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Eating Habits, Food Consumption, and Health: The Role of Early Life Experiences

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Abstract

This study explores the long-run effects of a temporary scarcity of a consumption good on preferences towards that good once the shock is over. Specifically, we focus on individuals who were children during World War II and assess the consequences of the temporary drop in meat availability they experienced early in life. To this end, we combine new hand-collected historical data on the number of livestock at the local level with microdata on eating habits, health outcomes, and food consumption expenditures. By exploiting cohort and regional variation in a difference-in-differences estimation, we show that individuals who as children were more exposed to meat scarcity tend to consume relatively more meat and spend more on food during late adulthood. Consistent with medical studies on the side effects of meat overconsumption, we also find that these individuals have a higher probability of being obese, having poor self-perceived health, and developing cancer. The effects are larger for women and persist intergenerationally, as the adult children of mothers who experienced meat scarcity similarly tend to overconsume meat. Our results point towards a behavioral channel, where early-life shocks shape eating habits, food consumption, and adult health.

JEL classifications: D12, I10, N44

Keywords: preferences, food consumption, early life experiences, gender differences.

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1 Introduction

In public debate, it is often assumed that the widespread availability of food, especially that high in fat, is an important determinant of bad eating habits. Yet, notable heterogeneities in consumption responses to the availability of fatty foods remain largely unexplained, even after accounting for a wide range of socio-demographic factors. In this paper, we investigate whether having experienced a lack of a given good in a certain period induces a long-run reaction in consumption once that good becomes available again. We find, indeed, a long-lasting link between the temporary scarcity of a food and individuals' eating habits.

We focus in particular on the causal relationship between meat scarcity during childhood and eating habits later in life, exploiting an early-life experience that is not susceptible to endogeneity problems, guarantees randomness in the exposure to the shock, and is orthogonal to previous habits/preferences. Specifically, we use unique historical information at the local (regional or provincial) level on changes in the availability of livestock during World War II (hereafter WWII) in Italy. During the war, hunger was quite common among families of any socio-economic status. This was in part due to the fact that much livestock was excised to fulfill the dietary requirements of the German army. We argue that the reduction in the number of breed animals led to a significant drop in the local availability of meat during this period (both through rationing and the black market). As livestock were present across the Italian territory before WWII, their decrease significantly affected individuals' meat consumption. That average per capita meat consumption had, by 1950, returned to its pre-WWII levels in almost all regions suggests that the observed decline during WWII was a deviation from its "steady state."

To achieve identification, we use a difference–in–differences estimator and exploit geographical and cohort variation in livestock availability in Italy. In particular, we compare the eating habits of individuals belonging to different cohorts (childhood during or after WWII) and who live in areas differently exposed to the reduction in livestock (continuous measure). We rely on data from the Italian Multipurpose Survey on Households, selecting individuals who were differentially exposed to meat scarcity during their childhood, for whom we observe their eating habits, body mass index (BMI), and other health-related outcomes later in life. Data from the Survey on Household Income and Wealth allows us to additionally examine the effects on food expenditures.

We find that individuals who experienced relatively more severe meat scarcity during childhood consume more meat and have an unbalanced diet later in life, with considerable health implications (i.e., increased probability of being obese, having poor self-perceived health and developing cancer). We show that the findings are not driven by selective fertility, infant mortality, survival biases or by age differences between the treated and the control group, which are accounted for in a triple-differences estimation. We also address issues related to mobility and the differential evolution over time of regions with varying degrees of livestock scarcity during WWII. Our results are robust to the inclusion of controls for other effects of WWII at the regional level (casualties or fall in GDP per capita) as well as to the use of different measures of meat scarcity. In addition, we observe null or negative effects if we use the prevalence of hunger or the decline in the local availability of wheat as "placebo treatments." We can therefore exclude that the estimated effects on eating habits operate through the general deprivation induced by WWII.

We set forth evidence in favor of a behavioral mechanism. First, in the spirit of Kesternich et al. (2015) who explore the effects of hunger, we use additional data at the household level to estimate Engel curves and document an increase in the share of food expenditure over total expenditure among households with a treated female member. Second, increases in the BMI of the treated women occur through increases in weight rather than decreases in height.

Although the estimated effects are statistically significant among males and females of all ages, they are particularly strong among individuals who experienced meat scarcity between the ages of 0 and 2, especially if female. This is in line with the literature on the detrimental effects of shocks that occur early in life (see, for example, Conti et al., 2016). We provide suggestive evidence that this gender difference is due to the preferential treatment of sons over daughters by parents during WWII, who presumably prioritized the former when it came to the allocation of scarce goods such as meat. Specifically, we find that among 2-year-old children, girls experienced, on average, greater weight loss than boys between 1942 and 1944.[1] The gender gap is wider among children of manual workers. The literature documents similar gender differences in breastfeeding among children in developing countries (Jayachandran and Kuziemko, 2011). Since we find that more severe meat scarcity during childhood leads to overconsumption later in life, this may explain why the estimated effects are stronger for females. The observed overconsumption of meat later in life among individuals aged 0-2 during WWII may be a result of in utero effects (Vitt et al., 2022) or a compensatory investment on the part of parents, in the spirit of Yi et al. (2015). That is, when WWII ended, parents may have tried to offset the meat scarcity experienced by their children during the war by providing them with relatively more meat. In this way, these children may have developed an increased desire

[1] In line with Van den Berg et al. (2016), we also find evidence of biological effects (drop in height) for individuals exposed to meat scarcity in early years or at the onset of life. In particular, we find a negative effect on height among males exposed to meat scarcity while in utero and among females aged 1-2 during WWII. This corroborates the argument of preferential treatment by gender at age 2.

for this food. In contrast, children who were born after WWII and comprise our control group were unaffected as they did not experience any meat scarcity.

Since meat is rich in fat content, its overconsumption can have negative consequences on individual health. Indeed, we find that females who experienced more severe meat scarcity during childhood tend to have a higher BMI and a greater probability of being obese later in life. This result is consistent with medical studies that examine how dietary patterns affect the risk of obesity or weight gain (Wang and Beydoun, 2009). Moreover, we document an increased probability of developing cancer for these individuals, in line with medical findings that link red and processed meat consumption with a higher risk of cancer (Cross et al., 2007).

We then extend the analysis to the next generation and observe that the effect persists to the adult children of the women who had experienced meat scarcity. This result suggests that local differences in meat availability can affect tastes and eating habits within and between generations. Atkin (2013) similarly documents that regional differences in taste depend on the local abundance of foods. In our setting, the long-lasting effect may occur in a process of habit formation, where current utility depends not only on current consumption but also on "habit stock" (Rozen, 2010). In such a framework, a temporary shock in the availability of a good may influence its consumption in the long run.

Related literature. Several papers have shown that past experience matters for individual behavior. These range from risk taking and savings (Malmendier et al., 2011; Malmendier and Nagel, 2011; Aizenman and Noy, 2015; Bucciol and Zarri, 2015) to political preferences (Fuchs-Schündeln and Schündeln, 2015) and religiosity (Bentzen, 2019). Our study contributes to such work by being one of the first to show how meat scarcity early in life shapes individual eating habits later on. In a contemporaneous study, Gertler and Gracner (2022) show that exposure to a sugar-rich diet early in childhood impacts health in later life but in this case the main channel is addiction.

Our findings also speak to a growing literature that studies the effects of shocks on health and educational outcomes of multiple generations (Vågerö et al., 2018; Black et al., 2019; Havari and Peracchi, 2019; Akresh et al., 2023; Costa et al., 2020). These papers, however, do not document that shocks to food availability lead to intergenerational effects on eating habits, nor provide evidence of intergenerational transmission through a behavioral, rather than a biological mechanism, which operates beyond the transmission of income (Waldkirch et al., 2004).[2]

[2]Several studies show how attitudes are transmitted from parents to children, including risk or time preferences and beliefs (Fernández et al., 2004; Dohmen et al., 2012; Zumbuehl et al., 2021, Bisin and Verdier, 2001; Doepke and Zilibotti, 2008), and may explain intergenerational persistence in a diverse set of economic outcomes such as income and education, as well as health (See, for example, Heckman,

One could, in principle, infer that a scarcity of food high in fat is favorable to individual health.[3] Indeed, there is a large literature focusing on the contemporaneous relationship between food availability, eating habits, and health.[4] These papers typically exploit an exogenous shock, where price or food availability change in a given location, and study its consequences on obesity and health. Dragone and Ziebarth (2017), for example, use German reunification as a natural experiment and find that East Germans changed their diet after the fall of the Wall by consuming novel Western food products. Such work tends to focus on the short-run effects of either an increase in food quantity or a reduction in its price, rarely observing individual eating habits. In the short run, people's reaction may, however, be driven by both a rational price-based explanation and a behavioral explanation, and disentangling these two effects is next to impossible. This paper differs in that we study the effects of a temporary fall in food availability on eating habits once the shock is over. In this case, the price effect is no longer present, and only a behavioral mechanism is at work. Moreover, we can observe the long-run effects of the shock, both within and between generations.

Finally, our paper intersects with the empirical literature on the impact of macroeconomic conditions during childhood on health later in life (e.g., Galobardes et al., 2008; Yeung et al., 2014; Thomasson and Fishback, 2014). Other papers focus on hunger and exposure to warfare while in utero or during early childhood and find negative effects on adult health.[5] These causal relationships linking early-life (socio-economic) conditions and health during adulthood have largely been explained via a biological mechanism.[6] Adverse nutritional conditions while in the womb or during the first years of life may impact height or even result in alterations in the development of vital organs, tissues, and/or other systems of the human body. Though advantageous for short-term survival, these alterations can be detrimental in the long run and may heighten a predisposition to chronic diseases in adulthood. While we cannot discard a biological mechanism, we do shed light on a behavioral mechanism. To date, such a channel has received little attention in the literature; namely, that the scarcity of a specific good shapes individuals'

2008; Björklund and Salvanes, 2011; Black and Devereux, 2011; Holmlund et al., 2011; Lindahl et al., 2016).

[3]For example, Ruhm (2000) shows that individuals tend to improve their diet by eating less fat and more fruit and vegetables during recessions.

[4]Examples include soft drink taxes (Fletcher et al. 2010; Dubois et al., 2020), food prices (Lakdawalla et al., 2005 and 2009), and the availability of fast food restaurants (Davis and Carpenter, 2009; Currie et al., 2010; Anderson and Matsa, 2011).

[5]See Akbulut-Yuksel (2014), Kesternich et al. (2014), Van den Berg et al. (2016), Havari and Peracchi (2017), Atella et al. (2023), Conti et al. (2021). Bertoni (2015) shows, for example, that exposure to episodes of hunger in childhood leads to people adopting lower subjective standards when evaluating life satisfaction in adulthood.

[6]See Parsons et al. (1999); Kuh and Ben-Shlomo (2004); Banerjee et al. (2010); Akresh et al. (2012), as well as Almond and Currie (2011) for an excellent review.

preferences and attitudes towards that good, which in turn affects their consumption behavior. We show that alternative mechanisms, such as aspirational consumption or lower cognitive ability, are unlikely to underlie our results.

2 Data

Our analysis relies on unique historical information on livestock availability at the local level in Italy, together with rich survey data on eating habits and health outcomes at the individual level. Italy provides a particularly interesting setting for three reasons. First, it was among the countries directly affected by a plausibly exogenous negative shock to the availability of meat during the war. Second, the availability of both data on livestock by region or province during WWII and detailed survey data allow us to observe individual eating habits for different cohorts and generations. Third, although Italy has a low obesity rate among adults, along with Spain and Greece it exhibits one of the highest childhood obesity rates in Europe (OECD, 2019). The intergenerational effects we document thus have direct policy implications.

We proxy meat scarcity at the regional (and provincial) level using hand-collected data from the livestock censuses that took place in 1941, 1942, and 1944 (Italian National Institute of Statistics - ISTAT, 1945 and 1948) as well as information on the number of slaughtered animals for meat in 1941, 1942, and 1945 from ISTAT's annual agricultural statistics (ISTAT, 1948 and 1950a).[7] The data reports the number of breed animals by species (See Figure A.1 in Appendix A). The sum of cattle, pigs, goats, and sheep provides our measure of meat availability in each region.[8] The 1944 census also records the number of livestock excised by the German army in the central and southern regions. Arbizzani (1976) and Liuzzi (2004) meanwhile describe the excise of livestock in certain northern regions.

Certainly, WWII affected regions in other dimensions as well. Two available indicators of the severity of WWII at the regional level serve as control variables for the effects of the war: the change in regional GDP per capita between 1943 and 1945 (Daniele and Malanima, 2007) and the number of war victims in the same period (casualties by firearms and explosives) by region (ISTAT, 1957). We express the number of war victims per 1,000 population in each region in 1936 (ISTAT, 1976). Additionally, we use infor-

[7] We use regional level information to analyze eating habits because the survey only contains information on respondents' region of residence. We are able to employ also provincial level information to explore food expenditures via another survey, in which respondents report both their province of birth and their province of residence.

[8] We compute a simple sum as we measure scarcity as a % change, and the distribution of species has remained fairly constant up to the present (cattle in the North, goats and sheep in the South). As a robustness check, we use i) a weighted sum by the relative size of each species, ii) quintals of slaughtered animals for meat.

mation on wheat production in 1941, 1942, and 1945 from ISTAT's annual agricultural statistics (ISTAT, 1948 and 1950a) to construct a "placebo" treatment. A second placebo treatment is based on self-reported retrospective information on experiences of hunger from SHARELIFE (wave 3). We restrict the sample to individuals born in Italy before 1946 and construct the binary variable "experience of hunger during WWII" that takes the value 1 for those who report that they experienced hunger in the period 1939-1945. We then aggregate this measure at the region of birth to compute the incidence of hunger at the regional level.

Along with the 1944 census, a number of surveys were carried out by the Italian Central Institute of Statistics and the Allied Commission in the liberated territory. In particular, the Survey of Living Conditions-Public Health provides data at the regional level on the average weight of 2-year-olds by gender and parental occupation in 1944 as well as the corresponding figures in 1942. We can furthermore distinguish this information by urban or rural area. The Survey of Living Conditions-Nutrition reports average daily caloric, protein, fat, and carbohydrate intake in 1944. We also obtain data on fetal and infant mortality (stillbirths and children deceased in the first year of life per 1,000 live births) by region in 1942 and 1945 from statistics on death causes (ISTAT, 1950b).

We merge the historical data on livestock availability by region with individual level data from ISTAT's 2003 Multipurpose Survey on Households: Aspects of Daily Life. To do so, we use the region of residence of the respondents. Although information on region of birth is not available, respondents do report whether or not they reside far from their relatives. We can accordingly reduce the presence of "potential internal migrants" in our sample by excluding those whose region of residence and region of birth are likely not to coincide.[9] The survey was initially conducted in 1993 and has since been repeated annually on a cross-section of households. To minimize survival bias, we use the 2003 wave, the first to collect data on respondents' (self-reported) weight and height.[10] We compute body mass index (BMI) using the formula BMI=(weight in kg)/(height in m)^2. The survey asks respondents about their eating habits. More specifically, the respondents indicate their frequency of consumption for various food categories on a scale ranging from "never," "less than once per week," "a few times per week, "once a day," to "several times per day"–see Figure A.2 in Appendix A. We construct the binary variable "Eat meat every day," which takes a value of 1 if the respondent eats pork, beef, chicken or other white meat once or several times a day. In our sample, around 13% of the respondents eat meat daily.[11] In the analysis we mainly use the binary variable "Eat meat every

[9]We complement the analysis using the Survey on Household Income and Wealth, which includes information on food expenditures and the region of birth and region of residence of the respondents.

[10]We formally test for survival bias in section 3.3.

[11]Vegetarians make up less than 1% of our sample.

day" as a dependent variable but also report estimates with the frequency of eating meat (ordinal variable in a 1-to-5 point scale) as an alternative outcome. To understand whether the daily consumption of meat is more generally associated with an unbalanced diet, we construct the binary variable "Unbalanced diet", which takes the value 1 if the respondent eats meat every day, salad and vegetables less than every day, fruit less than several times per day, fish less than once per week, and occasionally sweets. Further to food information, the survey also contains information related to health conditions. We specifically consider whether the respondent is obese (BMI equal to 30 or higher), has a poor self-perceived health or has had a tumor. Lastly, we take into account demographic characteristics of the respondents, namely, age and gender. We use the 2021 wave of the survey and employ a triple-differences estimator to better account for the effect of age on health-related outcomes.[12] As the survey reports information for all household members, we are also able to observe the eating habits of the coresident children, and thus to explore the degree of intergenerational persistence.

Next, we merge the historical data with the 2004 wave of the Survey on Household Income and Wealth (SHIW). The SHIW is a biennial survey, conducted by the Bank of Italy, which contains information at the household level on total and food consumption expenditures, total household income, as well as demographic characteristics of the household members (age and gender). We compute the share of food over total consumption to estimate Engel curves. An advantage of the SHIW is that it contains information both on household members' province of birth and their province of residence. This means we can exploit more granular information on livestock availability and assign to all individuals the meat scarcity of the province where they were born and most probably spent their childhood. Moreover, this allows to test whether our results change if we restrict the sample to non-migrants. In the next section, we describe in detail our identification strategy.

3 Identification

3.1 Measuring meat scarcity at the local level

We construct a measure of meat availability at the regional level using the historical data from the livestock census and annual agricultural statistics. We focus on the most severe years of WWII (in terms of casualties as well): the period of 1943-1945 for

[12]Starting from 2013, there is a structural break in the way some variables are reported in ISTAT's Multipurpose Survey on Households: Aspects of Daily Life. In particular, (i) 5-year age groups are reported instead of the detailed year of birth, and (ii) obesity and overweight categories are reported instead of the detailed weight and height. Therefore, we are restricted to use only specific age groups and health outcomes in the triple-differences estimation.

the North of Italy and that of 1943-1944 for the Center-South (Figure A.3, panel a in Appendix A). Information from the livestock census is available for all regions in 1941 and 1942, i.e., before the start of the harshest phases of the war. A livestock census was conducted in 1944 in the central-southern area of the country, which was already liberated.[13] For the northern regions, we complement the above information using the number of animals slaughtered for meat from annual agricultural statistics referring to 1941, 1942, and 1945.[14] We construct a proxy of meat scarcity at the regional level by calculating the percentage difference in the number of livestock between the 1941-42 average and that of 1944, available only for the central-southern regions. For the northern regions, we instead use the percentage difference in the number of animals slaughtered for meat between the 1941-42 average and that of 1945. As an alternative measure, we consider the percentage difference in the number of animals slaughtered for meat in all regions. Both measures are also available at a finer geographical level (province) and are in absolute value, with higher values denoting more severe scarcity levels.

Figure 1 shows that the number of animals slaughtered for meat decreased substantially during WWII. There is considerable variation across regions, ranging from 9 to 72%. Figure 2 compares the decrease in the number of animals slaughtered for meat with the decrease in the number of livestock in the central-southern regions, for which there is available data from the census. The two measures are correlated and both point towards a decrease in the availability of meat. This is partly explained by the German army's livestock excise, aimed at fulfilling their dietary needs. As shown in the same figure, the German army excised up to 32% of the livestock in some regions. Although there is no available data for the North, several historical sources report that livestock were almost entirely excised in several areas of Friuli Venezia Giulia (Liuzzi, 2004) and Emilia Romagna (Arbizzani, 1976), after numerous German divisions entered Italian territory. In Figure A.4 in Appendix A, we observe that the decrease in the availability of meat at the province level (panel c) closely resembles the movements of the German troops after the fall of Mussolini on July 25, 1943 and upon the Allied invasion in September of 1943 (panels a and b).

Using the decrease in the number of livestock as the treatment has several advantages. First, we do not need to rely on retrospective self-reported incidences of hunger that may suffer from recall bias and depend on the socio-economic status of the family of origin. The decrease in the number of livestock is arguably exogenous, as the German army excised a large share of the available livestock as they moved throughout the territory. Indeed, the

[13]The liberated territory in 1944 included the following regions: Umbria, Lazio, Abruzzo, Campania, Apulia, Lucania (Molise), Calabria, Sicily, and Sardinia.

[14]The next available livestock census took place in all regions in 1948, but by that time the number of livestock had already recovered to pre-war figures.

regions that experienced the largest decreases in livestock (Lazio and Friuli Venezia Giulia, Figure A.4, panel c) were not among those that saw the highest number of casualties per capita (e.g., Piedmont or Tuscany, Figure A.3, panel b) and vice versa. Second, contrary to other regional measures of exposure to WWII (e.g., number of casualties or decrease in GDP), the decline in livestock is closely tied to meat scarcity.[15] During WWII, a ration card was introduced in Italy and different types of food, including meat, could only be purchased in established quantities using this special card. Rations differed by region depending on local availability. For example, in Turin in 1941, these consisted of: 20 grams of meat, 150 of bread, 33 of potatoes, 25 of legumes, 25 of vegetables, 6 of rice, 7 of pasta, 50 of fruit, 12 of fat, 5 of cheese, 200 of milk, 16 of sugar (plus 1 egg per week), to guarantee a total of 819 calories per capita (Massola, 1951). The collection and distribution of food was administered by the State exclusively at the local level through the so-called *Sezioni Provinciali dell'Alimentazione* (Provincial Food Sections, see Luzzatto-Fegiz, 1948), leading many to rely on the black market to acquire basic goods (Daniele and Ghezzi, 2019). As the black market was also predominantly local (at most between city and countryside), the decrease in the number of livestock at the regional level likely captures the overall local availability of meat (both through rationing and the black market), providing a good measure of the meat scarcity individuals experienced during the war.[16]

The inefficiency of the rationing system (Morgan, 2007) and the very high inflation rate intensified the food shortage.[17] In certain cities, some items were completely missing because they could not get in from the outside, while for others (e.g., milk) trade between provinces was completely forbidden. Moreover, transport infrastructures suffered substantial damage, further hampering the trade and provision of products (Daneo, 1975). Therefore, in our setting, spillover effects between the treated and control regions (the so-called SUTVA) are unlikely to pose a threat to identification.

3.2 Defining the treated and control cohorts

In the first part of the analysis, we make use of the 2003 wave of the Multipurpose Survey on Households: Aspects of Daily Life to compare individuals belonging to different

[15]The number of slaughtered animals reflects meat consumption well, though its drop may also indicate reduced trade. Meanwhile, the livestock census captures the overall availability of meat, but also includes animals that in theory were not intended for consumption. We accordingly consider both measures as proxies of meat availability.

[16]It is reasonable to assume that livestock availability also proxies for the availability of milk/butter and other animal products, for which no regional level information exists in the historical archives. Information at the national level points to a significant drop in the availability of animal products (butter, cheese, lard and milk) along with meat–see Figure A.5 in Appendix A.

[17]In 1943, the consumer price index increased by 67.7% compared to the previous year, and in 1944 by 344.4% (ISTAT, 2012).

cohorts (i.e., the treated group, who experienced meat scarcity during childhood, and the control group, who did not) and living in regions with varying degrees of meat scarcity.[18] The decrease in the number of livestock is employed to proxy meat scarcity at the regional level. In other words, we assume that individuals living in regions that saw a large drop in livestock were more exposed to meat scarcity and estimate an intention to treat (ITT).

Figures A.6 and A.7 in Appendix A show that livestock were present across the Italian territory before the severest phases of WWII. This implies that people used to consume meat in all regions and as a result, a decrease in livestock would be detrimental to individual consumption. Although there are no historical data available at the regional level, average meat consumption per inhabitant at the national level dropped by 47% between 1941-1942 and 1945 according to ISTAT (1976).[19] This drop in consumption is quite close to the national drop in the number of livestock (42% in the same period). Moreover, by 1950 the number of slaughtered animals for meat in per capita terms had recovered to its pre-WWII levels in almost all regions (Figure A.7), suggesting that the fall in meat consumption during WWII was a deviation from its "steady state."

We define the treated and the control cohorts using individuals' year of birth. The original sample includes around 54,000 individuals born between 1900 and 2003. For the purposes of our study, we restrict the sample to the around 13,000 individuals born between 1934 and 1957. Italy entered WWII in 1940 but most of the casualties (severe phase) occurred in the period of 1943-1945 (Figure A.3, panel a in Appendix A). We therefore define the cohort affected by meat scarcity during childhood as those individuals born between 1934 and 1945 (i.e., those aged 0-11 during the harshest time of the war; aged 58-69 at the time of the interview in 2003). The cohort born right after the war, between 1946 and 1957, comprise the control group (i.e., those aged 0-11 in the post-war period; aged 46-57 at the time of the interview). As a robustness check, we also consider more disaggregated cohort groups. Figure A.8 provides a timeline and illustrates how we define the treated and control cohorts.

Figure A.9 in Appendix A shows that the average per capita annual consumption of meat fell sharply in 1943 and 1944 but recovered after the end of the war. The consumption of other food products (sweets, cereals, fruit and vegetables) also dropped, but mostly in 1945, and was not due to the movements of the German troops. For example, the production of wheat (the most commonly consumed cereal in Italy) decreased substantially also in the southern regions, where the incidence of hunger was high (Figure

[18] This is the earliest wave of the survey that contains all the necessary information for our analysis (eating habits, height, weight, health) and allows us to minimize survival bias (maximum age in our sample=69). We then complement this analysis with data from the 2004 wave of the SHIW to study the effects on food expenditures.

[19] The average food consumption per inhabitant in the historical source was obtained by dividing the overall quantities consumed by the resident population at mid-year.

A.10 in Appendix A). We observe in Figure A.11 in Appendix A that the average daily protein intake in the liberated territory in 1944 was around 30% lower than the minimum required intake for a person doing heavy muscular work. This confirms that individuals in the treated cohort, whose childhood occurred during the war, experienced meat scarcity.

Table 1 displays some descriptive statistics for the treated and control cohorts in regions that did not witness severe meat scarcity during WWII (columns 1 and 2) and in regions that did (columns 4 and 5), along with a formal test of the differences (columns 3 and 6).[20] Individuals in the treated cohort, in regions that experienced a severe meat scarcity are the group with the highest likelihood of eating meat every day (16.3% versus 13.2%, 11.6% and 11.5%). They also have the highest average frequency of meat consumption and the highest incidence of an unbalanced diet. Regarding BMI, treated (older) cohorts have larger BMI than control (younger) cohorts and their BMI exceeds 26. Yet, the difference between treated and control cohorts is larger in regions that witnessed severe meat scarcity (compare column 3 to column 6). The composition of all groups is similar in terms of gender. In the analysis, we account for the age difference between the treated and control cohort by using controls and by exploiting regional variation within cohorts. Given that age is a significant determinant of health outcomes, we adopt a triple-differences specification when we study the effects of meat scarcity on health. In this way, we effectively minimize the potential bias stemming from age disparities.

Figure 3 shows, in a non parametric way, that the average meat consumption of the treated cohort in 2003 is higher than that of the control cohort in regions that saw a more severe meat scarcity during WWII. We test this formally in the following subsection.

3.3 Methods

In order to estimate the causal effect of meat scarcity during childhood on eating habits later in life, we exploit cohort and regional variation in a continuous difference–in-differences framework (DD). We estimate the following specification:

$$\begin{aligned}(Eat\ meat\ every\ day)_{ir} &= \beta_1(cohort)_i + \beta_2(cohort \times \Delta(livestock))_{i,r} \\ &\quad + \beta_3 X_i + y_r + u_{i,r}, \end{aligned} \tag{1}$$

where i stands for the individual and r for the region. The dependent variable is a dummy=1 for those who eat meat every day and 0 otherwise, *Cohort*=1 if the individual is born in 1934-1945 and 0 if the individual is born in 1946-1957, and $\Delta(livestock)$ is the

[20]To ease exposition, we define scarcity in a region as severe if both proxies of meat scarcity were above the 75^{th} percentile. In the regression analysis we also use a continuous measure of scarcity.

percentage drop in livestock, which is continuous and ranges between 14% and 72%.[21] The coefficient of interest is β_2, i.e., that of the interaction between the cohort dummy and the decrease in livestock. We include a vector of demographic characteristics of the respondents X_i, namely their age, age squared, and gender.[22] We also include regional dummies, y_r to account for the differential effect of WWII across regions.[23] These also capture systematic differences in eating habits, for instance, due to the culinary traditions of each region. Given that the dependent variable is binary, we estimate a linear probability model. We cluster standard errors at the regional level (18 regions). Robustness exercises are conducted with two-way clustering by region and age and by estimating a probit model. In addition, we reduce the window of the treatment, defining as treated the cohort born in 1942-1945, and as the control that born in 1950-1952. In this way, we ensure that WWI is not a confounding factor among the treated cohort and that the control cohort lived their childhood during a period of full recovery. Moreover, we carry out a more disaggregated analysis by 4-year cohorts in the spirit of an event study analysis. This allows us to check whether the effect is stronger among a particular treated group and to confirm that the control cohorts were unaffected.[24]

We also use equation (1) to estimate the effects of meat scarcity on the frequency of eating meat (OLS and ordered probit) and on the probability of having an unbalanced diet (linear probability model). To verify that the treatment at the regional level indeed captures meat scarcity rather than the overall hardship of WWII, as a robustness check, we specifically control for the effects of the war at the regional level using the decrease in GDP per capita and the number of casualties per 1,000 population in the period of 1943-1945 including geographical area dummies instead of regional dummies. Moreover, we consider the prevalence of hunger and the scarcity of wheat as placebo treatments. In addition, we corroborate that the estimated effects are due to the meat scarcity experienced during WWII rather than a time trend by considering a placebo war. Specifically, we assume that the war took place at a later date and define the placebo cohort as those born between 1958-1969 while the control cohort remains the same as in the benchmark (born in 1946-1957).

Eating habits (and health outcomes) typically vary with age. Although we control for

[21] Throughout the analysis, we also report the results using the percentage change in the number of animals slaughtered for meat for all regions as a proxy of meat scarcity. This ranges between 9% and 72%.

[22] Ichino and Winter-Ebmer (2004) show that WWII had long-run consequences for individuals' education and earnings. We accordingly control for individuals' educational attainment and occupation in a robustness exercise. The results do not, however, depend on the inclusion/exclusion of these controls (See Section 4.2).

[23] The regional dummies absorb $\Delta(livestock)$ in the estimation.

[24] In our DD setting, it is not possible to check whether pre-trends are parallel as we do not observe the eating habits of the individuals during childhood. Therefore, we also present the results of a triple-differences exercise that does not require parallel pre-trends.

age and its square in the benchmark specification, we conduct an additional robustness check using the 2021 Wave of the Multipurpose Survey: Aspects of Daily Life. We adopt a triple-differences framework (DDD) and exploit variation by cohort, region, and wave by including in the analysis individuals who at the time of the interview in 2021 were the same age as the treated and control in 2003, thus allowing to account for the age difference between these two cohorts. An additional advantage of the DDD is that it does not require the parallel pre-trend assumption to hold.

As mentioned in Section 2, the data only record the current region of residence, which may not coincide with the region of birth. Internal migrants could pose a threat to our identification strategy if they spent their childhood in one region and afterwards migrated to another region, as we would not be able to assign to them the meat scarcity they experienced during their younger years. However, respondents do report whether or not they reside far from their relatives, which allows us to mitigate the issue of internal migration. Specifically, we exclude from the analysis those who reported living far away from their relatives, as they are likely to have migrated (around 18%). This increases the precision of our estimates. Still, this proxy is imperfect as there was a wave of mass migration from the South to the North of Italy in the post-war period (see Weiss, 2015) and entire families may have moved all together. Therefore, we further address the immigration issue using the SHIW, which includes individuals' region and province of birth. By defining internal migrants as those whose region of birth is different from that of their residence, we obtain a similar figure (around 19%). Using the variable "reside far away from relatives" therefore offers a plausible means of identifying the internal immigrants in our main dataset.[25]

Another potential concern is survival biases. Given that the Multipurpose Survey on Households: Aspects of Daily Life is a repeated cross-section we cannot test for non-random mortality in our sample. To minimize survival bias, we use the earliest wave of the survey in 2003 that includes all outcomes of interest and define as treated those born in 1934-1945 and as control those born in 1946-1957. Therefore, the oldest cohort included in our analysis are respondents born in 1934, aged 69 in 2003 (year of the interview). To test for survival biases, we use census records of populations for the five oldest age groups used in the analysis (aged 65-69 in 2003) and of the following five age groups (aged 70-74 in 2003) that are excluded from the analysis. The census records come from ISTAT[26] and report the survival rates by region, gender and age in 2003. We construct (separately for males and females) cells by region and age and regress the survival rate in 2003 on

[25]In Section 4.4 we use the SHIW to estimate the effect of meat scarcity on the share of food expenditures and obtain similar results if we consider individuals' region or province of birth or if we consider their region of origin and exclude internal migrants.

[26]`https://demo.istat.it/app/?i=TVM&l=it`

age dummies, the meat scarcity shock at the regional level, their interaction and regional dummies. Figure A.12 in Appendix A shows the coefficients of the interaction terms. We find that among interviewed females, there are no survival biases due to meat scarcity (panel a), while among interviewed males, survival biases appear only after age 72 (panel b), among cohorts that are anyways excluded from our analysis.

A similar concern is non-random fetal or infant mortality. If the most vulnerable children died or were never born due to meat scarcity, there could be issues of selection in our sample. To address this issue, we correlate historical statistics on fetal (stillbirths) and infant (first year of life) mortality at the regional level with our measure of meat scarcity. Figure A.13 in Appendix A shows that there is no correlation between meat scarcity and fetal/infant mortality during WWII. A possible explanation is that breastfeeding is more important than meat intake for survival at this early age. Moreover, infants were entitled to more generous rations in terms of calories than were adults or older children (Daniele and Ghezzi, 2019). Therefore, fetal or infant mortality is unlikely to affect our results for those aged 0-2 during WWII.[27] A similar type of bias could arise from selective fertility. However, contraception was quite ineffective in the period of analysis (Greenwood et al., 2021). Moreover, our results reveal large differences by gender that are hard to reconcile with selective abortions (in the 1940s, it was not possible to predict the baby's gender).

We follow a similar strategy to define treated and control households when studying the effects of meat scarcity on the share of food expenditures at the household level. Namely, the treatment (cohort and meat scarcity in the region of birth) refers to the female head or spouse of the household.[28] We use data from the SHIW and estimate a specification similar to (1) but at the household level, where the dependent variable is the share of food over total consumption expenditures. The advantage of this data set is that it contains information on region and province of birth, making the assignment of treatment to individuals more accurate. It also allows us to check whether excluding internal migrants from the analysis biases our results or whether the estimates change if the treatment is defined at a more granular level (province instead of region). That said, the SHIW reports food rather than specifically meat consumption expenditures and the information is aggregated at the household level. Our preferred specification is therefore the analysis of eating habits at the individual level.

We then estimate variants of (1) to analyze the effects on BMI defined as (weight in kg)/(height in m)^2, and separately on weight and height, before turning to health outcomes related to meat overconsumption, i.e., the probability of i) being obese (BMI $\geq$

[27] No data is available at the regional level on child mortality at older ages.

[28] Both in the analysis of household food expenditures and that of intergenerational transmission, treated mothers are those aged 0-2 during WWII, as they are young enough to have coresident children and are typically the ones responsible for cooking.

30), ii) having poor self-perceived health, iii) having had a tumor. Given that the treated and control groups in the DD framework differ in age by construction and age is a strong determinant of health, we use the 2021 wave of the survey and adopt a triple-differences estimator to study the effects of meat scarcity on health outcomes.[29]

Lastly, to estimate intergenerational effects, we focus on the children of treated and control mothers, i.e., the outcome variable in (1) in this case refers to the children but the treatment (cohort and regional meat scarcity) refers to the mother. Thus, we examine whether the meat scarcity experienced by the mother during her childhood is transmitted to the eating habits of the next generation. We focus on mothers as they are most often in charge of preparing meals and therefore more likely to transmit eating habits to their children. Moreover, in our sample more than 45% of women declare "housewife" as their main occupation. We analyze adult children aged 18-26, who are able to choose where and what to eat and have well-formed eating habits. It is only possible to assess the effects on children who live with their parents as we do not observe any information about the mother when children move out. Selection issues are not, however, a concern given that 90% of young Italians in the 18-26 age group still live with their parents (Eurostat), with very small differences by gender, age, own or paternal educational level, geographical macro area, or number of siblings (see Figure B.1 in Appendix B). Moreover, mobility for university is limited: less than 18% of college students in Italy study in a region different than that of their origin (Adamopoulou and Tanzi, 2017). We also verify that the effect on children's eating habits operates through intergenerational transmission rather than peer influence among household members by examining the eating habits of the fathers.

4 Results

4.1 Effects on individual eating habits

We first run a linear probability model as described in (1) to estimate the effect of meat scarcity during childhood on the probability of daily eating meat later in life.[30] Table 2, panel A, column 1, reports the results of the benchmark specification. The coefficient of interest β_2, which is associated with the interaction term, is positive and statistically significant. Quantitatively, the exposure to a 10% decrease in the number of livestock during childhood increases the probability of eating meat daily during adulthood by 1.3 percentage points. This is a substantial effect, given that less than 14% of individuals in our sample eat meat every day. The inclusion of regional dummies controls for regional

[29] As explained in Section 2, the 2021 Multipurpose Survey on Households: Aspects of Daily Life only reports obesity and overweight categories rather than detailed weight and height (and thus BMI). Therefore, we analyze the effects on weight, height and BMI in the DD framework.

[30] The dependent variable measures the probability of eating meat of any quality and price.

differences and the well-known Italian North-South gradient.[31]

In the benchmark specification and throughout the analysis, we exclude those individuals who reported living far from their relatives as they are likely internal immigrants. The results remain fairly robust in terms of magnitude if we do include the latter in the analysis (Table 2, panel A, column 2), and though the estimates are less precise they continue to be statistically significant. This is not surprising as individuals who declared living far from relatives likely live in a region different than that of their birth. Their exclusion from the analysis allows to mitigate the presence of internal migrants in the sample, thus increasing the accuracy of our estimates.[32]

As described in the previous section, we proxy meat scarcity at the regional level using the decrease in the number of livestock (available from the census only for the central-southern regions) and the number of animals slaughtered for meat (for the northern regions). We obtain similar estimates when we employ the number of animals slaughtered for meat for all regions (Table 2, panel B).[33] The results are confirmed also if we consider as a dependent variable the frequency of eating meat (ordinal variable on a 1-to-5 point scale ranging from "never" to "several times per day") rather than the binary variable "Eat meat every day". As Table 3, columns 1 and 2 show, there is a positive and statistically significant effect on the frequency of eating meat both in the OLS and in the ordered probit. To understand whether the daily consumption of meat is associated with an unhealthy diet more generally, we then consider as a dependent variable the probability of having an unbalanced diet, defined as eating meat every day, green and vegetables less than every day, fruit less than several times per day, fish less than once per week, and occasionally sweets. Table 3, column 3 reports the results. The exposure to a 10% decrease in the number of livestock during childhood increases the probability of having an unhealthy diet during adulthood by 0.7 percentage points. This is again substantial, given that less than 7% of individuals in our sample have an unbalanced diet.

4.2 Robustness

In this section, we check the robustness of our estimates. We first perform the analysis adding occupation and education to the set of controls. Specifically, we add a dummy for having a university degree, its interaction with gender, a dummy for having a high school diploma, and a dummy for high occupational level (manager, middle manager,

[31]In Section 4.2, we show that the results are not driven by a time trend via a placebo exercise. We also present evidence that the evolution of meat consumption over time at the regional level is unrelated to the regional meat scarcity during WWII.

[32]We also estimate regressions separately for individuals living in areas with easy/difficult access to public transportation (proxy of whether the area of residence is urban/rural), but do not detect any statistically significant difference between the two groups (see Table A.1 in Appendix A).

[33]Throughout the analysis, we report the estimates obtained with both proxies of meat scarcity.

or entrepreneur).[34] Although these variables can be considered endogenous ("bad" controls), it is reassuring that the results are almost identical to the benchmark estimates (Table A.2 in Appendix A, columns 1 and 2). Moreover, in our benchmark specification, we cluster standard errors by region, given that meat scarcity varies at the regional level. This results in 18 clusters. To increase the number of clusters, we re-estimate the model using two-way clustered standard errors by age and region, following Cameron and Miller (2011). The results are practically unaffected (Table A.2, column 3). This implies that in our setting, having 18 clusters does not affect the validity of the statistical inference. Our estimates do not change if we estimate a probit instead of a linear probability model (Table A.2, column 4), nor if we define meat scarcity during WWII using 1940 instead of 1941-42 as base year (Table A.2, column 5).[35] This validates our choice to focus on the harshest period of WWII. A possible concern with the benchmark specification is that part of the treated cohort (born in 1934-1945) may have also been affected by WWI, and that part of the control cohort (born in 1946-1957) grew up during a time of gradual but not full recovery after WWII. To address this concern, we restrict the treatment window to 1942-1945 for the treated and 1950-1952 for the control cohort. The coefficient becomes slightly larger (Table A.2, column 6), implying that the benchmark estimates are a lower bound. In the last two columns, we explicitly control for the effects of the war at the regional level using decline in GDP per capita and number of casualties per 1,000 population in the period of 1943-1945, including geographical area dummies instead of regional dummies. The estimated effect on eating habits is robust to the inclusion of these controls, suggesting that our treatment at the regional level likely captures meat scarcity rather than the overall hardship of WWII.

In Table A.3 in Appendix A, we report additional robustness checks regarding the way we measure meat scarcity at the regional level. In the benchmark specification, we proxy the availability of meat in each region by simply summing the number of cattle, pigs, goats, and sheep and then computing the % change between 1941-1942 and 1945. Given that the distribution of species remained fairly constant over time (cattle in the North, goats and sheep in the South), this is unlikely to cause serious measurement error. Nonetheless, as a robustness check we weigh the sum by the relative size of each species (Table A.3, column 2)[36] or use quintals of slaughtered animals for meat (Table A.3, column 3). In both cases, the coefficients become more precise and slightly smaller in size but remain in line with the benchmark estimates.

In our analysis, the treated and control groups each consist of a 12-year cohort. In

[34]The occupational level is current (past) for those who are presently employed (retired). The dummy high occupational level is equal to 0 for those who never worked, e.g., housewives.

[35]The only available data for 1940 is that on the number of animals slaughtered.

[36]We use as weights the average size of each species: cattle=700 kg, goat/sheep=85 kg, pig=300 kg

the spirit of an event study, we also consider more disaggregated groups, each a 4-year cohort, to check whether the effects are concentrated among a particular cohort and to verify that there is no effect on the eating habits of individuals born after WWII. Figure 4 presents the results. While all the treated cohorts are affected, the impact is stronger among those aged 0-3 during the severest phase of WWII. As expected, there is no effect among any of the control cohorts (all coefficients are small in size and not statistically different from zero).

We then conduct two exercises with placebo treatments to exclude the possibility that the treatment in our benchmark specification (meat scarcity) captures the overall hardship of WWII. Specifically, we rerun (1) using the % drop in wheat production between 1941-42 and 1945 as placebo treatment. Wheat had been widely consumed in Italy and also became scarce during WWII (See Figure A.10 in Appendix A). Differently from meat, however, the decrease in wheat availability in the South was not due to excise by the German army. We observe, in fact, that the estimated effect of wheat scarcity on meat consumption is not statistically significant and has the opposite sign than meat scarcity in the benchmark specification (compare columns 1 and 2 in Table 4). Similarly, we obtain null effects when we use the local incidence of hunger based on self-reported retrospective information from SHARELIFE (Table 4, column 3).

Additionally, we perform an exercise with a placebo war to ensure that the results are not driven by differential time trends in eating habits over time. We assume that the outbreak of WWII was in 1958 and define the placebo cohort as those born between 1958-1969 while the control cohort remains the same as that in the benchmark specification (born in 1946-1957). Table 5 reports the results. The coefficient of interest in the placebo exercise is not statistically different from zero and is less than half the size of the benchmark estimate. This suggests that it is meat scarcity rather than a time trend that underlies the estimated overconsumption of meat. Figure A.14 in Appendix A presents further evidence at the regional level using data on the number of slaughtered animals in 2002. We observe that per capita meat consumption increased significantly between 1940 and 2002 in all regions, but that this rise is not correlated with the regional meat scarcity during WWII.

4.3 Heterogeneous effects

Previous studies on the long-term health effects of shocks during childhood highlight important gender differences (See Yeung et al., 2014 for the impact of recessions and Van den Berg et al., 2016 for the consequences of of hunger). Moreover, a recently growing literature emphasizes the role of early lifetime conditions and shows that shocks during the first three years of life can be particularly detrimental (e.g., Conti et al., 2016). We accordingly examine whether the effects of meat scarcity on eating habits are heterogeneous across genders and whether they vary by the age of exposure. Figure 5 reports separate estimates for males and females who experienced meat scarcity at ages 0-2 and 3-11. We find that meat scarcity during childhood increases the probability of eating meat every day for all groups, but the effect is particularly strong among females who were exposed to meat scarcity at ages 0-2.

To shed light on the underlying mechanism, we rely on historical information at the regional level and plot the change in the average weight of 2-year-old girls and boys before and after the harshest years of the war (1942-1944). Figure 6 shows that in six out of the nine regions with available information, the average weight of 2-year-old girls was more affected than that of boys. Figure A.15 in Appendix A further distinguishes by paternal occupation (blue-/white-collar) among 2-year-olds living in rural and urban areas. Girls fared worse than boys especially if their father was a manual worker (blue-collar). Among the children of blue-collar workers in rural areas, the average weight loss in the 1942-1944 period was 4.0% for girls and just 1.4% for boys (Figure A.15, panel a). This gender gap is clearly observable in seven out of the nine studied regions. Similarly, among the children of blue-collar workers in urban areas, the average weight of 2-year-old girls in 1944 was 2.0% lower compared to 1942, while the average weight of 2-year-old boys in the same period actually increased by 4.3% (Figure A.15, panel b). In contrast, there is either no gender gap among the children of white-collar workers (rural areas-Figure A.15, panel c) or boys fared worse than girls (urban areas-Figure A.15, panel d). Although the evidence is only suggestive, it points towards a preferential treatment of sons over daughters in blue-collar families.[37] According to ISTAT (1945), agricultural workers in rural areas needed a very high number of calories (around 4,000 per day in normal times) while average consumption in 1944 was below 2,800 calories. In urban areas, where more than 90% of total consumption expenditures went to food on the black market, the average weekly consumption expenditures of blue-collar families in 1944 was 482 lire vs 576 lire for white-collar families. Therefore, blue-collar parents in both rural and urban areas may have prioritized sons over daughters in the allocation of the scarce quantity of meat, in line with the literature on preferential breastfeeding in developing countries (Jayachandran and Kuziemko, 2011). Given that more severe relative scarcity leads to higher consumption in the future, this may explain why the estimated effects are then stronger for females.

Presumably, as soon as WWII ended, parents provided their daughters with large quantities of meat as a form of compensatory investment (see Yi et al., 2015) or as a

[37]The large penalty observed among girls in rural or blue-collar families may be either due to stronger son preference or due to larger family size (see, for example, Barcellos et al., 2014).

reward (see Bauer et al., 2021). In this way, these female children aged 0-2 during WWII subsequently developed an increased desire for meat. Another possible explanation is in utero effects. Vitt et al. (2022), for example, show that children have less healthy food preferences if their mothers were exposed to stress during pregnancy. To examine this possibility, we look separately at the effects on 0-1 year olds (born in 1944-1945), who are likely to have experienced meat scarcity in utero. Indeed, as Figure A.16 in Appendix A shows, there is a large and statistically significant effect among females.

4.4 Effects on food expenditures

We use data at the household level from the 2004 wave of the SHIW to study the effects on food expenditures. The SHIW offers two advantages. First, it contains information both on the province of birth and the province of residence of the household members, making it possible to perfectly identify internal immigrants and assign to them the meat scarcity of the province where they were born and likely lived as children. Second, knowing the province of birth allows us to exploit more granular information on meat scarcity at the provincial rather than regional level.

Our analysis of the effect of meat scarcity on food consumption expenditures lends further support to an underlying behavioral mechanism. Specifically, we estimate Engel curves in the spirit of Kesternich et al. (2015). Table 6 presents some descriptive statistics for the treated and control cohorts in regions that did not witness severe meat scarcity (columns 1 and 2) and in regions that did (columns 4 and 5). The average share of food over total expenditures is around 30% and is higher among the treated than among the control cohorts. We adopt a similar diff-in-diff framework as in (1) and compare households with a female head or spouse in the treated and control cohort, who were exposed to different degrees of meat scarcity at the local level (continuous treatment).[38] The dependent variable is the share of food over total consumption expenditures. We include regional or provincial dummies and control for the total household income (equivalized) as well as the age and the educational level of the female head or spouse. Table 7, column 1 shows that exposure to meat scarcity leads to an increase in the share of food expenditure over total expenditures. We obtain fairly similar estimates if we use region of residence instead and exclude internal immigrants (Table 7, column 2) or if we use more granular information about their province of birth (Table 7, column 3). This validates the strategy we follow in our exploration of eating habits, where we are not able to observe individuals' region or province of birth.

[38] We restrict the treated group to females, traditionally those who prepare the meals and thus determine food expenditures. Moreover, we focus on treated females aged 0-2 during WWII, whose eating habits were most affected–see Section 4.3.

All in all, we find that individuals who experienced a scarcity of a food during childhood tend to increase the share of food expenditures at the household level later in life. Given that meat tends to be more expensive on average than vegetables, pasta, or other common food items, a rise in food expenditures may signal an increased consumption of meat. That said, higher food expenditures could also reflect greater quality (e.g., organic food) or increased consumption of fish, which also tends to cost more. Broadly, this result complements our main analysis, which is tied to meat quantities and allows us to observe individual eating habits rather than an aggregate measure of all household members' consumption.

4.5 Effects on individual health outcomes

Meat overconsumption may have direct consequences for individuals' BMI and health conditions. We examine this possibility by first estimating the effect of meat scarcity on BMI. Figure 7 reports the results by gender, where we observe that meat scarcity during childhood leads to an increase in the BMI of females. By contrast, we do not detect any statistically significant effect on males (coefficients are always close to zero). We then decompose the effect on BMI into weight and height and find that the increase in females' BMI is due to a rise in weight whereas the effect on height is null. Higher BMIs can be harmful, as they can indicate being obese (BMI≥30) and/or having poor health. We thus explore whether meat scarcity influences the incidence of various health issues that are often related to meat consumption (obesity, poor self-perceived health, tumor). Given that the control group is younger than the treated group, we need to ensure that any estimated effect on health is not driven by the age difference (beyond simply controlling for age and its square). To this end, we use the 2021 wave of ISTAT's Multipurpose Survey on Households: Aspects of Daily Life to run a triple-differences estimation (DDD). An additional advantage of the DDD estimator is that it does not require parallel pre-trends, which are practically impossible to test in our DD setting. Specifically, we estimate the following equation:

$$\begin{aligned}(Outcome)_{irt} = \; & \beta_1(cohort)_i + \beta_2(wave)_t \\ & +\beta_3(cohort \times scarcity)_{i,r} + \beta_4(cohort \times wave)_{i,t} \\ & +\beta_5(scarcity \times wave)_{r,t} \\ & +\beta_6(cohort \times scarcity \times wave)_{i,r,t} \\ & +\beta_7 X_i + y_r + u_{i,r}, \end{aligned} \tag{2}$$

where *cohort*=1 if the individual at the time of the 2003 or 2021 interview is 60-64 years old and =0 if the individual is 45-54 years old; *scarcity*=1 for regions above the 75^{th} percentile of both proxies of meat scarcity and =0 if below; *wave*=1 for the 2003 wave and =0 for the 2021 wave of the survey.[39] The coefficient of interest is that of the triple interaction, β_6. This model allows for differential trends (i) between people of the same age that live in regions that saw severe meat scarcity or not $(cohort \times scarcity)_{i,r}$, (ii) people of the same age who were young children during WWII or who were born afterwards $(cohort \times wave)_{i,t}$, and (iii) people that live in the same region and did or did not experience WWII $(scarcity \times wave)_{r,t}$. In this way, the age difference between the treated and the control group is accounted for via the triple difference.

Table 8 presents the results for females. In column 1 we confirm the increase in the probability of eating meat daily. The coefficient of the triple interaction term is positive and statistically significant, reassuring us that our benchmark DD estimates are not due to an age effect. Additionally, we find that meat scarcity leads to an increase in the probability of being obese (Table 8, column 2), in the probability of having poor self-perceived health (Table 8 column 3) and in the probability of developing cancer (Table 8, column 4). Our results align with findings in the medical literature linking red and processed meat consumption with an elevated risk of obesity (Wang and Beydoun, 2009) and various types of cancer (Cross et al., 2007). Again, we do not find any statistically significant effect of meat scarcity during childhood on the health conditions of males (Table A.4 in Appendix A).

4.6 Intergenerational transmission of eating habits

In addition to the above analyses, we take advantage of survey data on the eating habits of all household members to explore whether the effects on such habits persist intergenerationally. In practice, we identify households with mothers that belong to the control and treated cohorts and study the effects on the other household members. We focus on mothers, as they traditionally prepare meals and are therefore more likely to transmit eating habits to their children. Moreover, in our sample, more than 45% of women declare "housewife" to be their main occupation.

In particular, we analyze the effects on coresident sons/daughters aged 18-26 years old. These are adult children whose eating habits are well-formed and who are able to

[39] In the DDD, we are restricted to use only specific age groups and health outcomes due to the way some variables are reported in the 2021 ISTAT's Multipurpose Survey on Households: Aspects of Daily Life (5-year age groups instead of the detailed year of birth, and obesity or overweight categories instead of the detailed weight and height). Therefore, we analyze the effects on weight, height and BMI in the DD framework and the effect on obesity in the DDD. Moreover, the age range we consider in the DDD (60-64 years old versus 45-54 years old) does not encompass the entire age range considered in the DD (58-69 years old versus 46-57 years old).

choose where and what to eat. Selection issues are not a concern since more than 88% of 18-26 year old respondents in our data live with a parent, in line with official statistics.[40] Coresidence with parents during early adulthood is a widespread phenomenon in Italy with very small differences in the share of coresidence by gender, age, own or paternal educational level, geographical macro area, or number of siblings (See Figure B.1 in Appendix B). We employ the same DD framework and compare the eating habits of adult children, whose mothers were exposed to meat scarcity at ages 0-2 during WWII (treated) with those of adult children whose mothers belong to the control cohort, who live in regions that witnessed different degrees of meat scarcity.[41] We find a statistically significant increase in the probability of eating meat every day (Table 9, column 2),[42] though the indirect effect on children is smaller in size than the direct effect on mothers (Table 9, columns 1 and 2).[43] Our results suggest that a temporary fall in the availability of a consumption good during childhood can affect not only the eating habits of the affected individual later in life but also those of the next generation. We confirm that this occurs through a process of intergenerational transmission rather than a mere peer effect by examining the effects on husbands. Indeed, we do not find statistically significant spillover effects from their wives (Table 9, column 3). The eating habits of these men were arguably already formed and thus less susceptible to influence.

4.7 Mechanisms at work

The empirical analysis provides supportive evidence of a behavioral mechanism, i.e., individuals who experienced meat scarcity during childhood (aged 0-11 during WWII) acquired an increased desire for and greater habit of eating meat. First, we document that the increase in females' BMI is due to an increase in weight rather than a decrease in height (see Section 4.5). Second, we observe an increase in the share of food expenditures (see Section 4.4). If the mechanism was biological, we would expect to find a decrease in height and no effect on food expenditures. That said, our results do not contradict previous studies that do find a biological mechanism at work. Van den Berg et al. (2016) show that exposure to hunger in the early years or at the onset of life leads to a significant drop in height. To examine this possibility, we focus on exposure while in utero or at an early age and estimate the effects of meat scarcity on height distinguishing between males and females. We find, in fact, a negative effect on height among males exposed to

[40]See Eurostat, EU SILC survey.

[41]We are able to observe coresident children aged 18-26 years old for half of the females in our sample.

[42]Additional results (available upon request) indicate that the intergenerational effects are equally strong for sons and daughters.

[43]In line with the results in Figure 5, the direct effect on mothers is higher than in the benchmark as we restrict the sample to relatively young mothers (aged 0-2 during WWII), who are more likely to have coresident adult children.

meat scarcity while in utero (aged 0 during WWII) and among females aged 1-2 during WWII (Figure 8). This corroborates the argument of preferential treatment by gender at age 2 (see Section 4.3).

An alternative explanation is that the effects on eating habits are driven by lower cognitive ability. To explore this possibility, we use as outcome variables the probability of having a high school diploma or more and the probability of having a low skill occupation (current/past for those who are presently employed/retired) and run (1) separately for females and males. As Figure 9 shows, there is no effect on educational attainment but there is a higher chance of having a lower skill occupation among males. Therefore, it is unlikely that lower cognitive ability is the driving mechanism for females.

Another possibility is that meat consumption is a form of aspirational consumption. Specifically, as this food was scarce during WWII and only the very rich could acquire it at high (black market) prices, it may have become an aspirational good. Accordingly, those who experienced meat scarcity during WWII might still consider it as such, even if nowadays meat is available at much more affordable prices. One feature of aspirational consumption is that it is more common at the "bottom of the pyramid" (Srivastava et al., 2020). With this in mind, and to test whether aspirational consumption underlies our results, we consider various proxies of socioeconomic status (occupation, economic resources of the family, quality of the area of residence) and rerun (1) for different groups of individuals (high- or middle-skill vs low-skill occupation, sufficient vs insufficient economic resources, good vs bad neighborhood).[44] As Figure 10 shows, the estimated effect of meat scarcity on the probability of daily eating meat does not differ by socioeconomic status, implying that aspirational consumption does not drive our results.

5 Conclusions

Past experiences matter for various economic decisions, ranging from individuals' risk taking to political preferences. In this paper, we show that past experiences also shape eating habits, food consumption, and health. We find, in particular, that adult preferences towards a specific good are influenced by their individual experiences early in life relative to this good.

Specifically, historical archives and recent survey data allow us to study the effects of an exogenous local shock to meat availability on later outcomes using a difference-in-differences framework. We document that individuals, especially females, who were more

[44] More specifically, high- or middle-skill occupation refers to manager, middle manager, entrepreneur, or white collar worker; insufficient economic resources refers to individuals who perceive their family's economic resources as scarce or absolutely insufficient; and good neighborhood refers to areas of residence where criminality risk, air pollution, and unpleasant odors are low or nonexistent.

exposed to meat scarcity during childhood tend to overconsume meat and have a higher probability of being obese, having poor health and developing cancer later in life. This result sheds light on a behavioral channel whereby early-life shocks to food availability translate into later-life eating habits.

In contrast to much of the literature on early life experiences where the focus is largely on biological mechanisms (fetal programming, sensitive and critical periods), we highlight a behavioral channel that operates through overconsumption and/or overcompensation, with potentially adverse consequences. Yet, we also find evidence that a biological channel may also be at work, suggesting that further studies on this topic should take both mechanisms into account.

To conclude, temporary shocks in early life arguably have persistent effects on the preferences and attitudes of multiple generations. Transmission of these attitudes may, in turn, act as an additional channel through which economic outcomes such as consumption and savings significantly correlate across generations. Future research might apply models of habit formation more widely when studying parental investments or directly measure compensating behaviors among parents so as to better understand responses to adverse shocks.

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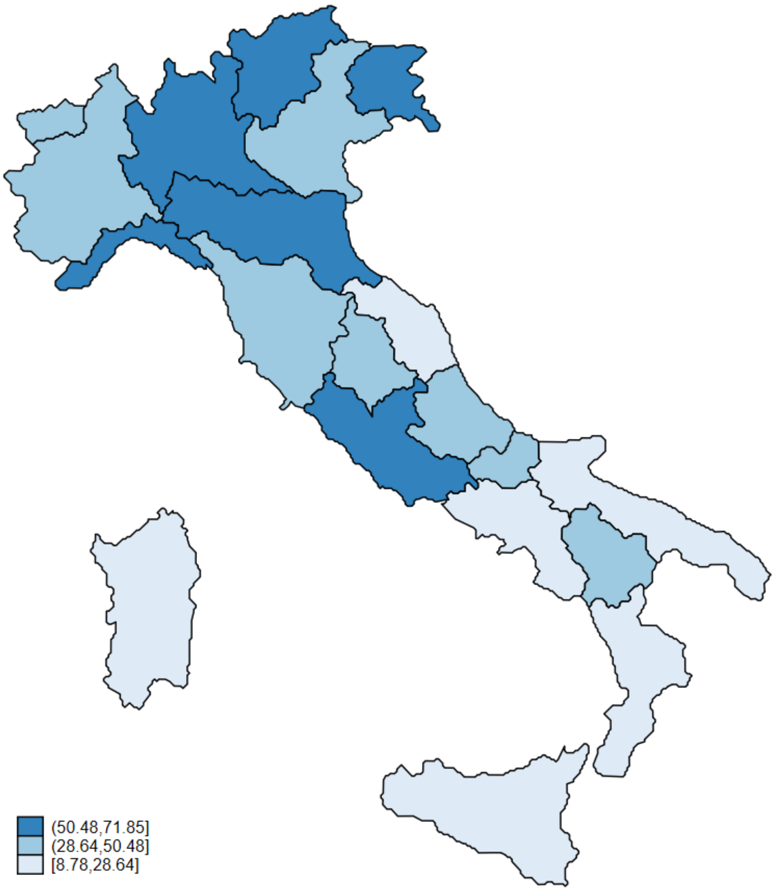
Figures and Tables

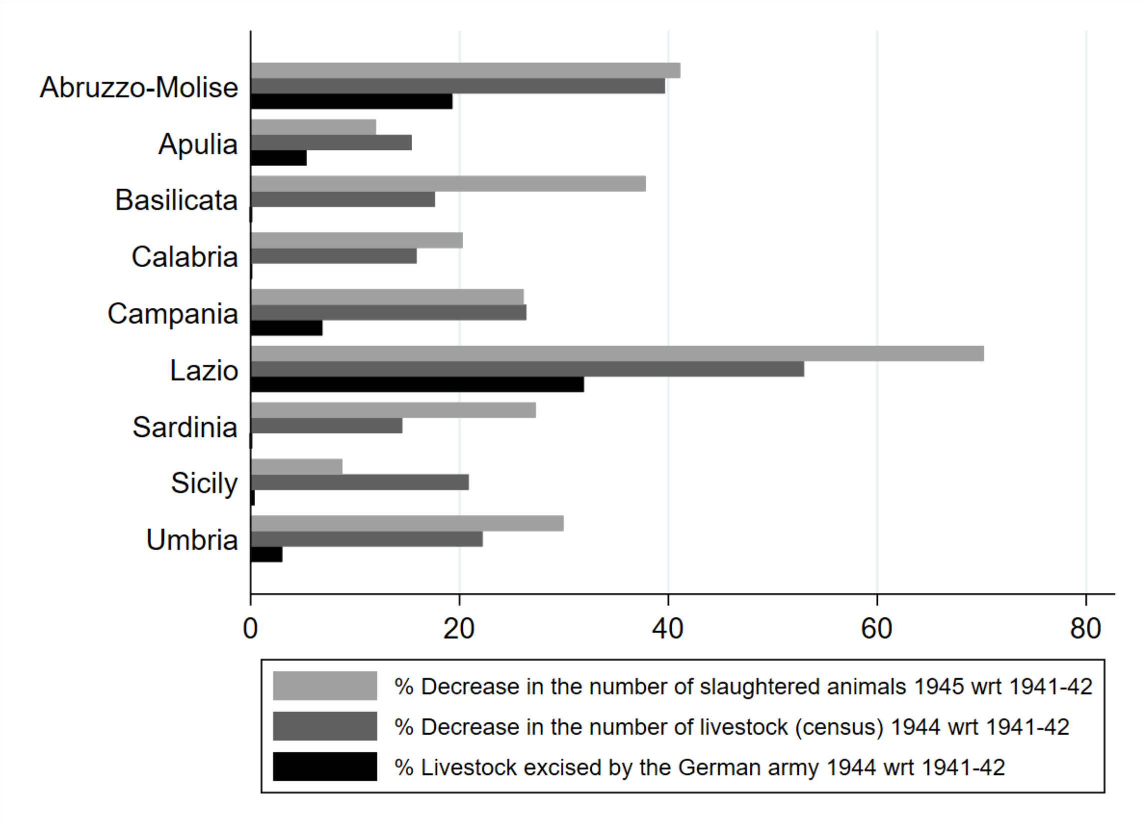
Figure 1: % Drop in the number of animals slaughtered for meat



Notes: Percentage difference (in absolute value) in the number of animals slaughtered for meat between 1945 and 1941-1942 as a proxy of meat scarcity at the regional level. The drop ranges between 9 and 72%.

Sources: Annual Agricultural Statistics 1941, 1942 (Istat, 1948) and 1945 (Istat, 1950a).

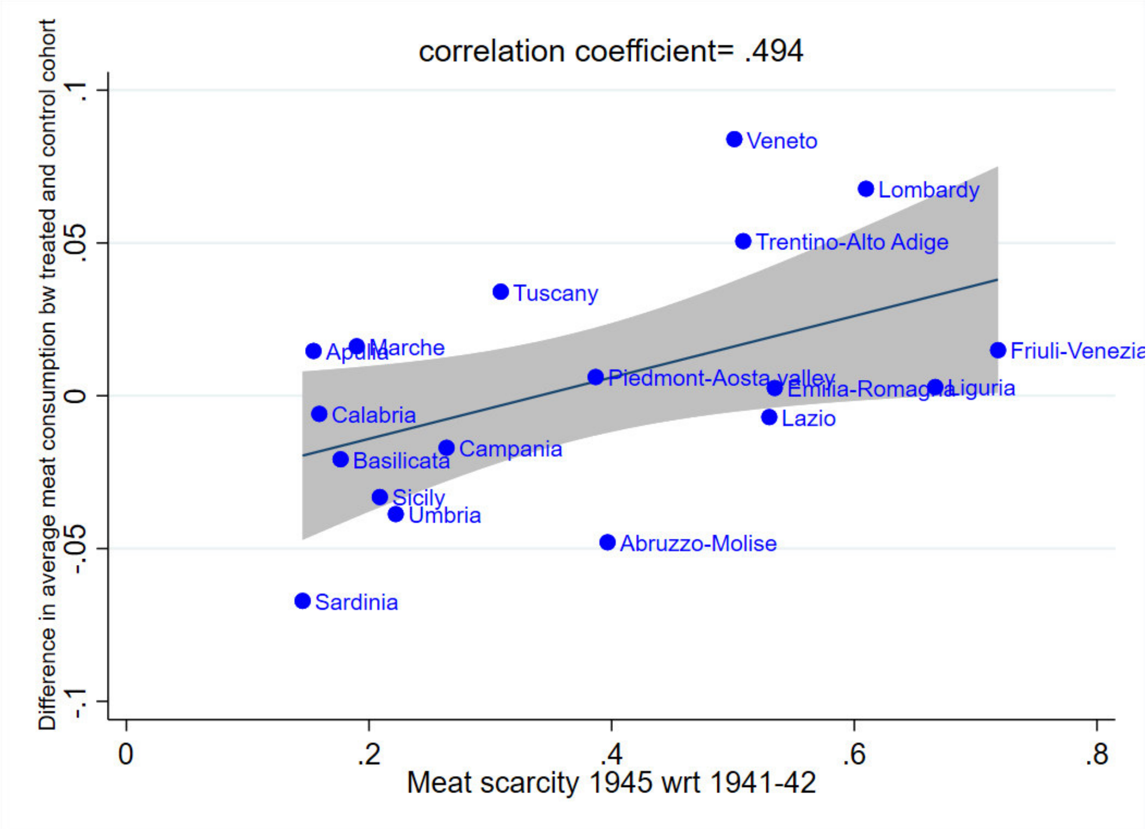
Figure 2: Proxies of meat scarcity and % livestock excised by the German army



Notes: The figure shows two different proxies of meat scarcity in the Central-Southern regions (% decrease in the number of slaughtered animals and % decrease in the number of livestock, both in absolute value) and the % of livestock excised by the German army. The latter explains part of the drop in the number of livestock in the regions where the German troops moved to after July 25, 1943.

Sources: Number of slaughtered animals from the Annual Agricultural Statistics 1941, 1942 (Istat, 1948) and 1945 (Istat, 1950a) and number of livestock and excised livestock from the Census of Agriculture 1941, 1942 (Istat, 1948) and 1944 (Istat, 1945).

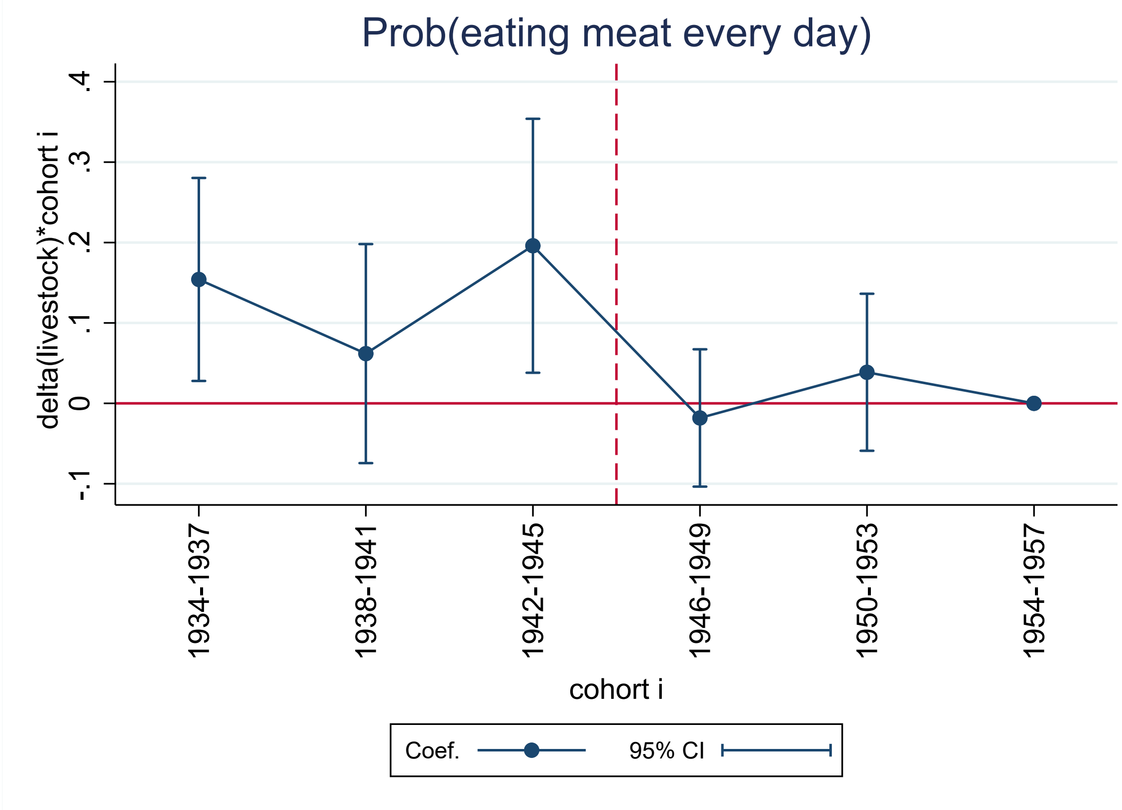
Figure 3: Meat scarcity and difference in meat consumption between treated and control cohorts



Notes: The figure shows that the difference in meat consumption between the treated (born in 1934-1945) and the control (born in 1946-1957) cohort is higher in regions that witnessed more severe meat scarcity during WWII.

Sources: Annual Agricultural Statistics 1941, 1942 (Istat, 1948) and 1945 (Istat, 1950a), Census of Agriculture 1941, 1942 (Istat, 1948) and 1944 (Istat, 1945) and own calculations on the 2003 Multipurpose Survey on Households: Aspects of Daily Life.

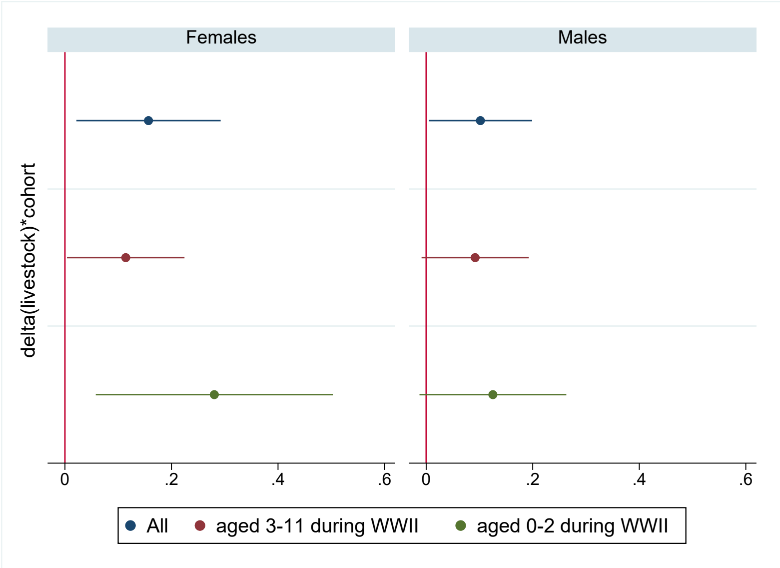
Figure 4: Effects of meat scarcity on meat eating habits-event study



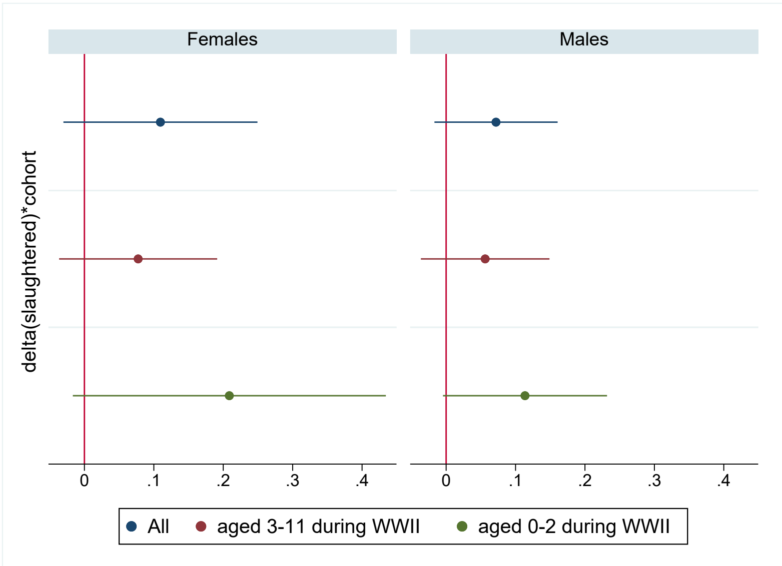
Notes: Estimated coefficients of the interaction terms in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. The dependent variable is a dummy=1 if the individual eats meat every day and 0 otherwise. Treated cohorts are born in 1934-1937, 1938-1941, and 1942-1945 (aged 8-11, 4-7, and 0-3 during the severe phase of WWII). Control cohorts are born in 1946-1949 and 1950-1953 (aged 8-11, 4-7 after the end of WWII). Omitted cohort (comparison category) is born in 1954-1957 (aged 0-3 after WWII). $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region.

Figure 5: Effects of meat scarcity on meat eating habits-by gender and age of exposure

(a)

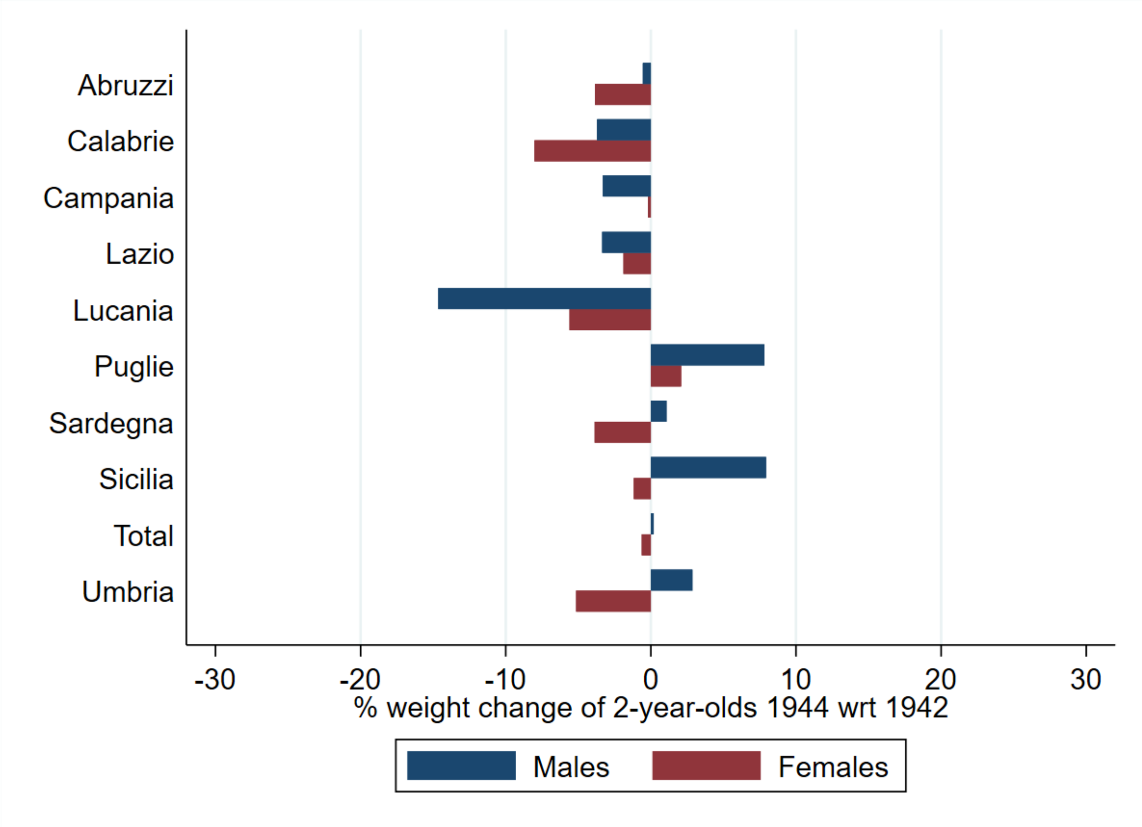


(b)



Notes: Estimated coefficients of the interaction term in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. The dependent variable is a dummy=1 if the individual eats meat every day and 0 otherwise. See equation 1 and notes of Table 2 for a detailed description of the specification. Treated: all (born in 1934-1945); aged 3-11 during WWII (born in 1934-1943); aged 0-2 during WWII (born in 1943-1945). Control: born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region; $\Delta(Slaughtered)$ is the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each region.

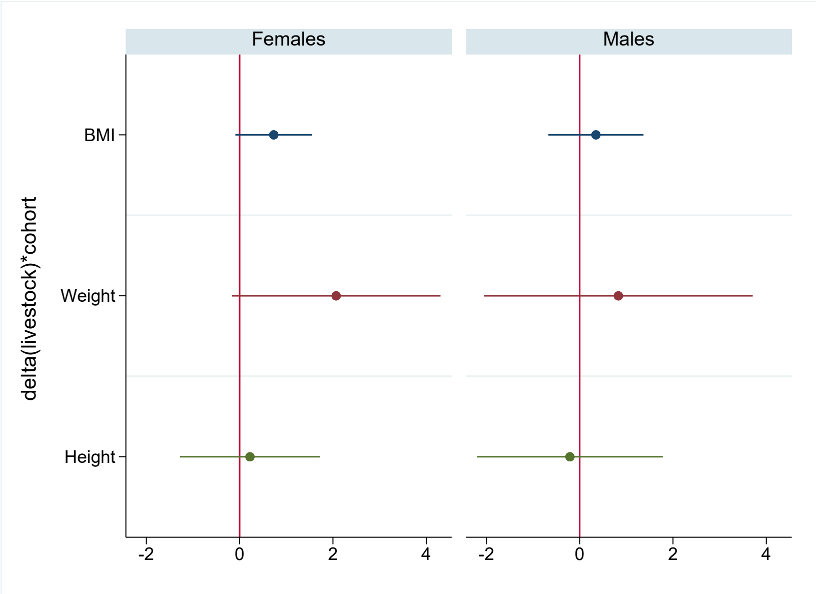
Figure 6: % Change in average weight of 2-year-olds by gender, 1942-1944



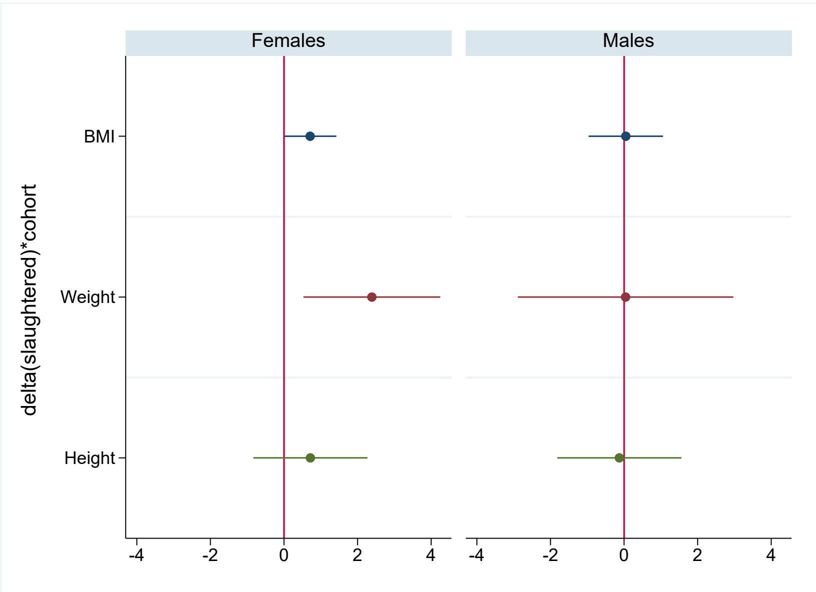
Notes: The figure shows the percentage change in average weight of 2-year-olds by gender between 1942 and 1944 in a set of regions with available data (liberated territory). In most regions, females were more severely affected than males.

Sources: Census and Surveys for the National Reconstruction 1944, Survey on Living Conditions-Public Health, Istat (1945).

Figure 7: Effects of scarcity on BMI, weight and height-by gender



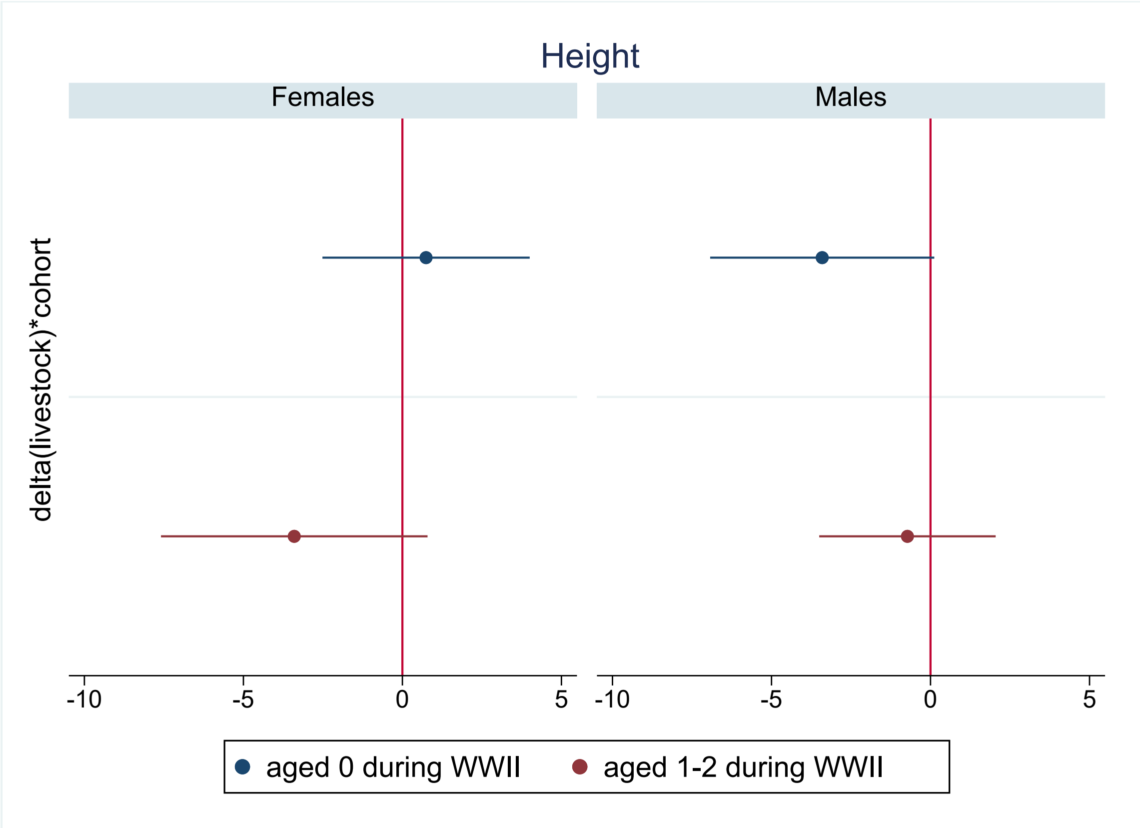
(a) Δ(Livestock) as proxy of meat scarcity



(b) Δ(Slaughtered) as proxy of meat scarcity

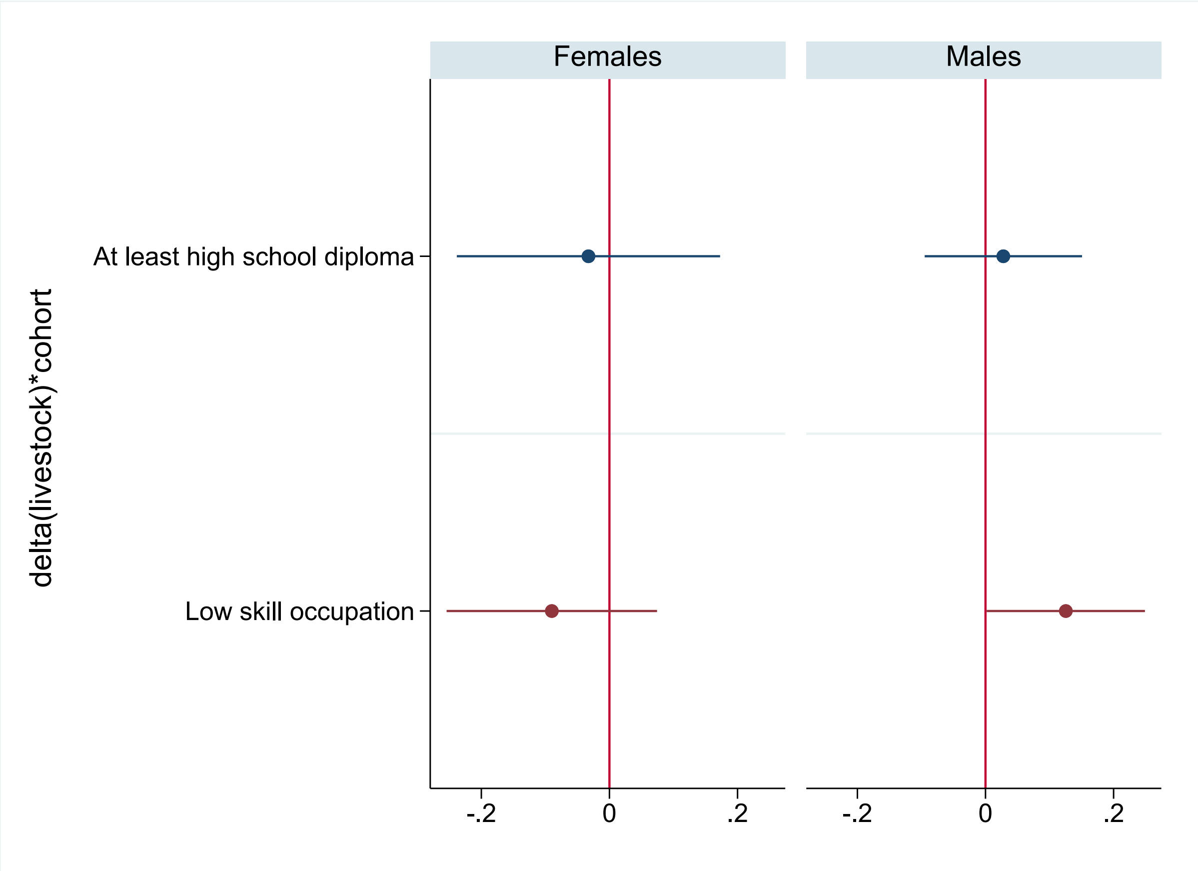
Notes: Estimated coefficients of the interaction term in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. The dependent variable is $BMI =$ (weight in kg)/(height in m)^2 in the first regression, weight in kg in the second and height in cm in the third. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region; $\Delta(Slaughtered)$ is the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each region.

Figure 8: Effects of meat scarcity on height, by gender and age of exposure



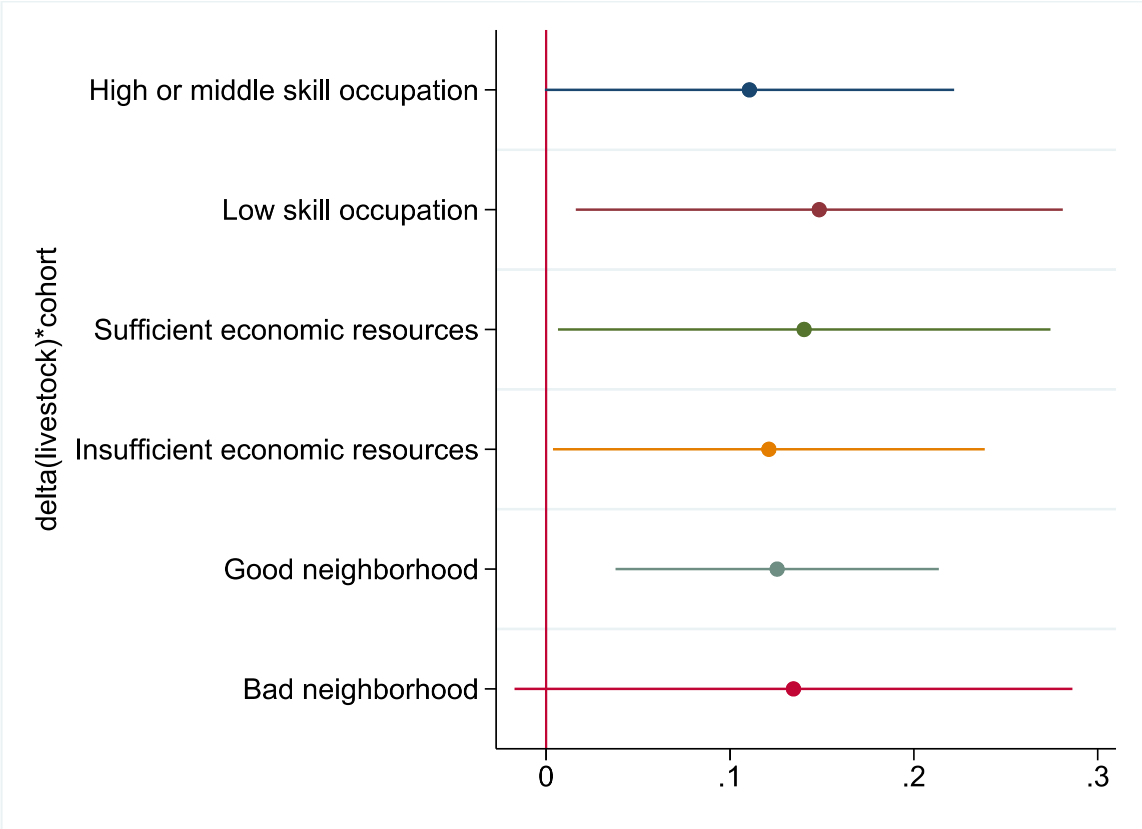
Notes: Estimated coefficients of the interaction term in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. The dependent variable is height in cm. Treated: all (born in 1934-1945); aged 0 during WWII (born in 1945); aged 1-2 during WWII (born in 1943-1944). Control: born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region.

Figure 9: Effects of meat scarcity on educational attainment, employment and occupation-by gender



Notes: Estimated coefficients of the interaction term in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. The dependent variable in the first regression is having at least high school diploma and takes the value 1 if the respondent has a high school diploma, a university degree or more. The dependent variable in the second regression is low skill occupation and takes the value 1 if the respondent's occupation (current/past for those who are presently employed/retired) is blue collar.

Figure 10: Effects of meat scarcity on eating habits, by socioeconomic status



Notes: Estimated coefficients of the interaction term in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. The dependent variable is a dummy=1 if the individual eats meat every day and 0 otherwise. See equation 1 and notes of Table 2 for a detailed description of the specification. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. High or middle skill occupation if manager, middle manager, entrepreneur or white collar (occupation is current/past for those who are presently employed/retired); Insufficient economic resources if the respondent declares that the family's resources are scarce or absolutely not enough; Good neighborhood if the perceived criminality risk, air pollution, and unpleasant odors are low or in-existent in the area of residence.

Table 1: Descriptive statistics-Multipurpose Survey on Households

	Cohort=0 & Scarcity=0	Cohort=1 & Scarcity=0	Diff.	Cohort=0 & Scarcity=1	Cohort=1 & Scarcity=1	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)
Eat meat every day	0.116	0.115	0.005	0.132	0.163	-0.020*
	(0.320)	(0.319)	(0.595)	(0.339)	(0.370)	(-2.430)
Frequency of eating meat (scale 1-5)	3.038	3.037	0.011	3.034	3.086	-0.044***
	(0.506)	(0.509)	(0.829)	(0.552)	(0.567)	(-3.409)
Unbalanced diet	0.070	0.057	0.018**	0.071	0.073	0.001
	(0.256)	(0.231)	(2.751)	(0.257)	(0.261)	(0.172)
Male	0.496	0.477	0.013	0.486	0.501	-0.014
	(0.500)	(0.500)	(0.974)	(0.500)	(0.500)	(-1.243)
Age	51.417	63.417	-11.903***	51.608	63.337	-11.744***
	(3.476)	(3.410)	(-129.388)	(3.532)	(3.369)	(-147.381)
Weight	71.784	71.723	-0.030	71.570	72.464	-0.677*
	(12.207)	(11.873)	(-0.094)	(13.628)	(12.529)	(-2.248)
Height	166.524	164.942	1.485***	167.760	166.635	1.245***
	(8.082)	(7.671)	(7.069)	(8.642)	(8.117)	(6.444)
BMI	25.814	26.319	-0.509***	25.315	26.033	-0.664***
	(3.550)	(3.735)	(-5.252)	(3.795)	(3.752)	(-7.544)
Obese	0.126	0.153	-0.025**	0.110	0.141	-0.026***
	(0.332)	(0.360)	(-2.730)	(0.313)	(0.348)	(-3.374)
Poor health	0.057	0.121	-0.062***	0.069	0.127	-0.060***
	(0.232)	(0.326)	(-7.961)	(0.254)	(0.333)	(-8.838)
Tumor	7.014	7.025	-0.008*	7.020	7.032	-0.011**
	(0.117)	(0.157)	(-2.100)	(0.142)	(0.176)	(-3.051)
Observations	3256	2460	5716	4119	3399	7518

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard deviation in parentheses (columns 1, 2, 4, 5); t-statistics (columns 3 and 6). Survey weights used. *Cohort*=1 if born in 1934-1945 and 0 if born in 1946-1957; *Scarcity*=1 for regions in the 75th percentile of the decrease in the number of breed and slaughtered animals between 1941-42 and 1945 and 0 otherwise. Unbalanced diet=1 if the respondent eats meat every day, green and vegetables less than every day, fruit less than several times per day, fish less than once per week, and occasionally sweets. BMI = (weight in kg)/(height in m)^2. Obese if $BMI \geq 30$. Poor health if self-perceived health status ≤ 2 (1-5 scale). See Table B.1 in Appendix B for the definition of all variables.

Table 2: Effects of meat scarcity on meat eating habits-benchmark

Panel A	Dep. Var.: Prob(Eat meat every day)	
	Benchmark (excluding migrants)	All
	(1)	(2)
$Cohort \times \Delta(Livestock)$	0.130**	0.104**
	(0.049)	(0.049)
Cohort	-0.037**	-0.031*
	(0.015)	(0.016)
Observations	13,234	16,189
Individual controls	Yes	Yes
Region FE	Yes	Yes
R squared	0.0188	0.0174
Mean Dep. Var.	0.131	0.129

Panel B	Dep. Var.: Prob(Eat meat every day)	
	Benchmark (excluding migrants)	All
	(1)	(2)
$Cohort \times \Delta(Slaughtered)$	0.092*	0.070
	(0.050)	(0.046)
Cohort	-0.022	-0.018
	(0.014)	(0.014)
Observations	13,234	16,189
Individual controls	Yes	Yes
Region FE	Yes	Yes
R squared	0.0184	0.0171
Mean Dep. Var.	0.131	0.129

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. *Cohort*=1 if born in 1934-1945 and 0 if born in 1946-1957; $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region; $\Delta(Slaughtered)$ is the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each region. Both measures are in absolute value and denote scarcity. Individual controls: age, age squared, gender. "Migrants" are those who declare living far away from their relatives.

Table 3: Effects of meat scarcity on frequency of eating meat and on unbalanced diet

	Frequency of eating meat		Prob(Unbalanced diet)
	OLS	Ordered logit	LPM
	(1)	(2)	(3)
$Cohort \times \Delta(Livestock)$	0.200**	0.975***	0.068**
	(0.082)	(0.335)	(0.029)
$Cohort$	-0.065*	-0.325***	-0.023
	(0.031)	(0.125)	(0.014)
Observations	13,234	13,234	13,064
Individual controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
R squared	0.0183		0.0112
Mean Dep. Var.	3.043	3.043	0.0693

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. $Cohort$=1 if born in 1934-1945 and 0 if born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. This measure is in absolute value thus denoting scarcity. Individual characteristics: age, age squared, gender. In col. 1 and 2 the dependent variable is the frequency of eating meat (1-to-5 point scale–see Figure A.2, panel a). In col. 3 the dependent variable takes the value 1 if the respondent eats meat every day, green and vegetables less than every day, fruit less than several times per day, fish less than once per week, and occasionally sweets.

Table 4: Effects of meat scarcity on eating habits-placebo treatment

	Dep. Var.: Prob(Eat meat every day)		
	Benchmark	Placebo	Placebo
	(1)	(2)	(3)
Cohort×Treatment	0.130**	-0.048	-0.104
	(0.049)	(0.071)	(0.223)
Cohort	-0.037**	0.037	0.030
	(0.015)	(0.029)	(0.024)
Observations	13,234	13,234	13,234
Individual controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Treatment	$\Delta(Livestock)$	$\Delta(Wheat)$	*Hunger*
R squared	0.0188	0.0178	0.0178
Mean Dep. Var.	0.131	0.131	0.131

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. *Cohort*=1 if born in 1934-1945 and 0 if born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. $\Delta(Wheat)$ is the % change in wheat production between 1941-42 and 1945 in each region. Both measures are in absolute value and denote scarcity. *Hunger* is self reported experience of hunger during WWI aggregated at the regional level. Individual characteristics: age, age squared, gender. Col. (1) presents the benchmark estimates, col. (2) the placebo estimates using the % change in wheat production instead of the % change in the number of livestock, and col. (3) the placebo estimates using the prevalence of hunger instead of the % change in the number of livestock.

Table 5: Effects of meat scarcity on eating habits-placebo war

	Dep. Var.: Prob(Eat meat every day)	
	Benchmark	Placebo
	(1)	(2)
$Cohort \times \Delta(Livestock)$	0.130**	0.042
	(0.049)	(0.051)
$Cohort$	-0.037**	-0.007
	(0.015)	(0.024)
Observations	13,234	15,351
Individual controls	Yes	Yes
Region FE	Yes	Yes
Treated	born in 1934-1945	born in 1958-1969
Control	born in 1946-1957	born in 1946-1957
R squared	0.0188	0.0141
Mean Dep. Var.	0.131	0.127

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. In col. (1) $Cohort$=1 if born in 1934-1945 and 0 if born in 1946-1957; In col. (2) $Cohort$=1 if born in 1958-1969 and 0 if born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. This measure is in absolute value thus denoting scarcity. Individual characteristics: age, age squared, gender. Col. (1) presents the benchmark estimates and col. (2) the placebo estimates assuming that the outbreak of WWII was in 1958.

Table 6: Descriptive statistics-SHIW

	Cohort=0 & Scarcity=0 (1)	Cohort=1 & Scarcity=0 (2)	Diff. (3)	Cohort=0 & Scarcity=1 (4)	Cohort=1 & Scarcity=1 (5)	Diff. (6)
Share of food/total expenditures	0.319	0.331	-0.011	0.278	0.303	-0.017
	(0.118)	(0.123)	(-1.297)	(0.113)	(0.115)	(-1.620)
Age	52.494	60.052	-7.431***	52.339	59.959	-7.416***
	(3.407)	(0.843)	(-62.869)	(3.416)	(0.822)	(-53.079)
Household income	15126.571	14344.255	795.966	21460.624	21407.863	-249.364
	(10622.425)	(8021.369)	(1.206)	(13560.989)	(12804.285)	(-0.181)
Observations	1076	224	1300	755	161	916

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard deviation in parentheses (columns 1, 2, 4, 5); t-statistics (columns 3 and 6). Survey weights used. *Cohort*=1 if born in 1934-1945 and 0 if born in 1946-1957; *Scarcity*=1 for regions in the 75th percentile of the decrease in the number of breed and slaughtered animals between 1941-42 and 1945 and 0 otherwise. See Table B.2 in Appendix B for the definition of all variables.

Table 7: Effects of meat scarcity on food expenditures over total consumption

Panel A	Dep. Var.: Share of food expenditures		
	Region of birth	Region of residence excluding migrants	Province of birth
	(1)	(2)	(3)
$Cohort \times \Delta(Livestock)$	0.063*	0.074*	0.066*
	(0.036)	(0.036)	(0.037)
Cohort	-0.005	-0.009	-0.009
	(0.016)	(0.017)	(0.015)
Observations	2,216	1,826	2,210
Individual controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
FE	Regional	Regional	Provincial
R squared	0.201	0.221	0.308
Mean Dep. Var.	0.304	0.304	0.304

Panel B	Dep. Var.: Share of food expenditures		
	Region of birth	Region of residence excluding migrants	Province of birth
	(1)	(2)	(3)
$Cohort \times \Delta(Slaughtered)$	0.052*	0.063**	0.047*
	(0.028)	(0.027)	(0.025)
Cohort	-0.001	-0.006	-0.001
	(0.013)	(0.013)	(0.012)
Observations	2,216	1,826	2,210
Individual controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
FE	Regional	Regional	Provincial
R squared	0.200	0.221	0.308
Mean Dep. Var.	0.304	0.304	0.304

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional/provincial level, survey weights used. *Cohort*=1 if a female household member was born in 1943-1945 and 0 if born in 1946-1957; $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region (col. 1 and 2) or province (col. 3) and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region (col. 1 and 2) or province (col. 3); $\Delta(Slaughtered)$ is the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each region (col. 1 and 2) or province (col. 3). Both measures are in absolute value and denote scarcity. Col. (1) uses the respondents' region of birth to assign the treatment, col. (2) uses the respondents' region of residence to assign the treatment excluding migrants, col. (3) uses the respondents' province of birth to assign the treatment. Individual characteristics of the female household member: age, age squared; Household characteristics: log(income). Consumption food expenditures and log(income) are equivalized using the ISEE scale. Migrants are those whose region of birth is different than the region of origin.

Table 8: Effects of meat scarcity on eating habits and health-DDD for females

	Dep. Var.: Prob(Outcome)			
Outcome:	Eat meat every day (1)	Obese (2)	Poor health (3)	Tumor (4)
$Cohort \times Scarcity \times Wave$	0.048**	0.062***	0.061**	0.025**
	(0.022)	(0.016)	(0.024)	(0.010)
Old	-0.017	0.023**	0.032***	0.026***
	(0.016)	(0.010)	(0.006)	(0.008)
$Wave$	-0.010	-0.002	0.026***	-0.004
	(0.013)	(0.011)	(0.007)	(0.007)
$Cohort \times Wave$	0.016	0.025	0.019	-0.026**
	(0.019)	(0.016)	(0.013)	(0.010)
$Cohort \times Scarcity$	-0.009	-0.015	-0.021***	-0.003
	(0.023)	(0.010)	(0.007)	(0.010)
$Scarcity \times Wave$	0.029	0.008	0.021**	-0.005
	(0.026)	(0.015)	(0.008)	(0.007)
Observations	8,591	8,591	8,591	8,591
Individual controls	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
R squared	0.00974	0.00986	0.0194	0.00588
Mean Dep. Var.	0.121	0.112	0.0569	0.0279

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. *Cohort*=1 if aged 60-64 and 0 if aged 45-54; *Scarcity*=1 for regions in the 75th percentile of the decrease in the number of breed and slaughtered animals between 1941-42 and 1945 and 0 otherwise. $Wave$=1 refers to the survey wave 2003 and 0 to 2021. Obese if $BMI \geq 30$. Poor health if self-perceived health status ≤ 2 (1-5 scale). Individual characteristics: age group dummies.

Table 9: Intergenerational transmission of eating habits-DD direct & indirect effect

Panel A	Dep. Var.: Prob(Eat meat every day)		
	Mothers	Coresident children 18-26	Fathers
	(1)	(2)	(3)
$Mother's\ Cohort \times \Delta(Livestock)$	0.487***	0.362**	0.259
	(0.147)	(0.145)	(0.232)
$Mother's\ cohort$	-0.143*	-0.088	-0.076
	(0.068)	(0.056)	(0.088)
Observations	2,015	2,629	1,820
Individual controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
R squared	0.0327	0.0315	0.0267
Mean Dep. Var.	0.194	0.289	0.236

Panel B	Dep. Var.: Prob(Eat meat every day)		
	Mothers	Corresident children 18-26	Fathers
	(1)	(2)	(3)
$Mother's\ Cohort \times \Delta(Slaughtered)$	0.397**	0.326*	0.282
	(0.147)	(0.184)	(0.203)
$Mother's\ cohort$	-0.111	-0.077	-0.090
	(0.068)	(0.078)	(0.075)
Observations	2,015	2,629	1,820
Individual controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
R squared	0.0319	0.0315	0.0270
Mean Dep. Var.	0.194	0.289	0.236

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. $Mother's\ cohort$=1 if mother born in 1943-1945 and 0 if born in 1946-1957; $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region; $\Delta(Slaughtered)$ is the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each region. Both measures are in absolute value and denote scarcity. Individual characteristics: age, age squared. Col. (1) presents the direct effect on mothers, col. (2) presents the indirect effect from mothers to their coresident children aged 18-26 and col. (3) presents the indirect effect from mothers to fathers.

A Appendix - Additional Figures and Tables

Figure A.1: An extract of the historical livestock census

Segue : TAV. 46 — Censimento del bestiame al 20 luglio 1942

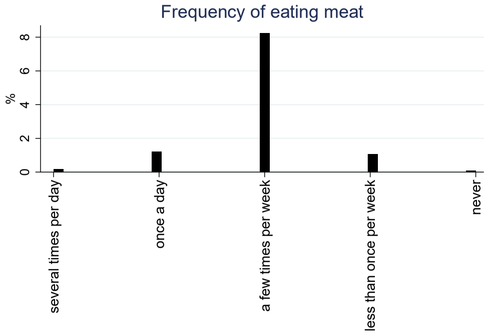
Segue : a) PER SPECIE (*capi*)

CIRCOSCRIZIONI	EQUINI			BOVINI		BUFALI	SUINI		OVINI		CAPRINI
	Cavalli	Asini	Muli e bardotti	Totale	di cui vacche		Totale	di cui scrofe	Totale	di cui pecore	
Piemonte	61.747	9.343	13.502	1.116.504	529.190	—	219.372	19.705	256.994	164.507	98.239
Liguria	5.786	5.327	6.033	98.375	57.450	—	8.959	317	74.317	55.694	27.608
Lombardia	160.473	34.616	8.606	1.509.005	739.612	—	477.304	38.800	143.569	89.180	63.038
Venezia Tridentina	10.574	1.978	1.024	188.531	103.403	—	48.163	4.193	96.874	55.008	41.893
Veneto	64.899	33.441	5.995	1.293.347	573.694	—	428.962	36.550	190.887	129.007	56.712
Venezia Giulia e Zara	6.746	12.771	1.124	159.521	75.952	—	93.285	10.445	140.560	105.781	30.995
Emilia	64.916	28.300	4.524	1.367.525	641.188	—	451.296	59.400	266.519	193.166	11.657
Toscana	31.512	39.590	4.554	482.278	188.075	—	312.001	51.457	846.007	696.179	20.713
Marche	11.107	7.304	2.343	473.093	207.349	—	242.286	28.121	356.961	274.242	6.206
Umbria	9.040	17.277	3.421	205.554	71.057	—	212.341	39.751	371.240	286.990	4.953
Lazio	35.299	69.390	14.050	296.716	142.965	1.870	240.312	27.918	1.199.662	941.916	69.533
Abruzzi e Molise	28.233	64.879	18.140	210.354	114.471	—	206.943	15.199	910.415	724.802	84.627
Campania	53.902	70.978	10.404	218.327	112.190	9.389	263.311	36.165	388.997	303.539	119.167
Puglie	89.771	39.136	50.270	84.145	43.079	1.507	54.633	9.323	735.614	572.841	100.565
Lucania	13.380	28.167	18.273	62.266	24.934	293	105.070	17.193	448.361	328.372	129.917
Calabrie	10.305	61.577	5.445	134.850	61.308	—	196.598	22.733	417.999	336.180	241.114
Sicilia	75.679	121.256	144.341	244.270	105.157	—	48.270	9.624	574.013	485.731	245.639
Sardegna	36.215	36.484	633	226.841	73.831	—	116.110	33.700	2.003.066	1.632.602	374.035

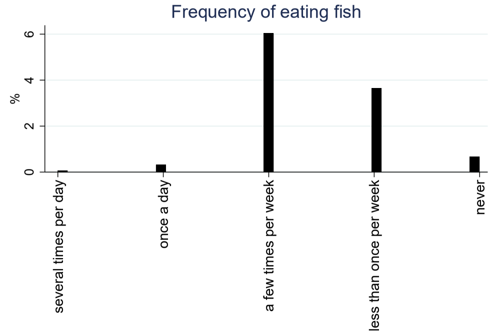
Notes: An extract of the 1942 livestock census that we digitized. We consider the sum of cattle, pigs, goats and sheep to measure the availability of meat in each region.
Sources: Census of Agriculture 1942 (Istat, 1948).

Figure A.2: Self-reported Eating Habits

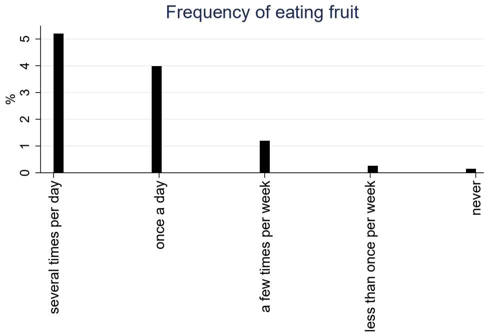
(a)



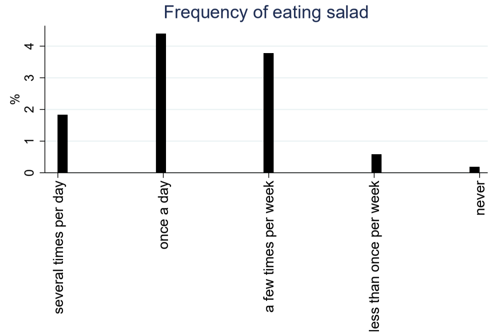
(b)



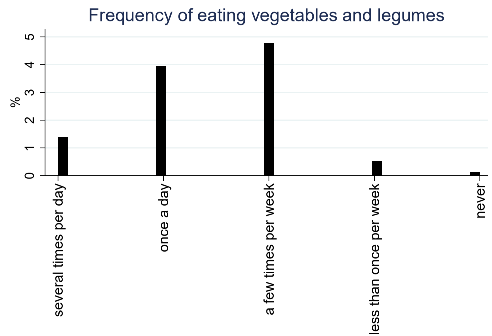
(c)



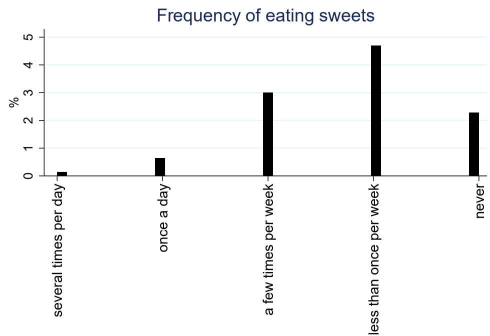
(d)



(e)



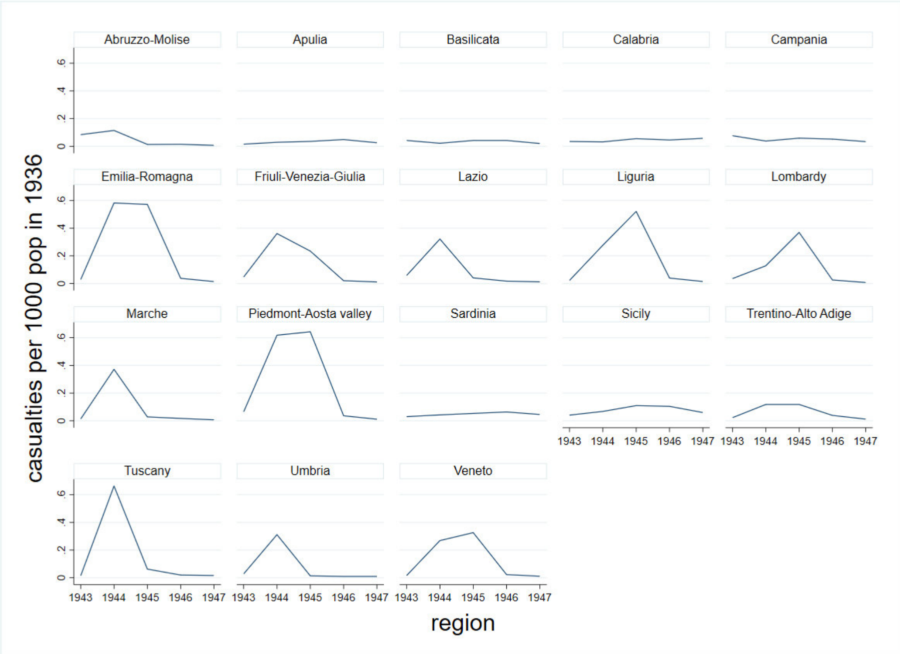
(f)



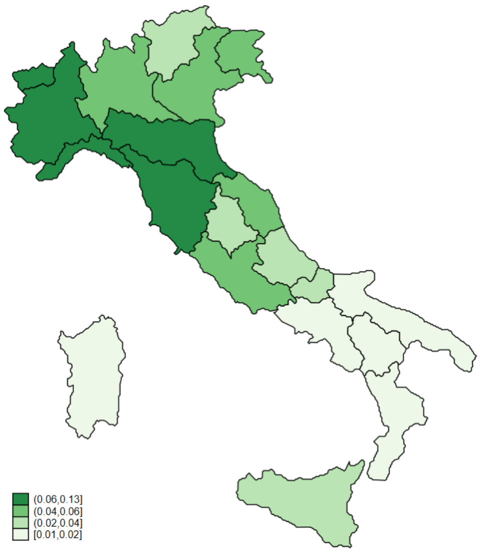
Notes: Food categories are a) meat (chicken, turkey, rabbit, veal, beef, veal, pork), b) fish, c) fruits, d) salad (spinach, salad, chicory, cabbage, broccoli), e) vegetables (tomatoes, eggplants, peppers, fennel, courgettes, artichokes, carrots, pumpkins, cauliflower, peas and other fresh legumes), and f) sweets.

Figure A.3: Casualties by explosives or firearms/1000 population in 1936

(a) Evolution over time



(b) Geographical distribution (cumulative 1943-1947)

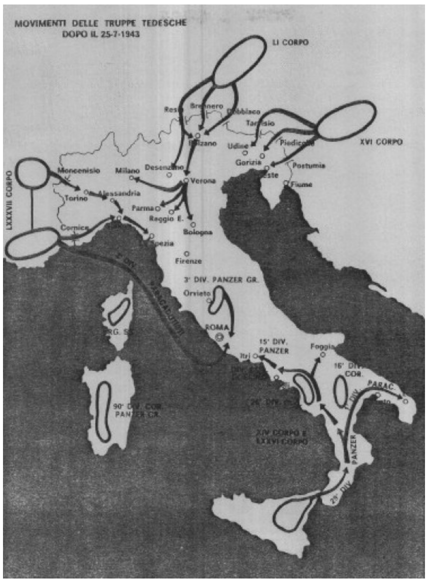


Notes: Number of casualties by explosives or firearms per 1000 population in 1936. They peak in 1944 in the Central regions and in 1945 in the Northern regions and Sicily.
Sources: Morti e Dispersi per Cause Belliche negli Anni 1940-1945, Istat (1957).

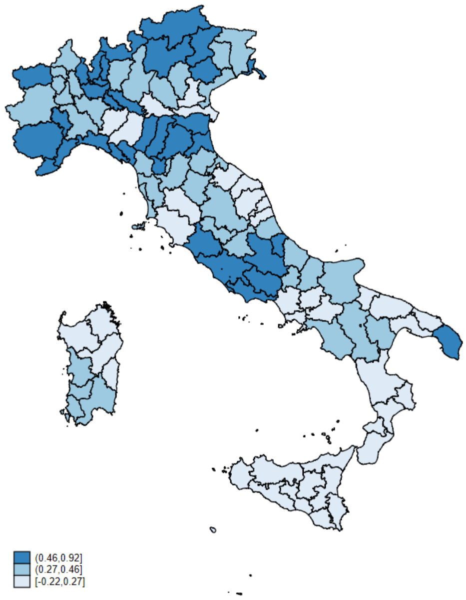
Figure A.4: Distribution of German troops before and after July 25, 1943

(a) Pre July 25, 1943

(b) Post July 25, 1943

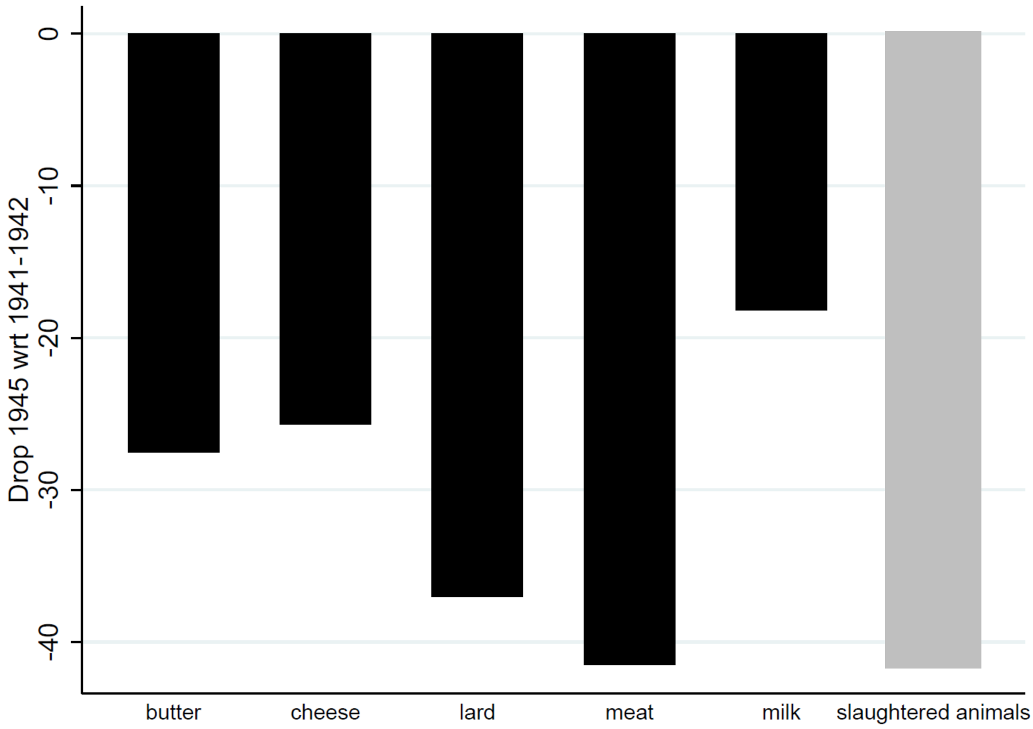


(c) % Drop in the number of animals slaughtered for meat



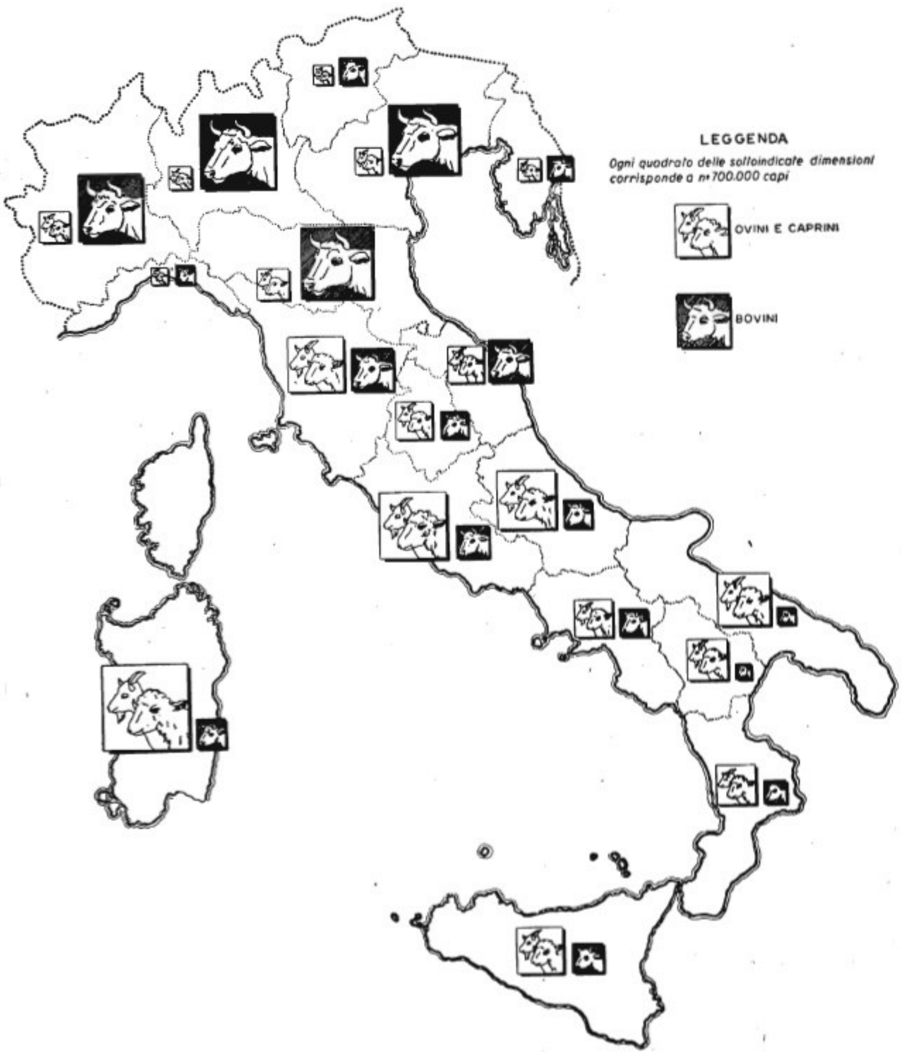
Notes: The figure shows that German troops were initially located in the Center-South and then moved towards the Center. At the same time, new German troops invaded from the North and moved towards the Center.
Sources: (a) and (b) Gandini (1995); (c) see notes of Figure 1.

Figure A.5: Drop in the availability of animal products and in the number of slaughtered animals for meat at the national level



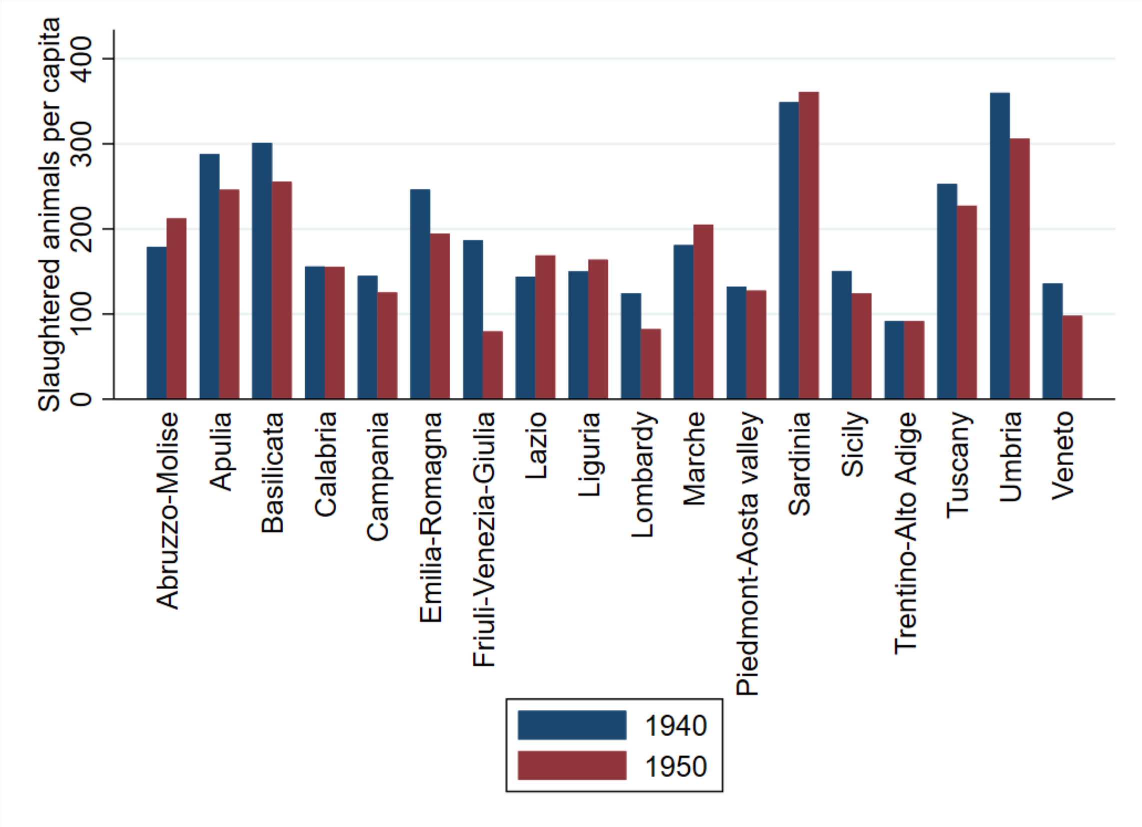
Notes: The figure shows that our measure of scarcity based on the number of livestock perfectly matches the drop in the availability of meat at the national level. Moreover, it is highly correlated with the drop in the availability of other animal products (butter, cheese, lard, milk) at the national level.
Sources: Information on butter, cheese, lard, meat and milk: ISTAT (1950), slaughtered animals: ISTAT (1948) and (1950).

Figure A.6: Distribution of livestock across regions in 1942



Notes: The figure shows that livestock was widespread all over the Italian territory. Cattle was more common in the North while goats and sheep were more common in the Center-South.
Sources: Statistical Summary of the Italian Regions (Istat, 1947).

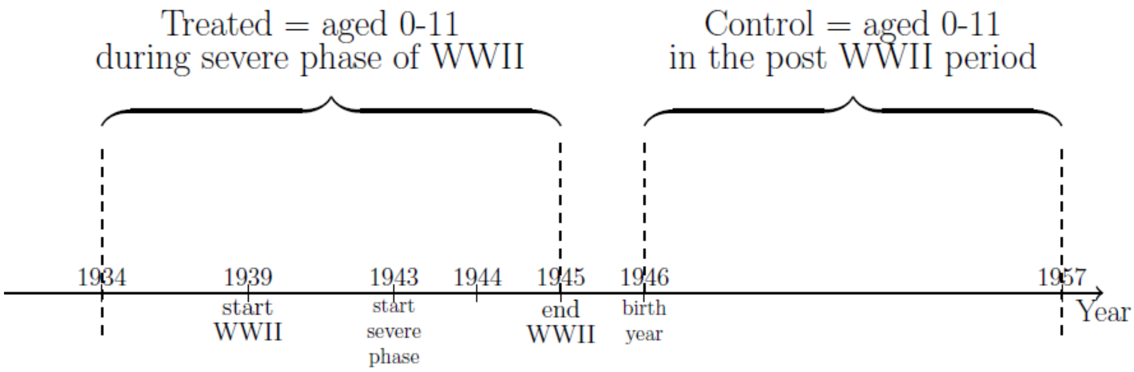
Figure A.7: Slaughtered animals for meat per capita by region in 1940 and 1950



Notes: The figure shows the number of slaughtered animals for meat in per capita terms in 1940 and in 1950. By 1950, the average meat consumption has recovered back to its pre-war steady state.

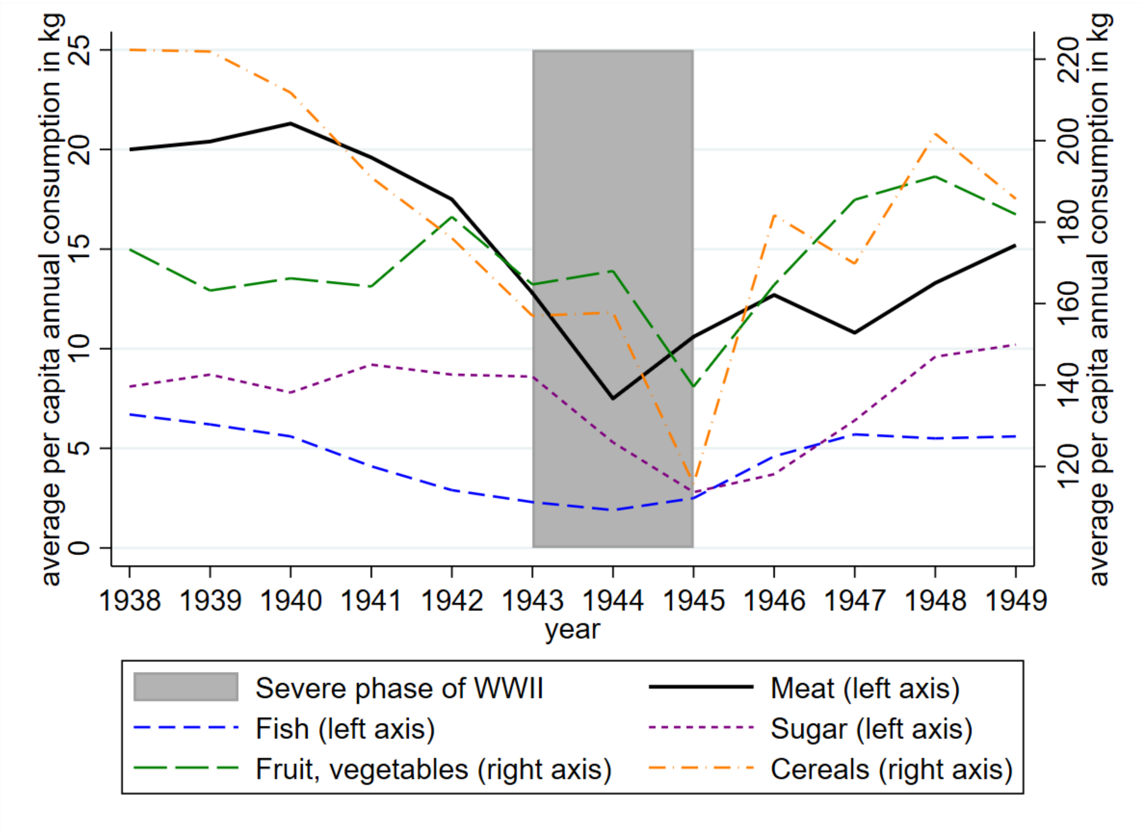
Sources: Annual Agricultural Statistics 1940 (Istat, 1948) and 1950 (Istat, 1953) and Population Census 1936 and 1951 (Istat, 1976).

Figure A.8: Timeline-definition of treated and control groups



Notes: The figure shows the cohorts that constitute the treated (born 1934-1945) and the control groups (born 1946-1957).

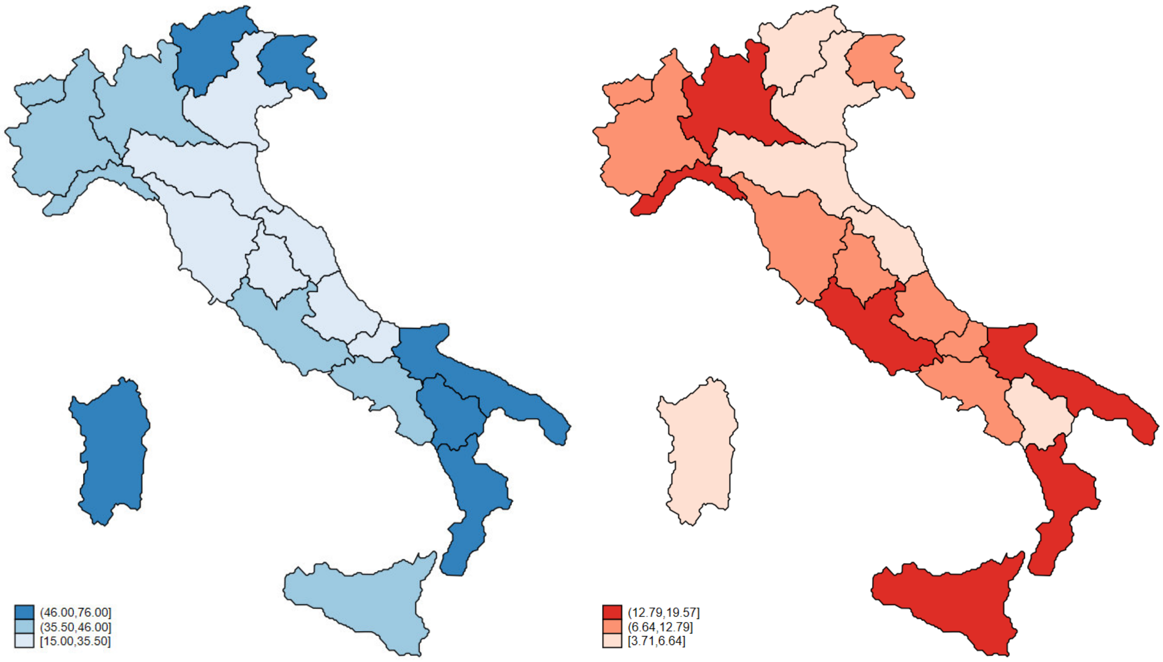
Figure A.9: Average per capita annual consumption of various food products



Notes: The figure shows the average consumption of various food products per inhabitant in the period 1938-1949. Average consumption of meat fell sharply in 1943 and 1944. The consumption of other food products also dropped but mostly in 1945. Average consumption per inhabitant is the ratio of total quantities consumed of each food product over the mid-year resident population.
Sources: Summary of Historical Statistics of Italy 1861-1975, (Istat, 1976).

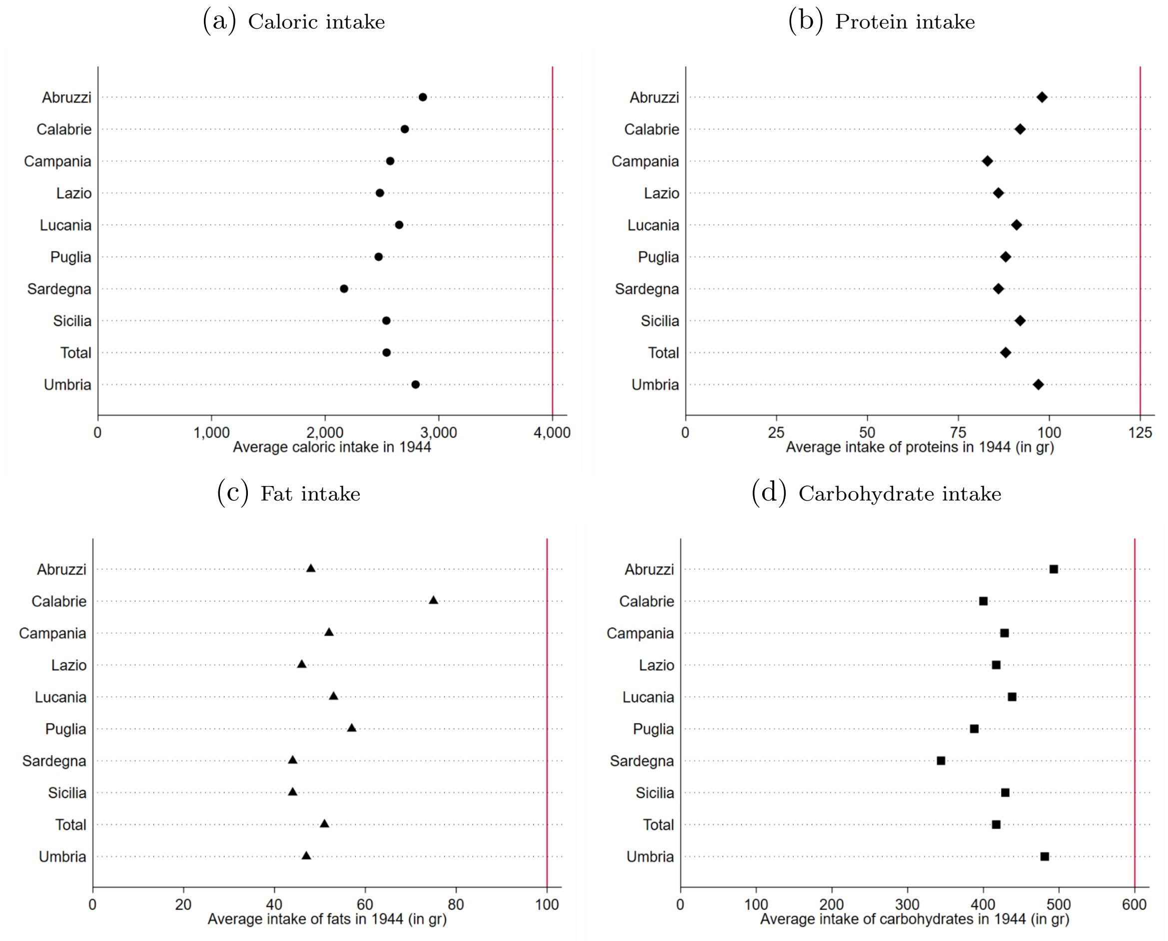
Figure A.10: % Drop in wheat production (quintals) and prevalence of hunger

(a) Drop in wheat production (b) % Self reported incidence of hunger during WWII



Notes: The figure shows the percentage difference (in absolute value) in quintals of wheat production between 1945 and 1941-1942 (panel a) and the prelavence of hunger during WWII (panel b). The drop in wheat production ranges between 15 and 76%. The prevalence of hunger ranges between 4 and 20%.
Sources: Annual Agricultural Statistics 1941, 1942 (Istat, 1948) and 1945 (Istat, 1950a) and own elaborations on retrospective information collected in SHARELIFE (Wave 3).

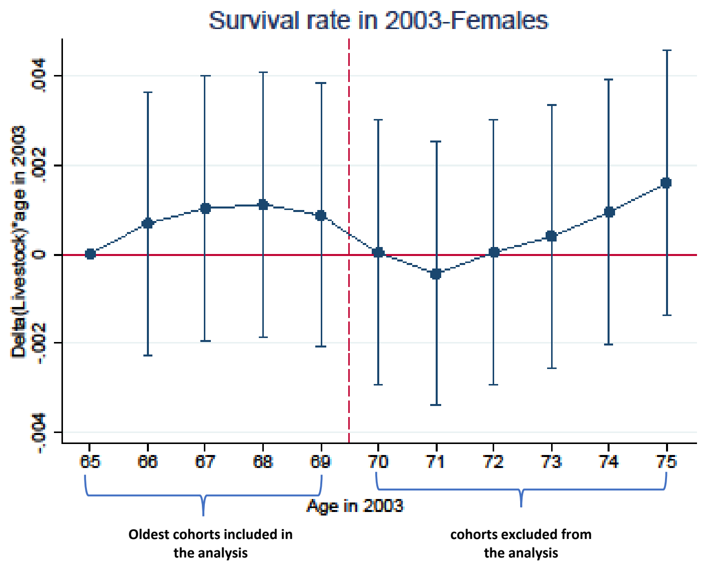
Figure A.11: Average daily caloric, protein, fat and carbohydrate intake and minimum requirements for heavy labor in 1944



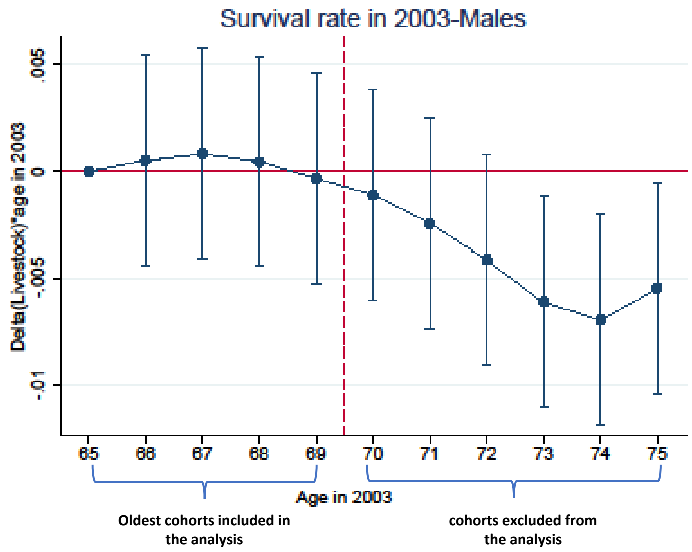
Notes: The figure shows the average daily a) caloric, b) protein, c) fat and d) carbohydrate intake in a set of regions with available data (liberated territory) in 1944. Red vertical lines represent the minimum requirement for each category for a person who does heavy muscular work. In all categories, the average daily intake was between 30 and 40% lower than the minimum requirement.
Sources: Census and Surveys for the National Reconstruction, Survey on Living Conditions-Nutrition, p. 137-142, Istat (1945).

Figure A.12: Survival rate

(a)

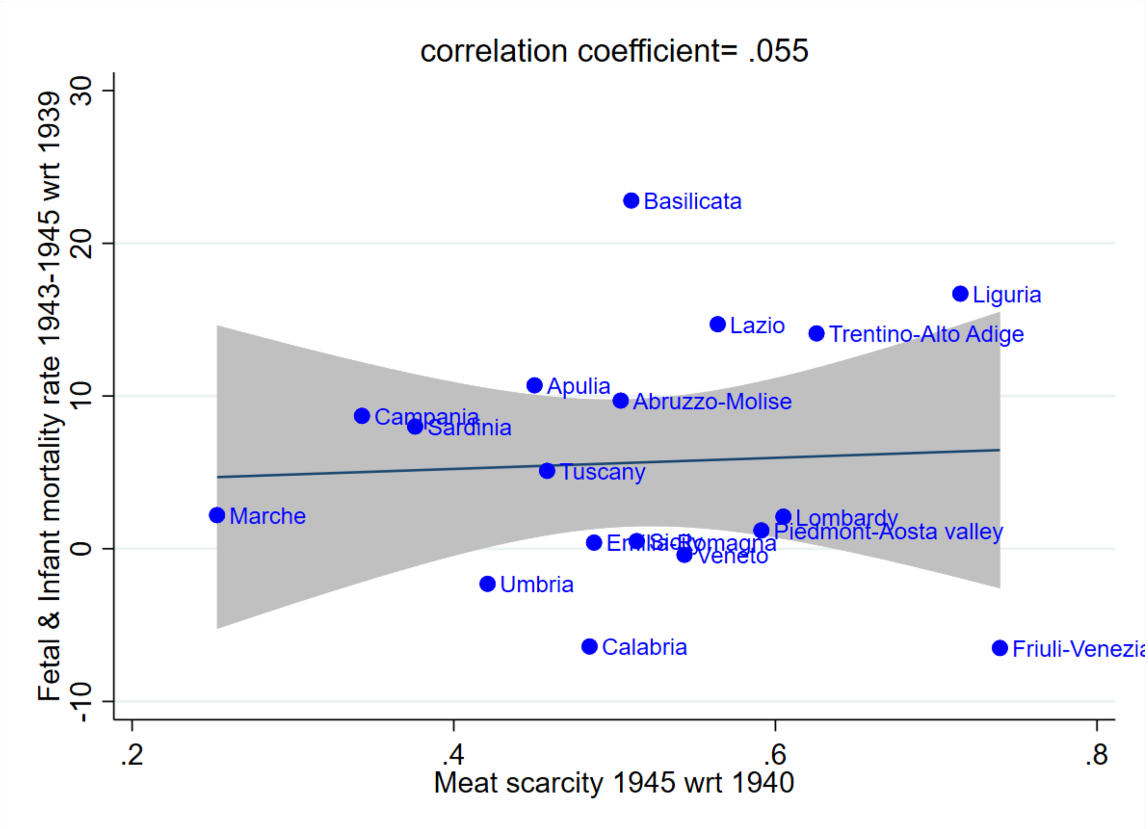


(b)



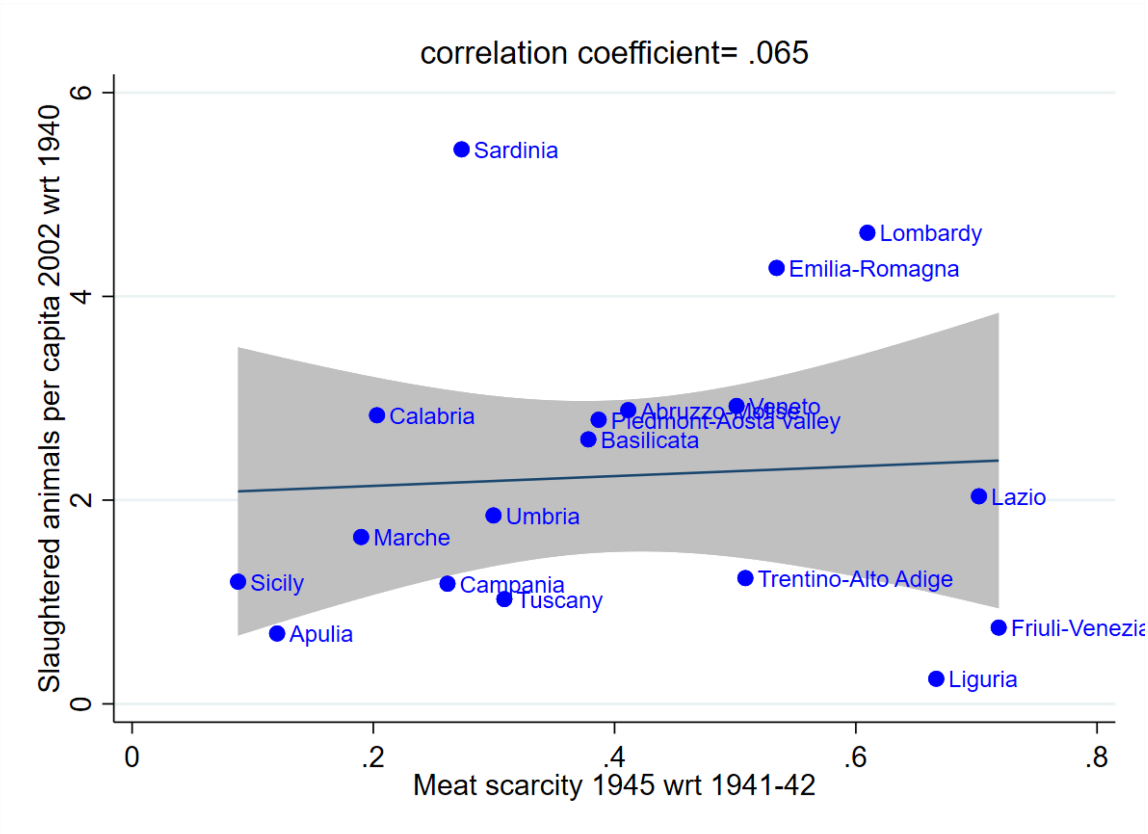
Notes: The figure shows among interviewed females, there are no survival biases due to meat scarcity (panel a), while among interviewed males, survival biases appear only after age 72 (panel b), among cohorts that are anyways excluded from our analysis.
Sources: Own elaborations on census records from ISTAT.

Figure A.13: Correlation between fetal-infant mortality and meat scarcity



Notes: The figure shows that there is no correlation between the change in fetal-infant mortality rate between 1939 and 1943-45 and the % change in the number of animals slaughtered for meat between 1940 and 1945 at the regional level.
Sources: Causes of Death in Italy in the Decade 1939-1948 (Istat, 1950b) and Annual Agricultural Statistics 1940 (Istat, 1948) and 1945 (Istat, 1950a).

Figure A.14: Correlation between the evolution over time of the number of slaughtered animals per capita (2002 vs 1940) and meat scarcity between 1941-42 and 1945

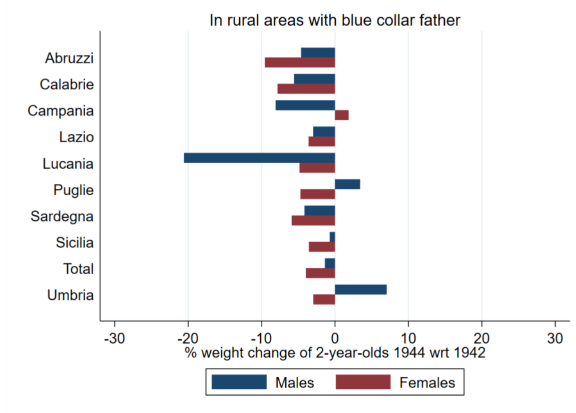


Notes: The figure shows that the number of slaughtered animals per capita increased significantly over time (2002 wrt 1940) in all regions. However, this increase is not correlated with the regional meat scarcity during WWII.

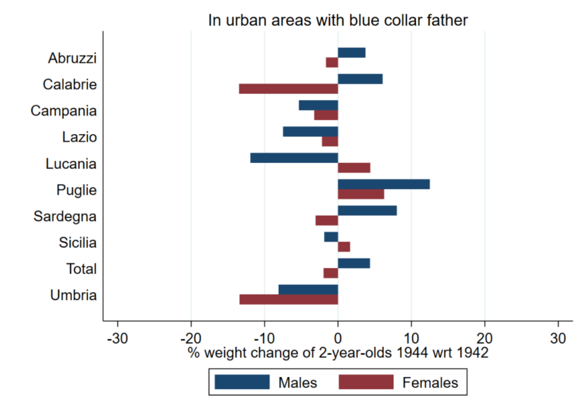
Sources: Annual Agricultural Statistics 1940, 1941, 1942 (Istat, 1948), 1945 (Istat, 1950a), 2002 `http://dati.istat.it/Index.aspx?DataSetCode=DCSP_MACELLAZIONI`. Population Census 1936 (Istat, 1976) and 2001 `http://dati.istat.it/Index.aspx?DataSetCode=DCIS_RICPOPRES2001#`.

Figure A.15: % Change in average weight of 2-year-olds by gender and paternal occupation in rural and urban areas, 1942-1944

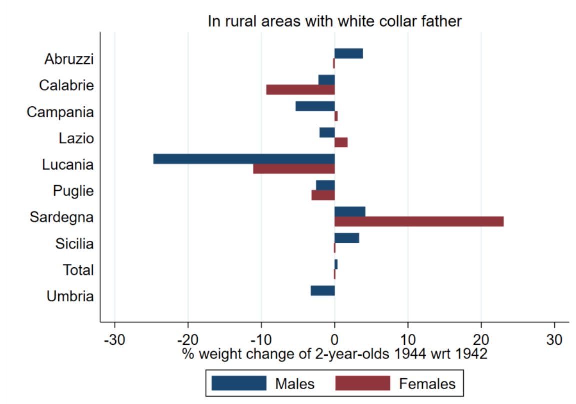
(a)



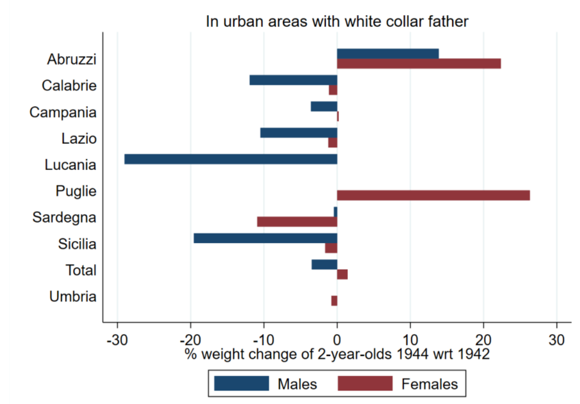
(b)



(c)

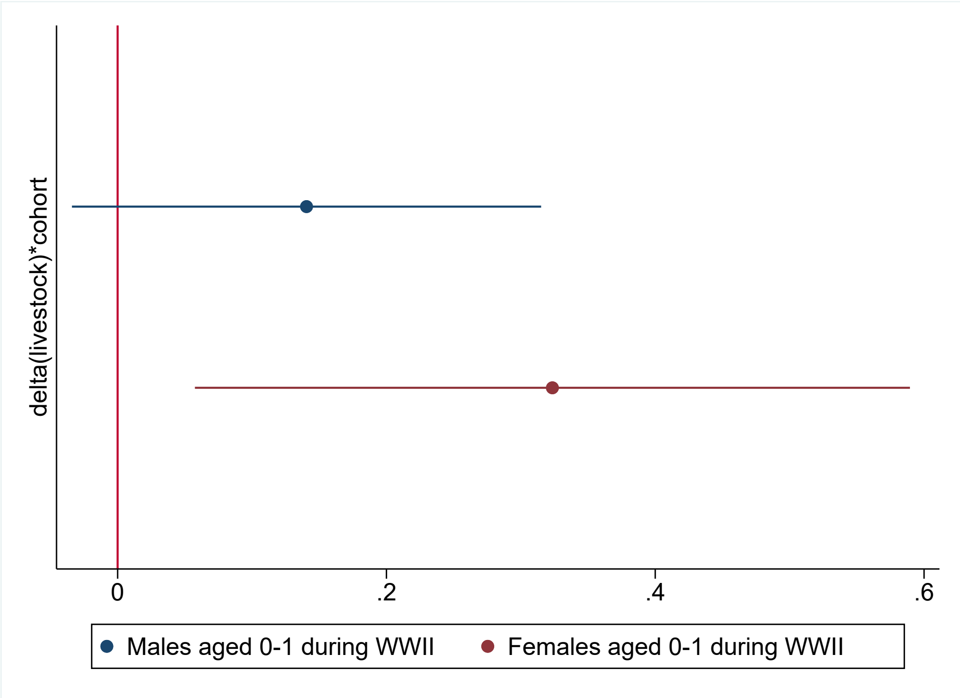


(d)



Notes: The figure shows the percentage change in average weight of 2-year-olds by gender and paternal occupation between 1942 and 1944 in rural and urban areas of a set of regions with available data (liberated territory). Females fared worse than males if their father was a manual worker (blue collar). (a) Among the children of blue collars in rural areas, the average weight loss in the period 1942-1944 was 4.0% for females and only 1.4% for males in total. This gender gap was evident in seven out of nine regions. (b) Among the children of blue collars in urban areas, the average weight of 2-year-old females in 1944 was 2.0% lower compared to 1942 while the average weight of 2-year-old males in the same period increased by 4.3%. (c) Among children of white collars in rural areas, there is no gender gap in total. (d) Among children of white collars in urban areas, males fared worse than females.
Sources: Census and Surveys for the National Reconstruction 1944, Survey on Living Conditions-Public Health, Istat (1945).

Figure A.16: Effects of meat scarcity in utero on meat eating habits-by gender



Notes: Estimated coefficients of the interaction term in the diff-in-diff specification and 95% confidence intervals. Standard errors clustered at the regional level. The dependent variable is a dummy=1 if the individual eats meat every day and 0 otherwise. See equation 1 and notes of Table 2 for a detailed description of the specification. Treated: aged 0-1 during WWII (born in 1943-1945). Control: born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region.

Table A.1: Effects of meat scarcity on eating habits-urban vs rural areas

	Dep. Var.: Prob(Eat meat every day)	
	Urban	Rural
	(1)	(2)
$Cohort \times \Delta(Livestock)$	0.131*	0.130**
	(0.070)	(0.051)
Cohort	-0.043*	-0.025
	(0.023)	(0.036)
Observations	8,993	3,820
Individual controls	Yes	Yes
Region FE	Yes	Yes
R squared	0.0190	0.0239
Mean Dep. Var.	0.129	0.136

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. *Cohort*=1 if born in 1934-1945 and 0 if born in 1946-1957. $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. This measure is in absolute value thus denoting scarcity. Individual characteristics: age, age squared, gender. Urban if area of residence with easy access to public transportation.

Table A.2: Effects of meat scarcity on eating habits-robustness I

	Benchmark (1)	Add endogenous controls (2)	Different clustering (3)	Probit instead of LPM (4)	Different base year (5)	Different treatm. window (6)	Control for $\Delta(GDP)$ (7)	Control for casualties (8)
$Cohort \times \Delta(Livestock)$	0.130**	0.131**	0.130**	0.129***	0.131**	0.153**	0.128**	0.118**
	(0.049)	(0.049)	(0.053)	(0.043)	(0.047)	(0.064)	(0.052)	(0.048)
Cohort	-0.037**	-0.038**	-0.037**	-0.038**	-0.042**	-0.002	-0.034**	-0.030*
	(0.015)	(0.015)	(0.017)	(0.015)	(0.017)	(0.050)	(0.015)	(0.014)
Observations	13,234	13,234	13,234	13,234	13,234	3,324	11,957	13,234
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	By region	By region	Two-way region age	By region	By region	By region	By region	By region
Base year	1941-42	1941-42	1941-42	1941-42	1940	1941-42	1941-42	1941-42
Treated cohort born in	1934-1945	1934-1945	1934-1945	1934-1945	1934-1945	1943-1945	1934-1945	1934-1945
Control cohort born in	1946-1957	1946-1957	1946-1957	1946-1957	1946-1957	1950-1952	1946-1957	1946-1957
Regional controls	No	No	No	No	No	No	$\Delta(GDP)$	Casualties
FE	Region	Region	Region	Region	Region	Region	Macro area	Macro area
R squared	0.0188	0.0205	0.0188		0.0189	0.0278	0.0123	0.0121
Mean Dep. Var.	0.131	0.131	0.131	0.131	0.131	0.141	0.136	0.131

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. *Cohort*=1 if treated and 0 if control; $\Delta(Livestock)$ is the % change in the number of breed animals between 1941-42 and 1944 in each Central-Southern region and the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each Northern region. This measure is in absolute value thus denoting scarcity. Col. (1) presents the benchmark estimates, col. (2) including university degree, gender×university degree, high school diploma, high occupational level as additional individual controls, col. (3) with two-way clustered standard errors by region and age, col (4) reports estimated marginal effects of a probit model, col. (5) using the number of slaughtered animals for meat in 1940 (available only for the North), col. (6) using a different window for the definition of the treated and control cohorts, col. (7) controlling for the % change in GDP per capita between 1942 and 1945 and col. (8) controlling for the number of casualties per 1000 population in 1936.

Table A.3: Effects of meat scarcity on eating habits-robustness II

	Benchmark	Accounting for different size	Using info on quintals of slaughtered animals
	(1)	(2)	(3)
$Cohort \times \Delta(Slaughtered)$	0.092*	0.076**	0.070**
	(0.050)	(0.031)	(0.031)
$Cohort$	-0.022	-0.012	-0.008
	(0.014)	(0.009)	(0.009)
Observations	13,234	13,234	13,234
$\Delta(Slaughtered)$ based on	Number of animals slaughtered for meat	Number of animals weighted by relative size	Quintals of animals slaughtered for meat
Individual controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
R squared	0.0184	0.0185	0.0184
Mean Dep. Var.	0.131	0.131	0.131

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust s.e. in parenthesis clustered at the regional level, survey weights used. $Cohort$=1 if born in 1934-1945 and 0 if born in 1946-1957. In col. (1), $\Delta(Slaughtered)$ is measured as the % change in the number of animals slaughtered for meat between 1941-42 and 1945 in each region; in col. (2) after weighting for the relative size of animals (Cattle=700 kg, Sheep/goat=85 kg, Pig=300 kg); in col. (3) using quintals of animals slaughtered for meat. All measures are in absolute value thus denoting scarcity. Individual characteristics: age, age squared, gender.

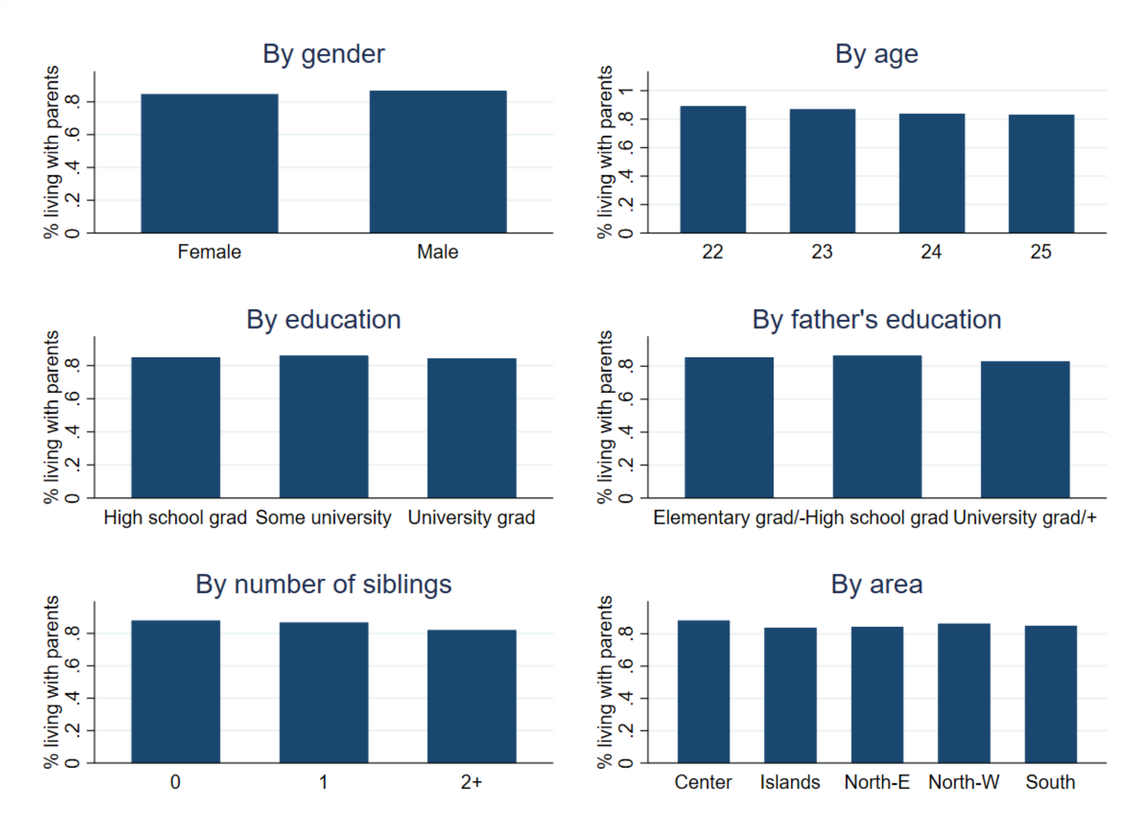
Table A.4: Effects of meat scarcity on eating habits and health-DDD for males

	Dep. Var.: Prob(Outcome)		
Outcome:	Obese (1)	Poor health (2)	Tumor (3)
$Cohort \times Scarcity \times Wave$	-0.016	0.018	0.005
	(0.032)	(0.022)	(0.011)
Old	-0.001	0.040***	0.014
	(0.019)	(0.012)	(0.011)
$Wave$	-0.038***	0.028***	-0.008
	(0.013)	(0.008)	(0.005)
$Cohort \times Wave$	0.027	0.024	0.008
	(0.026)	(0.017)	(0.010)
$Cohort \times Scarcity$	0.020	-0.046**	-0.008
	(0.029)	(0.018)	(0.015)
$Scarcity \times Wave$	-0.010	-0.013	0.004
	(0.016)	(0.008)	(0.005)
Observations	8,284	8,284	8,284
Individual controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
R squared	0.00999	0.0189	0.00519
Mean Dep. Var.	0.140	0.0433	0.0156

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust s.e. in parenthesis clustered at the regional level, survey weights used. *Cohort*=1 if aged 60-64 and 0 if aged 45-54; *Scarcity*=1 for regions in the 75th percentile of the decrease in the number of breed and slaughtered animals between 1941-42 and 1945 and 0 otherwise. $Wave$=1 refers to the survey wave 2003 and 0 to 2021. Obese if $BMI \geq 30$. Poor health if self-perceived health status ≤ 2 (1-5 scale). Individual characteristics: age group dummies.

B Appendix - Supplementary material

Figure B.1: Share of young adults aged 22-25 living with the parents, by characteristics



Notes: The figure shows the % of young adults aged 22-25 who report that they live with their parents.
Sources: Own elaborations on the 2011 Survey on Educational and Professional Paths of Upper Secondary School Graduates, Istat.

Table B.1: Definition of variables in the Multipurpose Survey on Households: Aspects of Daily Life

Variable	Type	Values
Eat meat every day	binary	1 if the respondent eats pork, beef, chicken or other white meat once or several times a day 0 otherwise
Frequency of eating meat	ordinal	1 never 2 less than once per week 3 a few times per week 4 once a day 5 several times per day
Weight	continuous	self reported in kg
Height	continuous	self reported in cm
BMI	continuous	(weight in kg)/(height in m)^2
Obese	binary	1 if BMI$\geq$30 0 otherwise
Poor health	binary	1 if self-perceived health status belongs to the lowest 2 categories in a 1-to-5 point scale 0 otherwise
Tumor	binary	1 if the respondent has ever had a tumor 0 otherwise
Male	binary	1 if male 0 if female
Age	continuous	in years

Table B.2: Definition of variables in the SHIW

Variable	Type	Values
Share of food expenditures	continuous	food expenditures/total household expenditures
Age	continuous	in years
Household income	continuous	annual, nominal, in euros