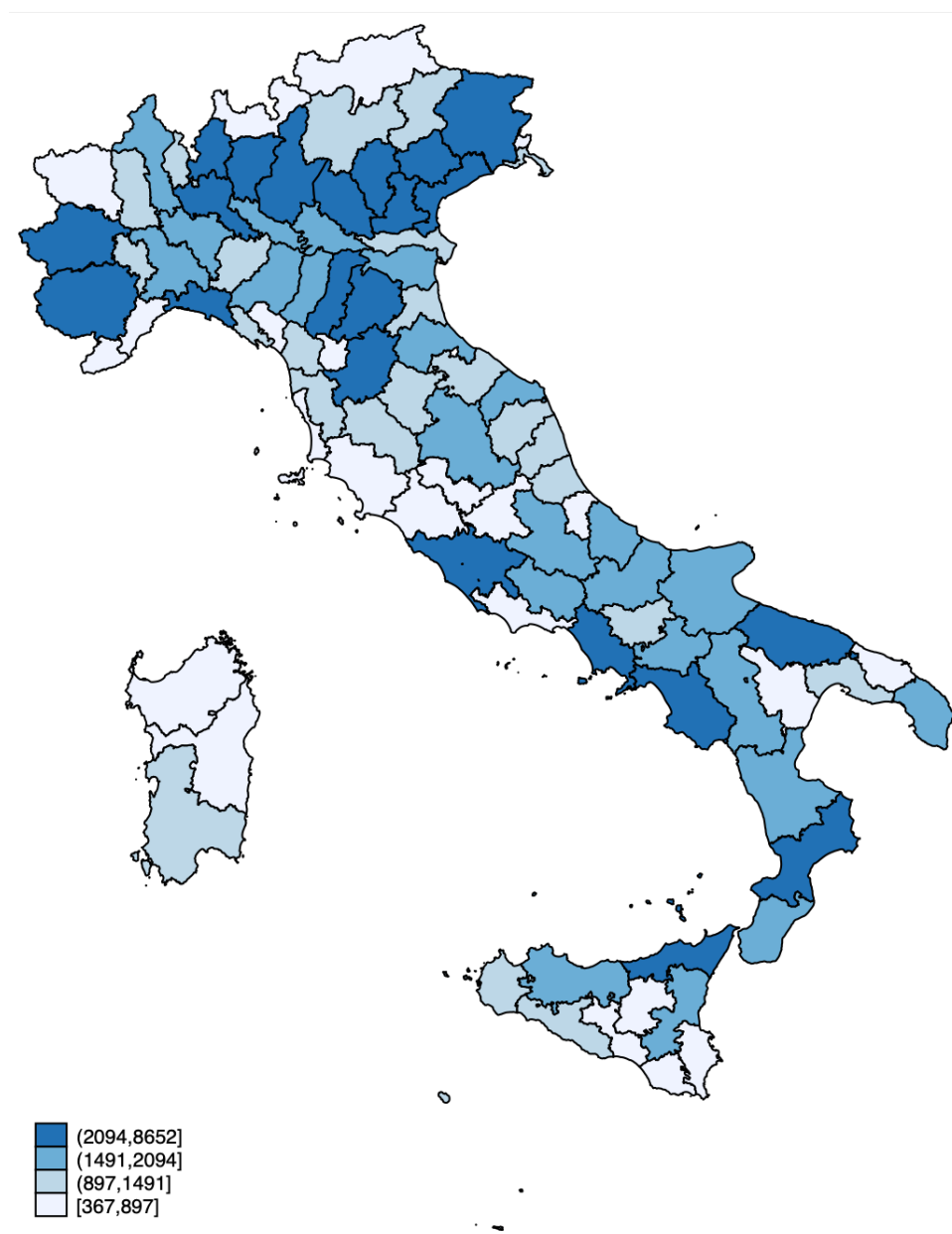
Legend:
- (2094,8652]
- (1491,2094]
- (897,1491]
- [367,897]

Source: ISTAT, "Morti e dispersi per cause belliche negli anni 1940-45". Individuals are distributed over provinces according to their province of residence.

Figure A2: Female active population by sector
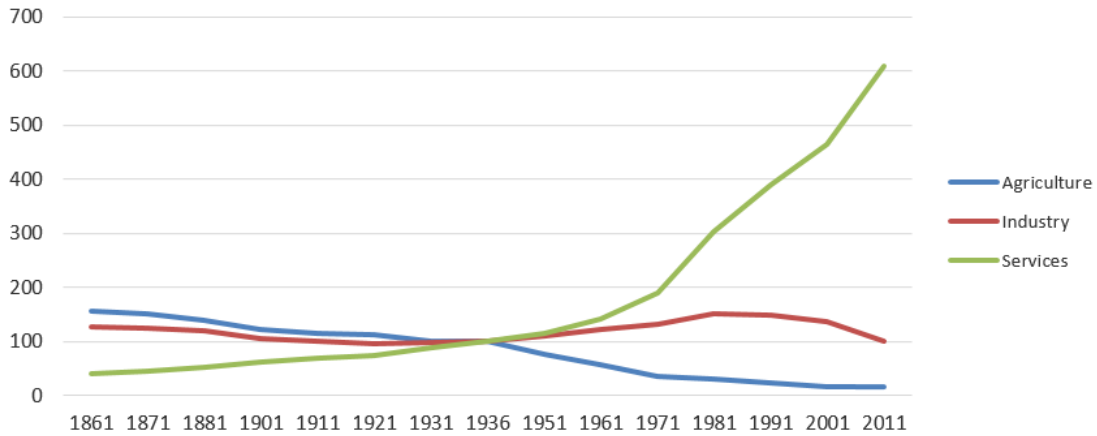
Source: ISTAT; *Tavola 10.3 - Popolazione attiva in condizione professionale per sesso e settore di attività economica ai Censimenti 1861-2011.*
Notes: Numbers are indexed to the 1936 Census, which serves as the baseline year, set at 100.

Table A1: Difference-in-differences results on female activity rates

Variables	Female activity rate
Fatality Rate × 1951	1.724**
	(0.75)
Fatality Rate × 1961	2.339**
	(0.91)
Fatality Rate × 1971	2.654**
	(1.04)
Constant	9.986***
	(0.75)
Observations	364
R-squared	0.951

Clustered standard errors at the prov level in parentheses
***p<0.01, **p<0.05, *p<0.1

Sources: ISTAT, "Morti e dispersi per cause belliche negli anni 1940-1945", and the Italian Censuses of 1931, 1951, 1961, and 1971.
Notes: The outcome variable is the female labor market activity rate, computed by dividing the female active population by the total female population residing in each province.