The Long-Term Effects of Destruction During the Second World War on Private Wealth in Germany*

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Abstract

By the end of the Second World War, an estimated 20 percent of the West German housing stock had been destroyed. This paper examines the extent to which regional differences in destruction can explain differences in wealth today. As our empirical basis, we link a unique dataset on the levels of wartime destruction in 1,739 West German cities with recent micro data on household wealth provided by the Socio-Economic Panel. Among individuals born in cities or villages that were badly damaged in the Second World War, wealth is still significantly lower today. Similarly, the destruction of parents' cities or villages of birth has significant negative effects on the wealth of their descendants. These detrimental effects are robust after controlling for a rich set of pre-war regional and city-level control variables. In a complementary mediation analysis, we study potential channels such as health, education, and work experience, through which the wartime destruction could have affected wealth accumulation.

Keywords: Wealth, Second World War, destruction, inequality, Socio-Economic Panel (SOEP)

JEL codes: D31, N34, N44

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1 Introduction

In human history, social conflicts and natural disasters have often driven down economic inequalities. The Second World War (WWII) was certainly an extreme catastrophe. Not only did it destroy countless human lives as well as human and economic capital; it is also argued to have been a "great leveler" (Scheidel, 2017), an event that markedly reduced the high income and wealth concentration at the beginning of the twentieth century (Roine and Waldenström, 2015; World Inequality Database, 2017).

Compared to the pre-war decade, the period after the Second World War saw a significant decline in the concentration of income and wealth in many countries. In 1930, the top 1% of the population held 43% of total wealth in the United States, 42% in Germany, 50% in France, and 57% in the United Kingdom.[1] In the year after the end of the war, these shares were only 30%, 25%, 31%, and 46%, respectively. Results are comparable for many other countries' top 1% income shares.[2] As documented in Scheidel (2017) and Ransom (2019), the equalizing effect of the Second World War can be attributed to a number of causes, including physical destruction, expropriation and confiscation, resettlement, and interruptions in international trade and capital flows.

While the studies cited above provide historical time series on income and wealth concentration, we take a different and complementary perspective. Using heterogeneous variation in the destruction of housing stock in Germany, we quantify the extent to which WWII building destruction continues to reverberate in private wealth today. Germany serves as our laboratory. Here, during the war, Allied bombs destroyed about 20 percent of the country's entire housing stock. The extent of the destruction varied greatly, even across narrow regional entities. We use this regional variation to identify the effects on today's wealth

[1] Figures for the United States, France, and United Kingdom from the World Income Database (Alvaredo et al., 2017). Figures for Germany from Albers et al. (2020).

[2] See Atkinson and Piketty (2007), Atkinson and Piketty (2010), Roine and Waldenström (2015), and Bartels (2019) for a more comprehensive picture.

distribution.

The data requirements for such an analysis are high: In addition to individual and regional control variables, it requires valid and regionally linkable data on the extent of bombing and on private wealth today. For the historical data, we have digitalized levels of destruction for municipalities larger than 3,000 inhabitants based on Gassdorf and Langhans-Ratzeburg (1950). To our knowledge, this is the most detailed digitalized database on WWII destruction in Germany. To these data, we added historical data on regional-level economic performance. We then linked the historical data with present-day data from the German Socio-Economic Panel (SOEP). SOEP not only provides wealth portfolios of the population today but also includes respondents' and their parents' birthplaces. Hence, it allows present-day wealth holdings to be linked with past regional destruction.

We expect that the destruction of housing during the Second World War will have a negative effect on wealth today. The mechanism directly connecting the two is the fact that WWII bombs destroyed the real estate of property owners as well as their heirs. There are also other potential mechanisms. One potential mechanism is education. Akbulut-Yuksel (2014) shows that bombing prevented children from going to school, resulting in fewer years of education. As higher education, ceteris paribus, implies higher lifetime earnings, and income is highly correlated with wealth, this mechanism should support our expectation. Another mechanism supporting our expectation is the adverse effect of combat activity on health (Li and Koulovatianos, 2020). Besides these mechanisms, which operate by way of human capital, macro-level mechanisms with unclear implications are conceivable. For example, Brakman et al. (2004) shows that wartime destruction caused cities to deviate from a random growth path. If real estate prices are related to city growth, this will also have long-term implications for wealth. As another example, Vonyó (2012) finds that the destruction of the housing stock leads to a spatial mismatch between labor and capital, resulting in lower productivity—and thus lower returns to capital—in urban areas after war.

Our empirical analysis focuses on two age cohorts. The first consists of persons born between 1931 and 1945. They were still children or adolescents during the war, and during the air attacks, their parents very likely lived in the cities where the children were born. For the first cohort, we estimate whether the level of regional destruction of the children's birthplaces matters for wealth holdings at the age of, on average, 65 years. The second cohort comprises persons whose mother or father was born between 1931 and 1945. Here we study whether the destruction of the parents' place of birth affects wealth at the age of about 40 years. Our results suggest that wartime destruction has a significant negative effect on current wealth. Controlling for pre-war regional and city-level characteristics, estimates from our preferred model suggest a negative effect size of about −1,015 euros for individual net wealth per additional percentage point of destruction. Effect sizes are of similar magnitude for both birth cohorts. Analyzing the wealth portfolio in more detail, wartime destruction is most detrimental to real estate wealth. Furthermore, we provide evidence that education partially mediates the relationship between the level of WWII destruction and wealth holdings today.

The remainder of the paper is as follows. Section 2 summarizes the historical context of the Allied air war and gives an overview of related literature. Data and methods are presented in sections 3 and 4. Section 5 discusses the results. Section 7 concludes.

2 Literature and Historical Context

2.1 Literature Review

There is an extensive literature on the socioeconomic consequences of war. In addition to the immediate impacts, which range from death and physical and psychological injury to the destruction of physical capital, the literature considers a wide range of other consequences. These include, above all, the consequences for the growth of income and wealth,[3] labor markets,[4] taxation and government spending,[5] health,[6] education,[7] population growth,[8] economic growth and productivity,[9] city size,[10] and consumption.[11]

Within this literature, one strand provides long-term time series assessing the distribution of certain outcomes before, during, and after periods of war. One of the most prominent works on the impacts on wealth and income is that of Piketty and Zucman (2014), who shows that income and wealth inequalities in many countries dropped sharply during and after the two world wars. For example, the top 1% income share dropped in Britain, Denmark, France, Germany, Japan, Sweden, and the United States between 1910 and 1950 from about 20% to 10% (Piketty and Zucman, 2014, pp.316-317). The top 1% wealth share dropped in the same period in the United States from about 45% to 30% and in various European countries from 60% to 40% (Piketty and Zucman, 2014, p.349). He also shows that inequalities trended upward again in the decades after the Second World War, particularly after 1980, resulting in a u-shaped inequality curve over the course of the last century. Piketty and Zucman (2014) and Scheidel (2017) argue that the reduction in inequality was caused to a large extent by wartime destruction and violent conflict. In this vein, Piketty writes that the "concentration of circumstances (wartime destruction, progressive tax policies made possible by the shocks of 1914–1945, and exceptional growth during the three decades following the end of World

[3]See, e.g., Ichino and Winter-Ebmer (2004), Lee (2005), Burchardi and Hassan (2013), Jürges (2013), Akbulut-Yuksel (2014), Piketty and Zucman (2014), Schiman et al. (2019), and Li and Koulovatianos (2020).

[4]See, e.g., Neelsen and Stratmann (2011), Jürges (2013), Braun and Omar Mahmoud (2014), Lee (2014), and Schiman et al. (2019).

[5]See, e.g., Chevalier et al. (2018).

[6]See, e.g., Akbulut-Yuksel (2014), Kesternich et al. (2014), Lee (2014), Kesternich et al. (2015), van Ewijk and Lindeboom (2017), and Li and Koulovatianos (2020).

[7]E.g., Ichino and Winter-Ebmer (2004), Neelsen and Stratmann (2011), Jürges (2013), Akbulut-Yuksel (2014), Lee (2014), Miguel and Roland (2011), Waldinger (2016), and Schiman et al. (2019).

[8]See, e.g., Davis and Weinstein (2002).

[9]See, e.g., Vonyó (2012), Davis and Weinstein (2008), and Braun and Kvasnicka (2012).

[10]See, e.g., Davis and Weinstein (2002), Brakman et al. (2004) Bosker et al. (2007), and Bosker et al. (2008).

[11]See, e.g., Kesternich et al. (2015).

War II [...] created a historically unprecedented situation, which lasted for nearly a century." (Piketty and Zucman, 2014, p.356).

Another strand of literature shifts the focus from descriptions of long-term time series to the identification of causal effects of wars. In Table 1, we classify these studies along three dimensions: (1) type of treatment, (2) the outcome, and (3), the time gap between cause and effect, i.e., short- vs. long-term effects.

With respect to treatment type, the literature assesses four different war-related shocks: (1) bombing, (2) other combat activity, (3) war-induced migration flows, and (4) hunger and food shortages. Most of the studies use regional or temporal variation in treatment intensity for the identification of effects. Similar to our study, Akbulut-Yuksel (2014) uses regional variation in destruction intensity during WWII in her study on long-term effects on education and health, finding significant negative long-term effects of destruction. Other examples include Davis and Weinstein (2002) and Brakman et al. (2004), who both use regional variations in WWII destruction levels – in Japan and Germany, respectively – to assess the effects on long-term city growth. For Japan, the authors find that destroyed cities grow faster after the war and return to their pre-war size within 20 years, while findings for Germany suggest that cities do not completely return to their pre-war size.

In terms of outcomes, studies focus on a number of different aspects, which can be grouped broadly into six themes: (1) wealth, (2) economic activity, including income and consumption, (3) education, (4) health, (5) population growth, and (6) other outcomes. Some papers also analyze multiple outcomes and are listed more than once in the table. Notably, and despite the large descriptive literature on this topic, only a few papers analyze the causal effect of war on household wealth and portfolio composition. Exceptions include Lee (2005), Kesternich et al. (2014), and Li and Koulovatianos (2020). Lee (2005) shows that physical injuries and exposure to combat during the US Civil War had strong negative effects on subsequent savings, as did illnesses while in military service. In particular, veterans who served in a company that underwent more dangerous military missions had less personal wealth five years after the war. Kesternich et al. (2014) looks at the long-term effects of WWII combat activity on civilians who lived in European combat regions. With outcomes being measured in the first decade of the twentieth century, they find significant negative effects for health outcomes and education but no effects for financial wealth.[12] They justify the lack of effect on today's wealth by the fact that wealth is mainly determined by savings and asset prices after the war. Finally, Li and Koulovatianos (2020) analyze the effects of combat exposure during the Second Sino-Japanese War (1937–1945) and the Chinese Civil War (1946–1950) on health and wealth. They find a negative effect on wealth among persons who were children or exposed to war in utero, and show that a deterioration in health due to combat exposure is the main driver of the result.

As regards time gaps, some papers study the short-term effects of war. With respect to bombing, Vonyó (2012) analyzes the immediate postwar period in Germany and shows that the destruction of the housing stock led to a spatial mismatch of capital and labor, resulting in lower economic productivity. Waldinger (2016) shows that the destruction of university departments in Germany had negative effects on scientific output in the short term, but not in the long term. Similarly, many of the papers on bombing and city growth deal with short-term effects and their persistence (Davis and Weinstein (2002), Brakman et al. (2004), Bosker et al. (2007), Bosker et al. (2008), Davis and Weinstein (2008)).

Other papers show that war affects socio-economic outcomes several decades later. Similar to our paper, many of these papers rely on recent survey data on respondents who were treated in childhood or in utero and surveyed at an advanced age. For example, Kesternich et al. (2015) show that WWII-related hunger episodes during childhood have an effect on food consumption at the

[12]Note that the paper does not consider destruction, and that the treatment is defined rather broadly as either living in a country that fought in WWII or living in a region in which combat took place.

age of 50 to 80. Similarly, in the aforementioned study by Akbulut-Yuksel (2014), the time gap between treatment and effect is 40 years, while Li and Koulovatianos (2020) show that war has a significant negative effect on wealth stocks 60 or more years after treatment.

Table 1: Literature on the causal effects of wars.

Outcome	Treatment	Short-term effects	Long-term effects
Wealth	1) Bombing	-	This paper
	2) Combat activity	Lee (2005)	Kesternich et al. (2014), Li and Koulovatianos (2020)
	3) Migration	-	-
	4) Hunger	-	-
Economic activity (e.g. output, income, or consumption)	1) Bombing	Vonyó (2012)	Miguel and Roland (2011), Akbulut-Yuksel (2014), Wolf and Caruana-Galizia (2015)[13]
	2) Combat activity	-	Ichino and Winter-Ebmer (2004), Lee (2014)
	3) Migration	Braun and Kvasnicka (2012), Braun and Omar Mahmoud (2014), Braun and Dwenger (2017)	Burchardi and Hassan (2013)
	4) Hunger	-	Neelsen and Stratmann (2011), Jürges (2013), Kesternich et al. (2015)
Education	1) Bombing	Waldinger (2016)	Miguel and Roland (2011), Akbulut-Yuksel (2014), Waldinger (2016)
	2) Combat activity	-	Ichino and Winter-Ebmer (2004), Kesternich et al. (2014), Lee (2014)
	3) Migration	Waldinger (2016)	Waldinger (2016), Becker et al. (2020)
	4) Hunger	-	Neelsen and Stratmann (2011), Jürges (2013)
Health	1) Bombing	-	Akbulut-Yuksel (2014)
	2) Combat activity	-	Kesternich et al. (2014), Lee (2014), Li and Koulovatianos (2020)
	3) Migration	-	-

[13] The treatment in Wolf and Caruana-Galizia (2015) is regional variation of homeownership rates instrumented by WWII bombing.

Table 1: Literature on the causal effects of wars.

Outcome	Treatment	Short-term effects	Long-term effects
	4) Hunger	-	Jürges (2013), Kesternich et al. (2015), van Ewijk and Lindeboom (2017)
Population	1) Bombing	Davis and Weinstein (2002), Brakman et al. (2004), Bosker et al. (2007), Bosker et al. (2008), Davis and Weinstein (2008)	Davis and Weinstein (2002), Brakman et al. (2004), Bosker et al. (2007), Bosker et al. (2008), Davis and Weinstein (2008), Miguel and Roland (2011)
	2) Combat activity	-	-
	3) Migration	Schumann (2014), Braun and Dwenger (2017)	Schumann (2014)
	4) Hunger	-	-
Other	1) Bombing	-	-
	2) Combat activity	-	Kesternich et al. (2014) (life satisfaction, and marital status)
	3) Migration	Braun and Dwenger (2017) (marital status, political voting), Chevalier et al. (2018) (political voting)	Chevalier et al. (2018) (political voting)
	4) Hunger	-	-

2.2 The Allied Bombing Campaign on German Territory

The identification strategy in this paper is based on regional differences in the extent of property destruction. The Allied bombing campaign in the Second World War was a massive military operation that inflicted heavy damage on German cities, infrastructure, and industrial centers, destroying about 20 percent of industrial capital and residential housing stock in Germany(Albers, 1989). Initiated in September 1939, the air raids on German territory varied greatly in intensity over the years, and the majority of damage was inflicted between summer 1942 and spring 1945, when the US Army Air Forces entered the war in support of the British Royal Air Force.

Bombing targets were not chosen at random, but the various goals and scope of the bombings introduced an important element of randomness in terms of the populations and regions that were hit. The Allied air attacks followed three main goals: (1) to damage specific production sites of crucial industries such as the ball bearing, oil, and aircraft industry, (2) to weaken the morale of the German population through area bombing of residential areas, (3) to support and clear the way for Allied ground troops on their way toward Berlin (The United States Strategic Bombing Survey, 1945; Hampe, 1963a). Especially the first two goals caused heavy damage to the broader population. Area bombing, which was implemented for the first time in spring 1942, consisted in sending formations of hundreds of planes to cause broad and heavy damage on populated areas within time spans of a few hours. The invasion of Germany after the liberation of France also brought with it heavy destruction, especially in West German cities along the border to the Netherlands, Belgium, and France, as Allied air forces used their unrivaled superiority to ensure safe passage for ground troops. Moreover, air attacks lacked precision and often hit unintended targets.[14]

Most of the planes carrying out the attacks flew from England, and to a minor degree from Italy and France after their liberation. There were few aerial attacks on Germany from the East, as the Soviet Red Army used their aircraft mainly in support of ground troops and did not strategically attack German cities or industrial centers (Hampe, 1963a). The result was that northwestern regions of Germany suffered more damage than eastern and southern regions, a pattern which we exploit for the instrumental variable estimation strategy explained in more detail in Section 4.2 (Hampe, 1963b).

For the protection of civilians, the Nazi German policy response was mainly

[14]The The United States Strategic Bombing Survey (1945) states "only about 20% of the bombs aimed at precision targets fell within [the] target area", the target area being "a circle having a radius of 1000 feet [305 meter] around the aiming point of attack."

to increase anti-air defense capabilities, provide air-raid shelters, and relocate civilians to rural sites. However, during the course of the war, Allied forces increasingly gained control of German air space and achieved technological superiority, rendering many defensive systems ineffective. Moreover, in the final years of the war, German policy prioritized the protection of strategic industries over the safety of civilians, ultimately leading to an estimated 370,000 to 390,000 German civilians killed by airstrikes (Groehler, 1990, p.320). In terms of wealth, estimates suggest that the air attacks in Germany destroyed about 20 percent of national wealth relative to 1939 levels.[15]

After the war, the new German government was confronted with a severe housing and employment shortage, aggravated by the inflow of millions of German refugees from former Eastern territories.[16] Policy makers responded with a variety of measures, two of which are noteworthy with respect to the study of household wealth, as they potentially affect the observed long-term effects of the destruction. First, the German government introduced a one-off levy on wealth: the *Lastenausgleich*, which transferred money from those who had suffered no or little damage to those who had lost property. Although the levy was 50 percent on assets held in 1948, its redistributive impact should not be overestimated. On the one hand, beneficiaries of the levy were only compensated for part of their losses, and replacement rates decreased with the value of the damage.[17] On the one hand, from the perspective of those who had to pay the levy, the burden was not high, as the levy could be paid in annuities over 30 years, facilitated by the substantial economic growth of the 1950s and 1960s. A second set of policies aimed at the provision of subsidized housing and the construction of new, mostly rental homes. The effect was

[15]Estimates summarized in citet[p.243]Hampe1963a state that the total percentage of national wealth lost as a result of the war was 45, of which 12 percentage points are due to the loss of territories east of the Oder-Neiße line and 20 to 22 percentage points to air attacks.

[16]By 1953, the number of refugees in West Germany had reached 8.3 million people from former Eastern territories and 2 million from the Soviet Occupation Zone (Albers, 1989).

[17]Replacement rates decreased from 100 percent for damages up to 6,200 Reichsmark (approximately 19,000 euros in 2020) to a minimum rate of 3.5 percent for damages larger than two million Reichsmark (approximately six million euros).The minimum rate was increased to 6.5 percent in 1967. (Albers, 1989; Deutsche Bundesbank, 2019).

that between 1950 to 1961, the number of dwellings in West Germany and Berlin increased from 10.1 million to 16.1 million, while at the same time, the homeownership rate declined from 39.1 to 34.1 percent (Statistisches Bundesamt, 1955, 1964).[18] Although such policies very likely affected prices on real estate markets as well as investment decisions, their effect on post-war household wealth is unclear.

3 Data

Our study relies on two data sources. The first source is the historical destruction data for German municipalities provided by Gassdorf and Langhans-Ratzeburg (1950) (GLR), enriched with regional control variables capturing the pre- and post-war phase. The second source is a representative household panel dataset for Germany, the Socio-Economic Panel (SOEP). Since 2002, SOEP has been providing information on wealth, our main outcome variable, together with a broad set of control variables. For the analyses, all data sources are georeferenced and the historical data is linked to present-day wealth holdings using SOEP respondents' place of birth.

3.1 Historical Data

3.1.1 Levels of City Destruction

Gassdorf and Langhans-Ratzeburg (1950) (GLR for short) assembled a comprehensive dataset on the destruction of German cities and municipalities.[19] It covers all 1,898 West German municipalities with more than 3,000 inhabitants [20] and provides the share of destroyed dwellings in 1945 relative to the total number of dwellings in 1939 for 1,739 of these municipalities. Unfortunately, GLR does not provide destruction information for municipalities in

[18]The increase also includes 0.3 million dwellings in the Saarland region that were built in 1957 when the Saarland became part of Germany again.

[19]We use the terms "city" and "municipality" interchangeably.

[20]The original GLR data contain 1,901 entries because three cities are reported twice.

East Germany.

The GLR database builds on harmonized administrative sources, including federal statistical offices, ministries, and local administrations. Administrative agencies collected these data in the post-war period to allocate refugees and reconstruction funds. In GLR, a dwelling is classified as destroyed if it was more than 50 percent damaged.[21] According to this definition and taking the weighted average using municipalities' population sizes in 1939, about 29 percent of the buildings were destroyed.

The extent of destruction varies with city size and across regions. Figure 1 provides a scatter plot of municipality-level destruction levels and population sizes. At any level of city size, destruction levels exhibit large variation, while the destruction level, on average, increases with city size. While we will control for this relationship in the subsequent analyses, our identification strategy builds on the differences in destruction levels across regions. Figure 2 provides a heat map of regional destruction. To create this Figure, we georeferenced the GLR data using the so-called Geonames database.[22] The map shows that cities cluster in the central western area of Germany (what today is the state of North Rhine-Westphalia) and in the southwest, along the Rhine river. It is also in these regions where most of the destroyed cities are located. However, cities that were largely (50 percent or more) destroyed can be found in all German regions.

We assess the quality of the GLR data in two respects. First, we compare the average level of destruction according to GLR with two alternative highly aggregated data sources. The United States Strategic Bombing Survey (1945) and Albers (1989) estimate that 20 percent of dwelling units were destroyed or heavily damaged, thus indicating a slightly lower level of destruction than the

[21] An exception are cities from the state of Bavaria. Here, only completely destroyed dwellings were classified as destroyed. For robustness, we conduct our main analysis excluding Bavarian cities.

[22] See http://www.geonames.org. Last accessed in October 2020. To each municipality we assigned the geo-coordinates of its center. Some of the municipalities were disbanded after 1939 and merged with neighboring cities, but they continue to exist as districts under their old name. In these cases, we assigned the geo-coordinates of the district center.

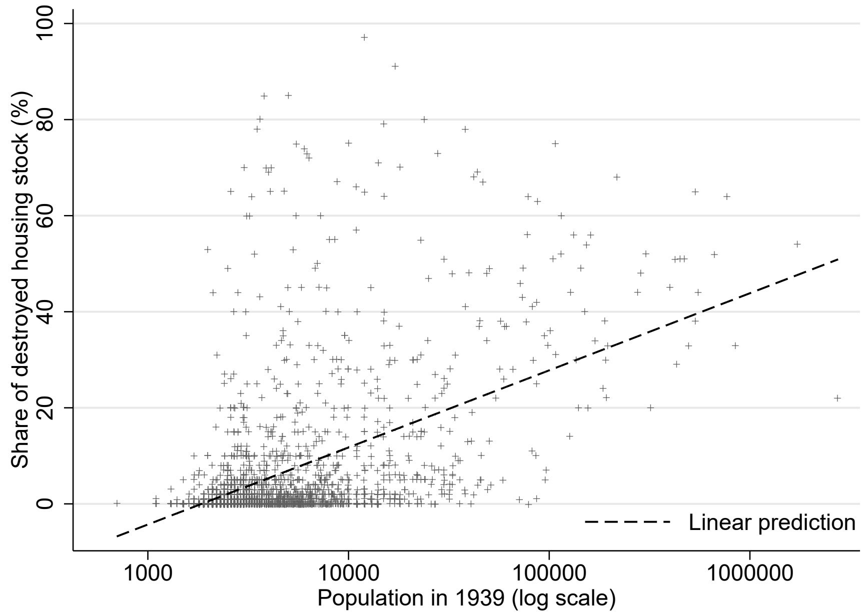


Figure 1: Destruction and population size

Note: The slope coefficient of the fitted line is 6.969, meaning that average destruction increases by approximately 0.07 percentage points for a one-percent increase in city size. Source: Gassdorf and Langhans-Ratzeburg (1950); own calculations.

GLR data. This is not surprising given that the GLR data do not contain very small municipalities, which were, on average, destroyed less than larger urban agglomerations. Second, we compare the GLR data with the destruction data for the largest 199 West German cities provided by Kästner (1949).[23] For these 199 cities, average destruction levels based on Kästner (1949) and GLR are very close, and the city-level destruction values form both data sources correlate highly (0.84).[24] Thus, both cross-validations suggest that the GLR data provide valid information on the levels of destruction of German municipalities.

[23]This is the data source used by Brakman et al. (2004), Vonyó (2012), Burchardi and Hassan (2013), Akbulut-Yuksel (2014), and Braun and Omar Mahmoud (2014) among others.

[24]Differences are largest for some cities in the state of North Rhine-Westphalia, for which the average destruction in Kästner (1949) is 6.5 percentage points higher. A footnote in Kästner (1949, p.368) states that their figures for North Rhine-Westphalia contain not only "completely destroyed" but also "heavily destroyed" dwellings, pointing to the possibility that the authors had to use a different definition of destruction for North Rhine-Westphalia than for the other states and a different one than used in the GLR data.

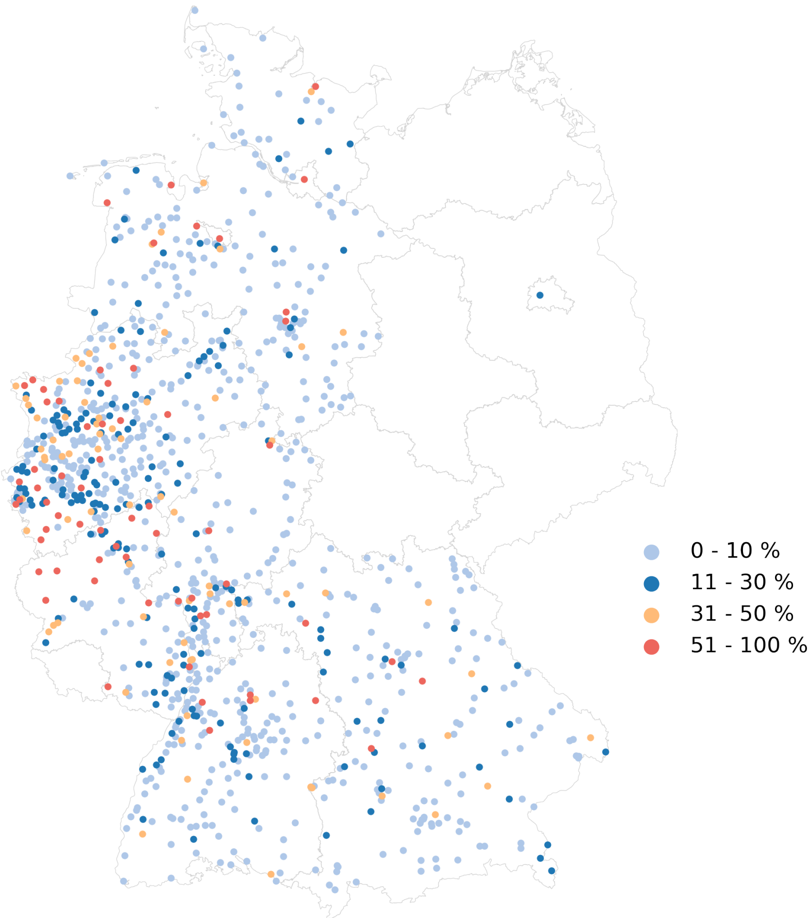


Figure 2: Share of destroyed housing stock in 1945 for cities with more than 3000 inhabitants. N = 1,739.

Source: Gassdorf and Langhans-Ratzeburg (1950); own calculations.

3.1.2 Additional Control Variables

In the analysis below, we include two types of regional variables to control for pre-war conditions:

1. *Economic performance.* To capture differences in regional economic performance, we use data from Brockmann and Halbmeier (2020) at the level of tax districts on per-capita tax revenues from income, payroll, wealth, and corporate taxes in the year 1938. In total, we use data for 516 tax districts covering West Germany and Berlin.

2. *Population density.* To capture structural differences between rural and urban regions, we use population densities on the level of 571 administra-

tive districts – so-called Stadt- and Landkreise – in 1939 from Statistisches Reichsamt (1944). Population densities are defined as inhabitants per square kilometer.

3.2 SOEP Data

The German Socio-Economic Panel (SOEP) is among the largest and longest-running representative panel surveys worldwide and is recognized for maintaining the highest standards of data quality and research ethics (Goebel et al., 2019). In 2019, the survey covered about 30,000 adults in 20,000 households. Since 1984, SOEP has provided both a broad set of self-reported "objective" variables, such as income, age, and gender, as well as many "subjective" indicators such as satisfaction with life and worries. Most importantly for our purposes, SOEP provides detailed household information on income portfolios and biographical data, including respondents' own and their parents' place of birth.

To cope with panel attrition, several refresher samples have been added to the SOEP to maintain the sample size. Further, to ensure the cross-sectional representativeness in the presence of influx to the underlying target population, several boost samples have been added.

3.2.1 Linking Historical and SOEP Data

We link the SOEP data with regional historical data using respondents' place of birth.

We match the municipality-level destruction data to SOEP respondents with the closest distance. For each person, we calculate the distance between her city of birth and all cities with destruction information and assign the destruction rate of the closest city to each person. We drop individuals for whom the closest distance exceeds five kilometers to ensure a close match between city of birth and actual destruction treatment.

We match the historical economic performance indicators using the georeferenced tax district borders by Brockmann and Halbmeier (2020) and the geocoded place of birth information from SOEP. Every SOEP respondent is matched to the tax district in which she was born. Analogously, we match SOEP respondents with the historical population densities using the georeferenced district borders provided by MPIDR and CGG (2011).

For the construction of what we refer to as the *first-generation sample* (see Section 3.2.3), we consider SOEP respondents who were born after 1930 and before 1946 and match them with the regional information about their own place of birth. Additionally, we investigate whether parents' exposure to WWII bombing had an effect on their children's wealth "today," motivated by the idea that the effects of destruction last across generations. To this end, to construct what we refer to as the *second-generation sample* (see Section 3.2.3), we match SOEP respondents to the destruction data using their fathers' and mothers' cities of birth. Figure 3 depicts the temporal sequence of birth, bombing exposure, and wealth surveying for all samples.

3.2.2 Focal Variables

Our analyses build on two core pieces of information from the SOEP: wealth and place of birth.

SOEP has been surveying respondents on their wealth portfolios every five years since 2002 using the questionnaire module "my personal balance sheet." A unique feature of the SOEP study is that each adult respondent in a household provides her/his portfolio. This includes net (of debt) wealth, the net-of-debt value of the residential real estate that the respondent occupies[25] and also whether (or not) the respondent owns the building she occupies. This allows for direct linkage of an individual's real estate today with her birth place in the past. To cope with item-non response, SOEP provides each portfolio

[25]The value is only known if the respondent owns the residential property. For non-owners, we use a value of zero.

component in imputed form.[26]

Because SOEP is a panel and the wealth module was implemented four times between 2002 and 2017, for most respondents, portfolio information is available at several time points. In our analysis, we use the earliest possible year for each respondent to limit the effects of old-age dissaving. Old-age dissaving is a potential threat to our analysis as it likely attenuates wealth differences between the wealthy and the poor, and also between those whose real estate was destroyed and those whose real estate was left intact.[27] We censor net wealth and the net-of-debt value of residential real estate at the 0.1st and 99.9th percentile to reduce biases from outliers.

As regards respondents' birth, SOEP provides the year and also geocoded place of birth (the latter since 2012). The parents' cities of birth were first collected in 2018, either indirectly, by asking SOEP respondents about their parents, or directly from the parents, provided they participated in SOEP. Unfortunately, respondents' own place of birth is not available for two SOEP subsamples – L2 and L3 – which consequently do not enter the subsequent analysis. L2 and L3 constitute about 16.7 percent of all SOEP individuals in 2012 and comprise mainly young families with low income. The exclusion of the two samples should be innocuous for our results, as persons born 1945 and earlier constitute only around 0.5 percent of samples L2 and L3. Apart from this, the parental place of birth is not available for a smaller share of SOEP respondents who conducted paper- or web-based interviews as the questions about the parental place of birth were only used in computer-assisted personal interviews (CAPI).[28]

[26]For each wealth item, five imputations are provided.

[27]Similarly, selective deaths within the population also potentially affect our analysis. If poorer individual pass away at younger ages, they are less likely to be surveyed. Based on this assumption, selective death also leads to an underestimation of potential effects.

[28]CAPI interviews constituted about 76 percent of all interviews in 2018 Further, parental information is available for non-CAPI interviewees if parents themselves participated in SOEP.

3.2.3 Construction of Working Samples

Our analyses rely on different SOEP working samples.

The *first-generation sample* includes SOEP respondents who were born after 1930 and before 1946, and thus were directly exposed to the bombings in childhood. As information in the GLR data is restricted to West German cities and Berlin, we exclude respondents from East Germany. In addition, we exclude respondents who *lived* part of their lives in the German Democratic Republic (GDR) as they experienced an additional wealth shock with the creation of a socialist system.

We apply analogous sample selection criteria to the two *second-generation samples* as we did for the *first-generation sample*. For the sample of fathers, we select individuals whose fathers were born between 1931 and 1945. The father's place of birth has to be in West Germany or Berlin, within five kilometers of a city with information on WWII destruction, and the respondent (not the father) may not have lived in the GDR.[29] In the sample of mothers, we apply analogous criteria.

The effect of these sample selection criteria for sample sizes is presented in Table 2. The table shows that from the initially 53,415 individuals in the SOEP for whom wealth information is available, 1,535 remain in the final first-generation sample. Most individuals, 86.6 percent, are dropped because they were not born between 1931 and 1945. Another 5.6 percent are dropped because the place of birth is missing. In the second-generation samples, sample selection criteria have similar effects, but relatively larger numbers of individuals are dropped due to a lack of data on parents' birthplaces.

[29]The data do not allow us to determine whether parents lived in the GDR. However, as the focus is on parents born in West Germany before 1946, almost all of the children were born before 1990, when the GDR still existed. If children did not live in the GDR, we consider it to be unlikely that their parents lived for an extended period in the GDR.

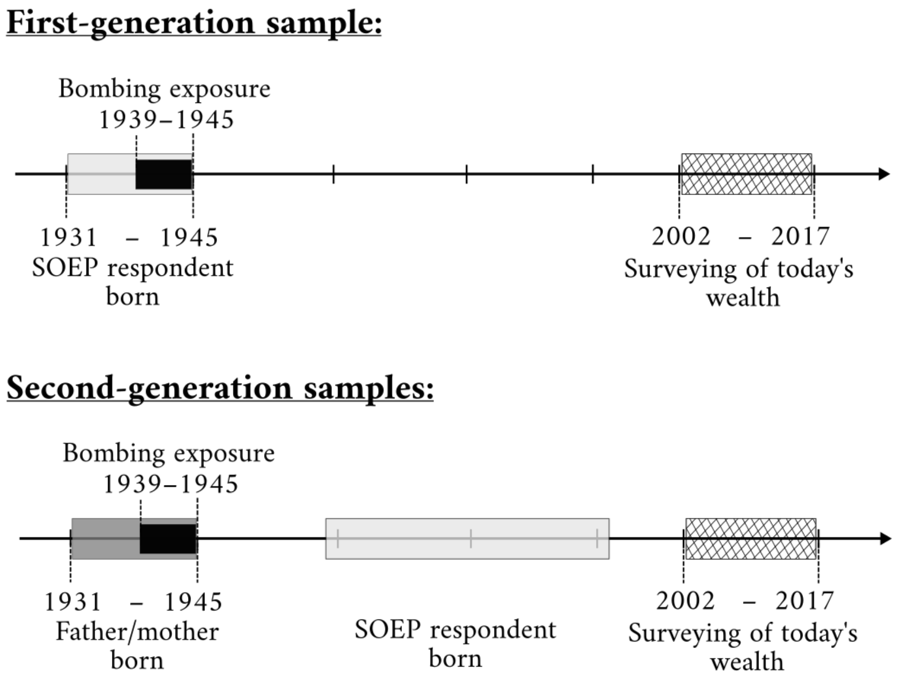


Figure 3: Timeline of events

Table 2: Dropped number of observations due to sample selection criteria and final sample sizes.

	First gen.	Second gen. fathers	Second gen. mothers
Initial sample (N)	53415	53,415	53,415
Sample selection criterium:		Dropped (N):	
+ Born 1931-1945	-46277	−40,117	−40,701
+ Did not live in GDR	-1791	−2,954	−2,787
+ With geocoded birth place	-2968	−8,539	−8,204
+ Birth place in West Germany or Berlin	-491	−474	−438
+ Birth place within 5km to city from GLR data	-311	−280	−265
+ Non-missing destruction and population	-42	−29	−34
Final sample (N)	1535	1,022	986

Note: The initial sample consists of all individuals who participated in at least one of the four survey waves that included the wealth questionnaire (2002, 2007, 2012, or 2017). Source: SOEP v35.

3.2.4 Descriptive Characteristics of the Working Samples

Table 3 provides descriptive statistics for the *first*- and *second-generation samples*. Column 1 shows that the individuals in the first-generation sample are, on average, 67.12 years old, hold 193,323 euros of net wealth, and 64.56 percent are homeowners. They were born in cities that had, on average, 401,820 inhabitants in 1939 and that were 21.98 percent destroyed. Columns (3) and (5) show that individuals in the second-generation samples are, by construction, substantially younger than the first-generation sample with an average age of 39.3 years (father sample) and 42.6 years (mother sample). Consistent with the lifecycle hypothesis, their average net wealth is, at around 40,000 euros, lower than that of the first-generation sample. Parents of these second-generation individuals were born in cities that had, on average, about 300,000 inhabitants and that were 23.2 (fathers) and22.0 (mothers) percent destroyed. Further, the table compares these samples to persons from the same birth cohort who (or whose parents) were also born in West Germany or Berlin, but who had to be excluded from analysis because their municipalities of birth are more than five kilometers away from the closest city in the GLR data. As could be expected, columns (2), (4), and (6) show that excluded persons—or their parents—come from more rural regions, as indicated by the lower population density indicators and lower regional per-capita tax returns. Further, the ratio of homeowners is higher among excluded persons in the case of the two second-generation samples.

Table 3: Average characteristics of first- and second-generation samples as well as excluded observations

	First generation		Second generation, fathers		Second generation, mothers	
	(1) In sample	(2) Excluded	(3) In sample	(4) Excluded	(5) In sample	(6) Excluded
SOEP data:						
Net wealth (Euro)	193,322.80	143,532.26	91,750.67	113,456.35	101,384.76	123,089.28
House net value (Euro)	99,872.92	86,117.95	38,887.28	53,816.73	47,209.78	58,982.10
Homeownership (%)	64.56	67.99	39.63	53.07	44.93	57.53
Age	67.12	67.82	39.27	40.72	42.61	42.85
Birth year	1,938.92	1,938.73	1,969.32	1,968.02	1,966.00	1,965.96
Survey year (minimum)	2,002.00	2,002.00	2,002.00	2,002.00	2,002.00	2,002.00
Survey year (maximum)	2,017.00	2,017.00	2,017.00	2,017.00	2,017.00	2,017.00
Historical data:						
Destruction (%)	21.98		23.17		21.98	
City population 1939 (1000 inh.)	401.82		320.55		309.78	
Population density 1939 (inh./km2)	1,430.81	319.35	1,328.15	134.58	1,322.53	167.03
Tax revenues 1938 (RM per capita):						
- Wealth	6.73	3.12	6.24	2.69	6.17	2.76
- Payroll	35.92	14.53	33.24	11.71	32.69	13.46
- Income	55.81	29.41	51.77	23.55	51.59	25.96
- Corporate	44.18	14.22	39.53	10.73	39.61	10.63
Observations	1535	353	1022	309	986	299

Note: Samples shown in columns (1), (3), and (5) are defined as described in Section 3.2.3. Excluded individuals in column (2) were born between 1931 and 1945 in West Germany or Berlin and did not live in the GDR, but were born more than five kilometers away from a municipality with destruction information or were born close to a municipality with missing destruction or population information. Excluded individuals in column (4)/(6) did not live in the GDR and had fathers/mothers who were born between 1931 and 1945 in West Germany or Berlin but more than five kilometers away from a municipality with destruction information or who were born close to a municipality with missing destruction or population information. RM are Reichsmark. Source: SOEP v35, Statistisches Reichsamt (1944), Gassdorf and Langhans-Ratzeburg (1950), Brockmann and Halbmeier (2020), own calculations.

4 Methods

4.1 Specification of Regressions

By exploiting the exogenous variation of destruction, we identify the causal effect of the shock exposure on wealth stocks today. The wealth stock is captured by three variables: net-of-debt wealth (in euros), net value of primary residence (in euros), and being the owner of primary residence (dummy variable). Wealth is always measured in the earliest available year between 2002 and 2017. For the first-generation sample, which was treated with different intensities of destruction at the age of 0 to 10 years, the basic OLS regression model takes the form,

$$y_{imrt} = \alpha + \beta_1 D_m + X_i' \beta_2 + V_r^{hist'} \beta_3 + \sum_t D_t \beta_t + \varepsilon_{imrt} \quad . \tag{1}$$

The left-hand variable, y_{imt}, measures the wealth stock of a respondent i in year t, born in municipality, m, in region r.

The first right-hand variable, D_m, is the percentage share of the destroyed housing stock in a person's birthplace, m. The proposed coefficient of interest is β_1. If higher destruction in the past implies lower wealth today, β_1 will be negative. X_i' is a set of individual-level control variables including age, age squared, and the federal state where the respondent was born. D_t is a dummy variable indicating the year $t \in (2002, 2007, 2012, 2017)$ when wealth was surveyed.

A potentially important confounding factor is the past economic development of a region that both made bombardment more likely and also affects wealth stocks today. Allied forces indeed targeted specific industries, important infrastructures, and larger cities in general, and it is possible that these factors correlate with post-war growth, affecting income and wealth levels up to the present. To mitigate such effects, we include $V_r^{hist'}$, a set of variables capturing the pre-war economic development of the birth region of i: the income, payroll, corporate, and wealth tax revenue per capita, the regional population density, as well as the number of inhabitants of a municipality.

Finally, ε_{imrt} is a random, idiosyncratic error term, clustered at the level of GLR municipalities to account for correlations in wealth between individuals born in the same region of destruction.

Additionally, our second strategy is to bypass confounding factors by means of IV estimations detailed below.

In the second-generation sample, fathers and mothers were aged between 0 and 10 years at the end of the war, and wealth of their children is measured 60 to 70 years later. To assess the effects of destruction of a parent's city of birth on individual i's wealth, we build on adapted version of model (1), taking the form,

$$y_{im_pr_pt} = \alpha^p + \beta_1^p D_{m_p}^p + X_i'\beta_2^p + V_{r_p}^{hist'}\beta_3 + \sum_t D_t\beta_t + \varepsilon_{im_pr_pt} \quad , \; p \in (\text{mother, father}). \tag{2}$$

The treatment now is $D_{m_p}^p$, the destruction of the father's or mother's city of birth. Hence, if higher destruction of the father's (mother's) birth place in the past imply lower wealth today, β_1^f (β_1^m) will be negative. $V_{r_p}^{hist'}$ captures the pre-war economic development (as defined above) of the birth region of parent p of i.

Because the wealth data is multiply imputed, in all estimations, we use Rubin's rule (Rubin, 1987).

4.2 Instrumental Variables

Following Vonyó (2012) and Akbulut-Yuksel (2014), we use the distance between a municipality and London as an instrumental variable.[30] Figure 4 shows that there is a strong negative correlation between the distance to Lon-

[30] Miguel and Roland (2011) use distance between Vietnamese regions and the 17^{th} parallel north in their study on bombing during the Vietnam War.

don and the degree of destruction. That the instrument is relevant is indicated by relatively high F statistics: Depending on the sample of interest, these range between 10.1 and 24.5. [31] F-statistics are not higher because we take a conservative approach by clustering on the level of GLR municipalities, and there is, by construction, no variation in the instrument and the instrumented destruction variable within clusters.

There are several possible reasons why more distant municipalities were bombed less. First, the range of aircraft types was limited, particularly in the early years of the war.[32] Second, as argued by Hampe (1963b), most regions in Germany offered valuable targets, and from a simple cost-benefit perspective, it was more convenient to attack nearby regions. Third, the course of the war led to invasion of British and Americans troops from the West, escorted by heavy bombardments that destroyed several municipalities near the German western border.

As regards exogeneity of the instrument, our main concern is that the distance variable picks up peculiarities of the German economic geography. For example, the federal state of Bavaria is in one of the richest areas of Germany and is also far from London. To ensure that our estimates are robust to such unintended links, we repeat all estimations in the robustness section excluding specific states.

[31] These are Kleibergen-Paap rk Wald F-statistics for a test of weak instruments for the two-stage least squares estimator as reported by Stata's ivreg2 command (Baum et al., 2002). Based on critical values from Stock and Yogo (2005), F-statistics larger than 16.38 imply that the null hypothesis of weak instruments can be rejected at a significance level of 5%. The null hypothesis states specifically that a Wald test on the estimated coefficient of interest (β_1) has a size larger than 10%, meaning that statistically, inference on β_1 is prone to type-I errors under the null hypothesis. A second, looser null hypothesis is that the Wald test size is more than 15%, which corresponds to a critical F-statistic of 8.96. All of our IV regressions surpass this second critical value.

[32] Although bombers had sufficient range to penetrate deep into German territory, the limited range of accompanying fighter aircraft posed a major problem for Allied forces. An important technical innovation was the introduction of the P-47D Thunderbolt and P-51 Mustang long-range fighters in 1943, which made it possible to escort bombers deeper into the German territory (p.6 The United States Strategic Bombing Survey, 1945; Hampe, 1963a, p.125)

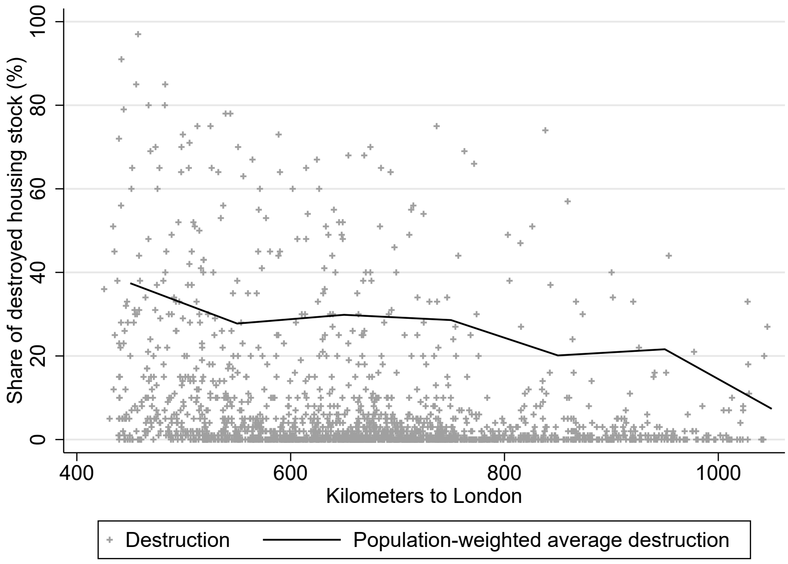


Figure 4: Destruction and distance from London of German municipalities.

Note: The figure shows all 1739 municipalities with valid destruction information. Population-weighted average destruction is calculated for bins of 100 kilometers using a municipality's number of inhabitants in 1939 as weight. Source: Gassdorf and Langhans-Ratzeburg (1950); own calculations.

5 The Long-Run Effect of Bombings on Wealth Holdings

5.1 Regression Results

Table 4 reports the estimate of the destruction parameter, β_1, from OLS and IV regressions for the first-generation sample for each of our three dependent variables: net wealth, net value of primary residence, and being a homeowner. For both models, OLS and IV, we estimate two specifications, differing in the set of control variables: while in specification (1), X' only contains controls for age, specification (2) also includes the state in which the respondent was born to control for regional effects resulting, e.g., from different developments in real-estate markets.

All OLS estimates of the destruction parameter are significant and negative, suggesting that the experience of bombing during childhood has a permanent negative effect on wealth holdings in later life, including the probability of being a homeowner. The effect is economically relevant. As an example, a one percentage point increase in the proportion of destroyed residential buildings in the municipality of birth reduces net wealth later in life by about −1,015 to −1,131 euros. The effect size equals approximately 0.5% of the average net wealth in the sample. A main question is whether the detrimental effect on net wealth is due to lower real estate possessions. This is the case: the higher the level of destruction, the lower the value of real estate and the probability of possessing real estate. With an effect size of about −718 to −836 euros, losses in real estate explain more than two thirds of the losses in net wealth. Moreover, small standard errors indicate that there is a strong link between destruction and real estate holdings.

The IV estimations confirm the negative effect of having experienced bombing in WWII on wealth holdings today. Quantitatively, the effects are stronger and estimated with less precision compared to OLS. In sum, the estimates for the first-generation sample support the idea that WWII destruction has a long-lasting effect on wealth holdings of German households.

The regression results for the two second-generation samples support the above assessments. Table 5 provides the effects for the treatment of fathers and Table 6 of mothers. Quantitatively and qualitatively, the OLS estimates for the second-generation sample are very similar to the first-generation sample. As regards the treatment of fathers, OLS estimates show that a one percentage point increase in destruction experienced by parents reduces the later-life net wealth of their children by −964 to −1,055 euros. For the treatment of mothers, the effects are somewhat smaller (−753 to −974 euros). Again, the detrimental effect of destruction operates strongly through real estate holdings: According to the OLS estimates, a marginal increase in destruction in the father's region reduces the net value of the children's primary residence by −488 to −507 euros and between −385 and −485 euros for mother's region. Again, destruction is echoed again in the probability of being a homeowner. Compared to the effects estimated in the first generation, we find a larger effect of the destruction level of fathers' regions on the likelihood of being a homeowner, −0.293 to −0.358 percentage points in case of OLS, but no effect of the destruction level of mothers' regions. One possible explanation is the channels through which assets are transferred between generations. The issue of inheritance is further explored in the following mediation analysis. Table 7 shows that bombardment has a substantial detrimental economic impact. According to the point estimates, average net wealth was 16,553 to 22,330 euros higher in the absence of bombardment, depending on the sample. These absolute differences correspond to 11.5 percent of average net wealth in the first-generation sample, 24.3 percent in the second-generation father sample, and 16.3 percent in the mother sample. For net value of the primary residence, the losses amount to 8,452 to 15,781 euros.[33]

Irrespective of the outcome, effects in the IV regressions are quantitatively larger than in OLS but estimated with lower precision. This result coincides with the results of the study by Akbulut-Yuksel (2014), who use the same identification strategy as ours. A likely explanation is that OLS estimates are somewhat biased towards zero due to omitted variables. Although we include pre-war economic control variables on a small regional level, we do not control for any factors on the municipality level other than the number of inhabitants. One might, for example, think that omitting the municipality-level population density biases the OLS results if wealthier people lived denser municipalities and these municipalities were attacked more heavily. Both assumptions may be true given that population density should correlate positively with property prices and economic development. Moreover, Allied forces might have attacked denser cities more heavily due to their strategy of bombing to break the morale of the German population or other strategic considerations. Overall, OLS estimates may be interpreted as a conservative lower bound of the true effect, which is negative regardless of the estimation method.

[33] To calculate hypothetical distributions of net wealth, we add to each person's net wealth an amount corresponding to the level of destruction that the person experienced times the estimated effect of destruction based on specification (2).

Table 4: Effect of destruction, first generation, 1931-1945 cohort.

	OLS		IV	
Outcome	(1)	(2)	(3)	(4)
Net wealth	-1130.8***	-1014.6**	-4113.1**	-5725.0*
	(426.6)	(467.5)	(1953.9)	(3037.4)
Net value primary resid.	-835.6***	-718.1***	-3578.6***	-2386.5**
	(211.7)	(174.0)	(1004.7)	(1074.0)
Homeownership	-0.175*	-0.194**	-0.594**	-0.235
	(0.092)	(0.093)	(0.297)	(0.392)

Note: Specifications (2) and (4) include federal state dummy variables. Further controls in all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax in 1938. Instrument: distance to London. The number of observations is 1,535 in all regressions. Standard errors in parentheses, clustered on the level of GLR municipalities, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

Table 5: Effect of destruction, second generation, 1931-1945 father cohort.

	OLS		IV	
Outcome	(1)	(2)	(3)	(4)
Net wealth	-1055.0***	-963.8***	-3775.7**	-1330.3
	(395.0)	(333.3)	(1515.0)	(1963.7)
Net value primary resid.	-487.7***	-506.8***	-1889.5***	-1557.6**
	(133.5)	(121.1)	(688.1)	(688.6)
Homeownership	-0.293***	-0.358***	-0.563*	-0.651
	(0.098)	(0.099)	(0.316)	(0.436)

Note: Specifications (2) and (4) include federal state dummy variables. Further controls in all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax in 1938. Instrument: distance to London. The number of observations is 1,022 in all regressions. Standard errors in parentheses, clustered on the level of GLR municipalities, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

Table 6: Effect of destruction, second generation, 1931-1945 mother cohort.

	OLS		IV	
Outcome	(1)	(2)	(3)	(4)
Net wealth	-973.8**	-753.2**	-4564.2**	-34.8
	(409.8)	(366.6)	(1876.0)	(2419.0)
Net value primary resid.	-485.3***	-384.6**	-2643.0***	-1582.3
	(148.0)	(148.7)	(829.5)	(1002.0)
Homeownership	-0.136	-0.131	-0.109	0.083
	(0.090)	(0.099)	(0.327)	(0.553)

Note: Specifications (2) and (4) include federal state dummy variables. Further controls in all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax 1938. Instrument: distance to London. The number of observations is 986 in all regressions. Standard errors in parentheses, clustered on the level of GLR municipalities, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

5.2 Mediation Analysis

The mediation analysis seeks to identify and explain the mechanisms underlying the observed relationship between wartime destruction and wealth holdings today through the inclusion of third variables, the so-called mediators. Rather than a direct causal relationship between wartime destruction and wealth, the mediation analysis proposes that wartime destruction influences the mediator variables, which in turn influence wealth holdings.

Against the background of the existing literature on the consequences of wars, we study the role of the following potential mediators:

- *Education.* Several studies show (Table 1) the detrimental effect of war and wartime destruction on educational outcomes. According to Akbulut-Yuksel (2014), World War II destruction in Germany reduced the years of school attendance at that time. As higher education, an important component of human capital, implies higher lifetime income and thus a higher propensity to save and accumulate wealth (Card, 1999), we expect education to be an important mediator that explains part of the total effect of destruction on wealth. As a measure for education, we

Table 7: Hypothetical distribution of average wealth stock assuming no destruction.

		OLS (2)		IV (2)	
	Observed	Hypothetical	Difference	Hypothetical	Difference
		Net wealth:			
First generation	193,323	215,621	22,298	319,146	125,823
Second generation, fathers	91,751	114,080	22,330	122,572	30,821
Second generation, mothers	101,385	117,938	16,553	102,149	764
		Net value of primary residence:			
First generation	99,873	115,654	15,781	152,322	52,449
Second generation, fathers	38,887	50,629	11,741	74,975	36,087
Second generation, mothers	47,210	55,661	8,452	81,984	34,775

Note: Source: SOEP v35.

use a person's highest educational degree classified according to the International Standard Classification of Education (ISCED) (UNESCO (2006)).

- *Health.* Health is another important part of human capital and presumably operates in a similar way to education. Several studies find that war-related treatments have long-lasting detrimental effects on health outcomes (see Table 1). Hence, we expect that health, like education, explains part of the total effect of destruction on wealth. As a measure of health, we use a person's current satisfaction with her health, self-rated on a 0-to-10 scale.[34]

- *Lifetime labor market outcomes.* For the vast majority of people, work is a central determinant of material well-being. Labor market outcomes may pick up potential effects of destruction on regional economic development, both in regions where individuals were born as well as in regions to which they moved later in life. For example, the results of Brakman et al. (2004) and Bosker et al. (2008) indicate that the WWII bombings in Germany reduced city-level population growth up to 50 years after the war, which might have affected regional economic development in various ways. We use three indicators of labor market success: 1) The age at which a person had her first job, to test whether labor market entrance decisions were affected by destruction. 2) The years of total labor market experience to measure lifetime labor supply. 3) An indicator of lifetime income.

- *Inheritances.* The channel of missed inheritances due to wartime destruction might be the most obvious channel negatively affecting the wealth position today – especially for the second-generation sample. To assess this channel, we construct a dummy variable that indicates whether a

[34]Unfortunately, the data do not contain information on health during childhood or a person's medical history.

person has received an inheritance or inter vivos gift. Depending on the availability of data, the dummy is defined by one of three variables: individual inheritances over the lifetime up to the year 2001; individual inheritances during the period 2002 to 2017; household-level inheritances during the years a person participated in the SOEP. Due to the differences in the measurement, we expect significant measurement error in the variable.

To study the role of the potential mechanisms, we proceed in three steps. First, we re-estimate equations (1) and (2), but use the potential mechanism as the dependent variable in lieu of wealth (row a. in Table8). That is, we test whether differences in the local level of wartime destruction affect the respective mediator. Second, we test whether the mediator is correlated with wealth (row b). For a causal pathway to exist, we would expect that wartime destruction directly impacts the mediator, which in turn is correlated with wealth. Third, we estimate the magnitude of the mediated effect using the method of Acharya et al. (2016), which relies on the Average Controlled Direct Effect (ACDE). The ACDE is defined as the direct causal effect of destruction on wealth if there were no mediated effects.[35] Row d reports the difference between the ACDE and the total effect of destruction as an estimate for the magnitude of the mediated effect, whereas row c reports the total effect of destruction as a reference.[36]

Table 8 summarizes the results for all three samples. Education and destruction are always negatively related, while education correlates positively with net wealth. Depending on the sample, education explains about 25 to 256 euros of the total effect of destruction on wealth. The contribution of education is smaller in the second-generation samples, possibly because the

[35] More precisely, "[t]he CDE represents the causal effect of a treatment when the mediator is fixed at a particular level." (Acharya et al., 2016). In the analysis, all mediators are fixed at 0 or at the lowest category (education and age (minimum legal working age (13 years)).

[36] The total effects reported in Table 8 differ slightly compared to the main results reported in Tables 4 to 6 because some observations had to be dropped from the sample due to missing values in the mediators.

effect of education on net wealth (row b) is smaller than in the first-generation sample. This is reasonable considering that the second generation is younger than the first generation and education still has not yielded the full lifetime returns. Satisfaction with health correlates positively with net wealth, but the correlation with destruction is rather weak. In sum, we find a small but insignificant mediating effect in the first-generation sample of about 96 euros, and null effects for the second-generation samples. Regarding the labor market outcomes positively correlate with net wealth have a weak negative correlation with destruction, indicating that individuals from more severely destroyed municipalities started to work at a younger age, accumulated less labor market experience, and earned less lifetime income. Yet the mediating effect of the labor market outcomes is negligible. The same holds for inheritances. This runs counter to our expectations because inheritances are an essential channel through which families pass on wealth to their children. We suspect, however, that measurement error in the inheritance indicator introduces significant bias into the estimates.

Overall, the mediation analysis points to education as an important mediator that, in the first-generation sample, contributes about one quarter to the total effect of destruction on net wealth. The mediation analysis also shows that a large share of the total effect is not explained by the mediators we considered, pointing to the possibility that other mediators exist that we could not consider due to data constraints. For example, Second World War destruction triggered large-scale rebuilding programs and important government interventions into the real estate market that may have had long-lasting effects on individual investment behavior and household portfolios. Further, while we considered lifetime labor market outcomes, it is also possible that effects of destruction were mediated through the capital market. Affected individuals potentially had less assets for investment or as collateral for mortgages, such that post-war wealth differences were perpetuated over decades.

Table 8: Mediation analysis.

	(1) Education	(2) Satisfaction with health	(3) Age at first job	(4) Labor market experience	(5) Lifetime income rank	(6) Inheritances
First generation:						
a. Effect of destruction on mediator	-0.005**	-0.008*	-0.005	-0.047*	-0.000	-0.011
b. Effect of mediator on net wealth	61499.852***	18628.205***	14092.898***	327.278	73556.078**	642.374**
c. Total effect β_1 (Euro)	-994.301**	-994.301**	-994.301**	-994.301**	-994.301**	-994.301**
d. Contribution of mediated effect (Euro)	-255.965*	-96.310	-29.248	-41.844	5.498	-5.488
Observations	1497	1497	1497	1497	1497	1497
Second generation, fathers:						
a. Effect of destruction on mediator	-0.007**	-0.002	0.000	0.006	-0.001**	0.005
b. Effect of mediator on net wealth	22700.676***	9428.377**	8051.045***	-3078.960**	77692.007***	991.517***
c. Total effect β_1^f	-1000.323***	-1000.323***	-1000.323***	-1000.323***	-1000.323***	-1000.323***
d. Contribution of mediated effect (Euro)	-25.038	-14.003	-0.844	-11.654	-88.426	4.445
Observations	977	977	977	977	977	977
Second generation, mothers:						
a. Effect of destruction on mediator	-0.004*	-0.004	-0.009	-0.008	-0.001	0.051
b. Effect of mediator on net wealth	24156.969***	10227.937***	6511.469***	-1840.738	102782.142***	875.357***
c. Total effect β_1^m	-746.427**	-746.427**	-746.427**	-746.427**	-746.427**	-746.427**
d. Contribution of mediated effect (Euro)	-28.254	-30.566	-18.517	12.665	-47.766	40.655
Observations	969	969	969	969	969	969

Note: Control variables in all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax in 1938, survey year and federal state dummy variables. Analytical standard errors clustered on the level of GLR municipalities in rows a to c; bootstrap standard errors based on 1,500 bootstrap replications in row d, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

6 Robustness

6.1 Dealing with Skewness

Wealth distributions are known to be skewed, with the effect that a few observations with high assets may drive the results. To check whether this is the case, we repeat the estimation using two transformations of the dependent variable that are robust to outliers. First, we censor the dependent variables at the 1st and 99th percentile. Second, instead of wealth, we use each observation's standardized rank in the wealth distribution (position on the cumulative density).

Estimations results are summarized in Tables 9 to 11 for the first- and second-generation samples. The tables confirm the results from the main analysis for the transformed two variables: Destruction has a significant negative effect on net wealth and the net value of the primary residence. The robustness checks also show that, in case of net wealth, the effect size is partly driven by observations with high net wealth. Effect sizes for censored net wealth are about one third smaller than in the main analysis. In the case of the net value of the primary residence, the robustness checks show that effect sizes are not driven by observations at the top or bottom of the distribution.

6.2 Dealing with Spurious Correlation

It is not excluded that spurious correlation between destruction and the post-war economic development of specific federal states drive our results. Regions that were formerly relatively weak economically, such as Bavaria and Baden-Württemberg, are now among the strongest and were also less affected by WWII bombings than other states. The opposite is true, for example, for North Rhine-Westphalia, which was heavily destroyed during WWII and saw its mining industry decline in the post-war decades, leading to economic downturn.

To study the influence of individual states on the results, we implement a regional jackknifing procedure. That is, we re-run the basic regressions

Table 9: Effect of destruction, first generation, 1931-1945 cohort.

	OLS		IV	
Outcome	(1)	(2)	(3)	(4)
Net wealth (censored)	-782.822**	-711.803*	-4143.336***	-2924.464
	(376.285)	(387.840)	(1492.887)	(1786.055)
Net value primary resid.	-681.569***	-618.716***	-2986.519***	-1905.767**
(censored)	(185.986)	(159.146)	(850.186)	(889.477)
Net wealth (rank 0-1)	-0.001**	-0.001**	-0.007***	-0.005**
	(0.001)	(0.001)	(0.002)	(0.003)
Net value primary resid.	-0.002***	-0.002***	-0.007***	-0.004*
(rank 0-1)	(0.001)	(0.000)	(0.002)	(0.002)

Note: Specifications (2) and (4) include federal state dummy variables. Further controls on all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax in 1938. Instrument: distance to London. The number of observations is 1,536 in all regressions. Standard errors in parentheses, clustered on the level of GLR municipalities, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

from our main analysis, always leaving out one region. The jackknife method performs $r = 1, \ldots, 16$ regressions. In each run, all observations living in a state r are left out.

Figures 5 to 13 in the Appendix show the distribution of the r jackknife coefficients for each dependent variable and sample. The jackknife procedure reconfirms our main analysis. Overall, omitting a federal state changes the results very little. Nonetheless, some tendencies are observable. First, leaving out a state reduces sample size and this tends to widen confidence bands. Second, leaving out North Rhine-Westphalia strengthens the negative effect of wartime destruction, suggesting that the relation between destruction and wealth is stronger in the other states. Leaving out Bavaria or Baden-Württemberg has the opposite effect.

Table 10: Effect of destruction, second generation, 1931-1945 father cohort.

	OLS		IV	
Outcome	(1)	(2)	(3)	(4)
Net wealth (censored)	-730.426***	-697.513***	-3279.059***	-1294.463
	(252.188)	(267.338)	(1209.172)	(1618.460)
Net value primary resid. (censored)	-412.160***	-454.336***	-1672.774***	-1477.184**
	(118.212)	(114.436)	(588.820)	(644.627)
Net wealth (rank 0-1)	-0.002***	-0.002***	-0.008***	-0.006**
	(0.001)	(0.001)	(0.003)	(0.003)
Net value primary resid. (rank 0-1)	-0.002***	-0.002***	-0.005***	-0.006**
	(0.000)	(0.000)	(0.002)	(0.002)

Note: Specifications (2) and (4) include federal state dummy variables. Further controls on all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax 1938. Instrument: distance to London. The number of observations is 1,021 in all regressions. Standard errors in parentheses, clustered on the level of GLR municipalities, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

Table 11: Effect of destruction, second generation, 1931-1945 mother cohort.

	OLS		IV	
Outcome	(1)	(2)	(3)	(4)
Net wealth (censored)	-661.728**	-491.002*	-3972.678***	-1016.406
	(256.413)	(256.847)	(1525.028)	(1874.654)
Net value primary resid. (censored)	-413.172***	-327.764**	-2213.245***	-1508.658
	(128.145)	(133.907)	(678.882)	(948.701)
Net wealth (rank 0-1)	-0.002***	-0.002***	-0.005**	-0.002
	(0.001)	(0.001)	(0.002)	(0.004)
Net value primary resid. (rank 0-1)	-0.001**	-0.001**	-0.003*	-0.002
	(0.000)	(0.000)	(0.002)	(0.003)

Note: Specifications (2) and (4) include federal state dummy variables. Further controls on all regressions: age and age squared, population in 1939, population in 1939 squared, density in 1939, per-capita wealth, payroll, income, and corporate tax 1938. Instrument: distance to London. The number of observations is 987 in all regressions. Standard errors in parentheses, clustered on the level of GLR municipalities, * significant at 10%, ** significant at 5%, *** significant at 1%. Source: SOEP v35.

7 Conclusion

The Second World War has often been called a "great leveler" (Scheidel, 2017) that markedly reduced persistently high income and wealth concentrations (Roine and Waldenström, 2015; World Inequality Database, 2017). The present work shows that the wartime destruction left its mark on the level of private wealth today: People who were exposed to particularly heavy bombing during the war have fewer assets today. The results indicate that today's net wealth was lowered by about 12 percent by the bombings. This also carries over to the next generation, where the present work finds reductions of net wealth due to wartime destruction in the range of 16 to 24 percent.

The evidence from the present and previous studies suggests that exposure to war in early life has long-run effects on well-being later in life. This holds for many dimensions of well-being, including wealth, income, health, and education. These long-term welfare costs of ongoing armed conflicts highlight the importance of peaceful resolutions of conflicts.

From a data infrastructure perspective, the paper highlights the advantages of using biographical information from prospective panel studies together with regional indicators—for the currently surveyed sample as well as for surveys of the parent generation. Complemented with digitalized (historical) data from archives, such approaches open up a wide range of research opportunities (see Kesternich et al. (2014) and Schröder et al. (2020)).

References

Acharya, A., Blackwell, M., and Sen, M. (2016). Explaining causal findings without bias: Detecting and assessing direct effects. *American Political Science Review*, 110(3):512–529.

Akbulut-Yuksel, M. (2014). Children of War: The Long-Run Effects of Large-Scale Physical Destruction and Warfare on Children. *Journal of Human Resources*, 49(3):634–662.

Albers, T. N., Bartels, C., and Schularick, M. (2020). The Distribution of Wealth in Germany, 1895-2018.

Albers, W. (1989). Der Lastenausgleich Rückblick und Beurteilung. *FinanzArchiv / Public Finance Analysis*, 47(2):272–298.

Alvaredo, F., Atkinson, A. B., Chanel, L., Piketty, T., Saez, E., and Zucman, G. (2017). Distributional National Accounts Guidelines: Methods and Concepts Used in WID.world. *WID.world Working Paper Series*, 2016(2).

Atkinson, A. B. and Piketty, T., editors (2007). *Top Income Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Oxford University Press, Oxford.

Atkinson, A. B. and Piketty, T., editors (2010). *Top Incomes: A Global Perspective*. Oxford University Press, Oxford.

Bartels, C. (2019). Top Incomes in Germany 1871-2014. *Journal of Economic History*, (forthcoming).

Baum, C. F., Schaffer, M. E., and Stillman, S. (2002). IVREG2: Stata module for extended instrumental variable/2SLS and GMM estimation. *Statistical Software Components*, S425401, B.

Becker, S. O., Grosfeld, I., Grosjean, P. A., Voigtländer, N., and Zhuravskaya, E. V. (2020). Forced Migration and Human Capital: Evidence from Post-WWII Population Transfers. *American Economic Review*, 110(5):1430–1463.

Bosker, M., Brakman, S., Garretsen, H., and Schramm, M. (2007). Looking for multiple equilibria when geography matters: German city growth and the WWII shock. *Journal of Urban Economics*, 61:152–169.

Bosker, M., Brakman, S., Garretsen, H., and Schramm, M. (2008). A century of shocks: The evolution of the German city size distribution 1925-1999. *Regional Science and Urban Economics*, 38:330–347.

Brakman, S., Garretsen, H., and Schramm, M. (2004). The strategic bombing of German cities during World War II and its impact on city growth. *Journal of Economic Geography*, 4(2):201–218.

Braun, S. and Kvasnicka, M. (2012). Immigration and structural change: Evidence from post-war Germany. *Kiel Working Paper*, 1778.

Braun, S. and Omar Mahmoud, T. (2014). The Employment Effects of Immigration: Evidence from the Mass Arrival of German Expellees in Postwar Germany. *The Journal of Economic History*, 74(01):69–108.

Braun, S. T. and Dwenger, N. (2017). The Local Environment Shapes Refugee Integration: Evidence from Post-war Germany.

Brockmann, P. and Halbmeier, C. (2020). Tax Revenues of German Tax Districts in the Years 1926 to 1938. *Working Paper*.

Burchardi, K. B. and Hassan, T. A. (2013). The Economic Impact of Social Ties: Evidence from German Reunification. *The Quarterly Journal of Economics*, 128(3):1219–1271.

Card, D. (1999). The causal effect of education on earnings. In Ashenfelter, O. C. and Card, D., editors, *Handbook of Labor Economics*, volume Volumne 3, pages 1801–1863. Elsevier Masson SAS.

Chevalier, A., Elsner, B., Lichter, A., and Pestel, N. (2018). Immigrant Voters, Taxation and the Size of the Welfare State. *SOEPpapers on Multidisciplinary Panel Data Research*, 994.

Davis, D. R. and Weinstein, D. E. (2002). Bones, Bombs, and Break Points: The Geography of Economic Activity. *The American Economic Review*, 92(5):1269–1289.

Davis, D. R. and Weinstein, D. E. (2008). A Search for Multiple Equilibria in Urban Industrial Structure. *Journal of Regional Science*, 48(1):29–65.

Deutsche Bundesbank (2019). Kaufkraftäquivalente historischer Beträge in deutschen Währungen.

Gassdorf, K.-O. and Langhans-Ratzeburg, M. (1950). *Zahlennachweis zur Kriegsfolgen-Karte Westdeutschland 1939-1950*. Verlagsbuchhandlung Karl-Otto Gassdorf, Frankfurt am Main.

Goebel, J., Grabka, M. M., Liebig, S., Kroh, M., Richter, D., Schröder, C., and Schupp, J. (2019). The German Socio-Economic Panel (SOEP). *Journal of Economics and Statistics*, 239(2):345–360.

Groehler, O. (1990). *Bombenkrieg gegen Deutschland*. Akademie-Verlag Berlin, Berlin.

Hampe, E. (1963a). Der Verlauf des Luftkrieges. In Hampe, E., editor, *Der Zivile Luftschutz im Zweiten Weltkrieg*, pages 95–137. Bernard & Greafe Verlag für Wehrwesen, Frankfurt am Main.

Hampe, E. (1963b). Die Bilanz des Luftkrieges. In Hampe, E., editor, *Der Zivile Luftschutz im Zweiten Weltkrieg*, pages 138–244. Bernard & Greafe Verlag für Wehrwesen, Frankfurt am Main.

Ichino, A. and Winter-Ebmer, R. (2004). The Long-Run Educational Cost of World War II. *Journal of Labor Economics*, 22(1):57–86.

Jürges, H. (2013). Collateral damage: The German food crisis, educational attainment and labor market outcomes of German post-war cohorts. *Journal of Health Economics*, 32(1):286–303.

Kästner, F. (1949). Kriegsschäden (Trümmermengen, Wohnungsverluste, Grundsteuerausfall und Vermögensteuerausfall). In Deutscher Städtetag and Verband Deutscher Städtestatistiker, editors, *Statistisches Jahrbuch Deutscher Gemeinden, 37*, pages 361–391. Alfons Bürger Verlag, Schwäbisch Gmünd.

Kesternich, I., Siflinger, B., Smith, J. P., and Winter, J. K. (2014). The Effects of World War II on Economic and Health Outcomes across Europe. *The Review of Economics and Statistics*, 96(1):103–118.

Kesternich, I., Siflinger, B., Smith, J. P., and Winter, J. K. (2015). Individual Behaviour as a Pathway Between Early-Life Shocks and Adult Health: Evidence from Hunger Episodes in Post-War Germany. *The Economic Journal*, 125(588):372–393.

Lee, C. (2005). Wealth Accumulation and the Health of Union Army Veterans, 1860–1870. *The Journal of Economic History*, 65(2):352–385.

Lee, C. (2014). In utero exposure to the Korean War and its long-term effects on socioeconomic and health outcomes. *Journal of Health Economics*, 33(January):76–93.

Li, J. and Koulovatianos, C. (2020). The Long Shadows of War in China: Battle Shocks in Early Life and Health/Wealth Accumulation. *China Economic Review*, 60(April).

Miguel, E. and Roland, G. (2011). The long-run impact of bombing Vietnam. *Journal of Development Economics*, 96(1):1–15.

MPIDR (Max Planck Institute for Demographic Research) and CGG (Chair for Geodesy and Geoinformatics University of Rostock) (2011). *MPIDR Population History GIS Collection (partly based on Hubatsch and Klein 1975 ff.)*. Rostock.

Neelsen, S. and Stratmann, T. (2011). Effects of prenatal and early life malnutrition: Evidence from the Greek famine. *Journal of Health Economics*, 30(3):479–488.

Piketty, T. and Zucman, G. (2014). Capital is Back: Wealth-Income Rations in Rich Countries 1700–2010. *Quarterly Journal of Economics*, 129(3):1255–1310.

Ransom, R. (2019). War and Cliometrics in an Age of Catastrophes. In Diebolt, C. and Haupert, M., editors, *Handbook of Cliometrics*. Springer, Berlin.

Roine, J. and Waldenström, D. (2015). Long-Run Trends in the Distribution of Income and Wealth. In Atkinson, A. B. and Bourguignon, F., editors, *Handbook of Income Distribution, vol .2A*. North-Holland, Amsterdam.

Rubin, D. B. (1987). *Multiple Imputation for Nonresponse in Surveys*. John Wiley & Sons, New York.

Scheidel, W. (2017). *The Great Leveler: Violence and the History of Inequality from the Stone Age to the Twenty-First Century*. Princeton University Press, Princeton.

Schiman, J. C., Kaestner, R., and Lo Sasso, A. T. (2019). Infant mortality and adult wellbeing: Evidence from wartime Britain. *Labour Economics*, 60(July 2018):12–29.

Schröder, C., Bartels, C., Göbler, K., Grabka, M. M., and König, J. (2020). MillionärInnen unter dem Mikroskop: Datenlücke bei sehr hohen Vermögen geschlossen - Konzentration höher als bisher ausgewiesen. *DIW Wochenbericht*, 87(29):512–521.

Schumann, A. (2014). Persistence of Population Shocks: Evidence from the Occupation of West Germany after World War II. *American Economic Journal: Applied Economics*, 6(3):189–205.

Statistisches Bundesamt (1955). *Gebäude- und Wohnungszählung in der Bundesrepublik Deutschland vom 13. September 1950 - Heft 2: Hauptergebnisse nach Kreisen (Statistik der Bundesrepublik Deutschland Band 38)*. W. Kohlhammer Verlag, Stuttgart/Köln.

Statistisches Bundesamt (1964). *Gebäudezählung vom 6. Juni 1961 - Heft 1: Methodische Einführung, Bewohnte Gebäude und Unterkünfte, Wohnungen und Wohngelegenheiten (Fachserie E: Bauwirtschaft Bautätigkeit Wohnungen)*. W. Kohlhammer Verlag, Stuttgart und Mainz.

Statistisches Reichsamt (1944). *Amtliches Gemeindeverzeichnis für das Großdeutsche Reich auf Grund der Volkszählung 1939*. Verlag für Sozialpolitik, Wirtschaft und Statitik, Paul Schmidt, Berlin SW 68, Berlin, 2nd edition.

Stock, J. H. and Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regression. In Andrews, D. W. K. and Stock, J. H., editors, *Identification and Inference for Econometric Models*, pages 80–108. Cambridge University Press.

The United States Strategic Bombing Survey (1945). Summary Report (European War). Technical report, Washington, D.C.

United Nations Educational Scientific and Cultural Organization (2006). *International Standard Classification of Education ISCED 1997 (re-edition)*, volume 5. UNESCO Institute for Statistics, Montreal.

van Ewijk, R. and Lindeboom, M. (2017). Why People Born During World War II are Healthier. *GSME Working Paper*, 1619.

Vonyó, T. (2012). The bombing of Germany: The economic geography of war-induced dislocation in West German industry. *European Review of Economic History*, 16(1):97–118.

Waldinger, F. (2016). Bombs, Brains, and Science: The Role of Human and Physical Capital for the Creation of Scientific Knowledge. *The Review of Economics and Statistics*, 98(5):811–831.

Wolf, N. and Caruana-Galizia, P. (2015). Bombs, homes, and jobs: Revisiting the Oswald hypothesis for Germany. *Economics Letters*, 135:65–68.

World Inequality Database (2017). World Inequality Database.

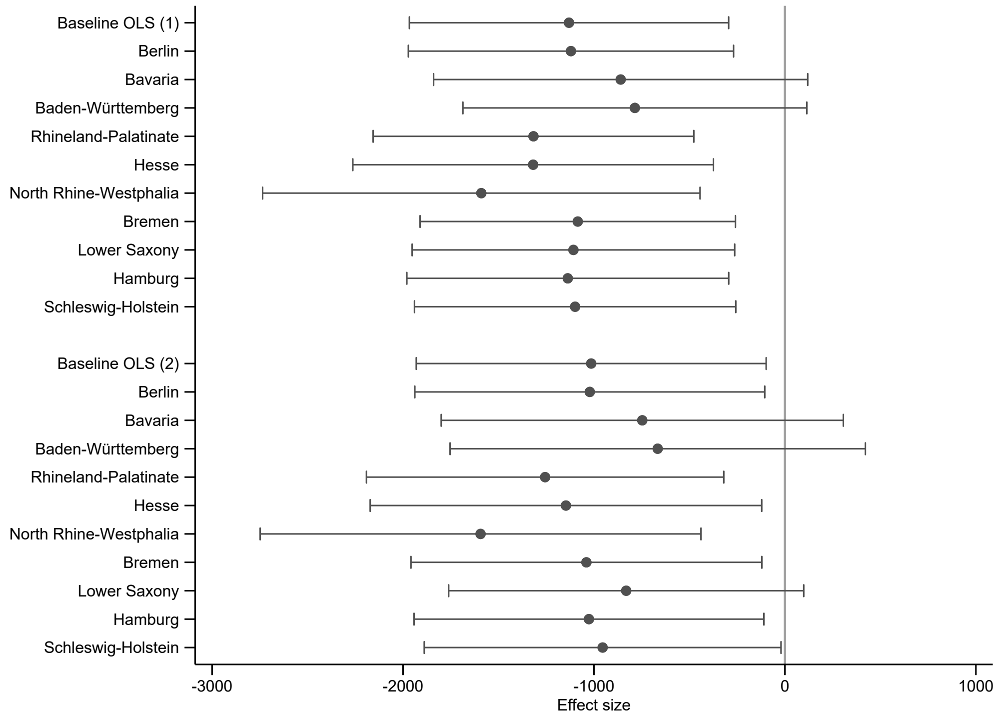
Appendix

A Mediation Analysis – Construction of Lifetime Income Indicator

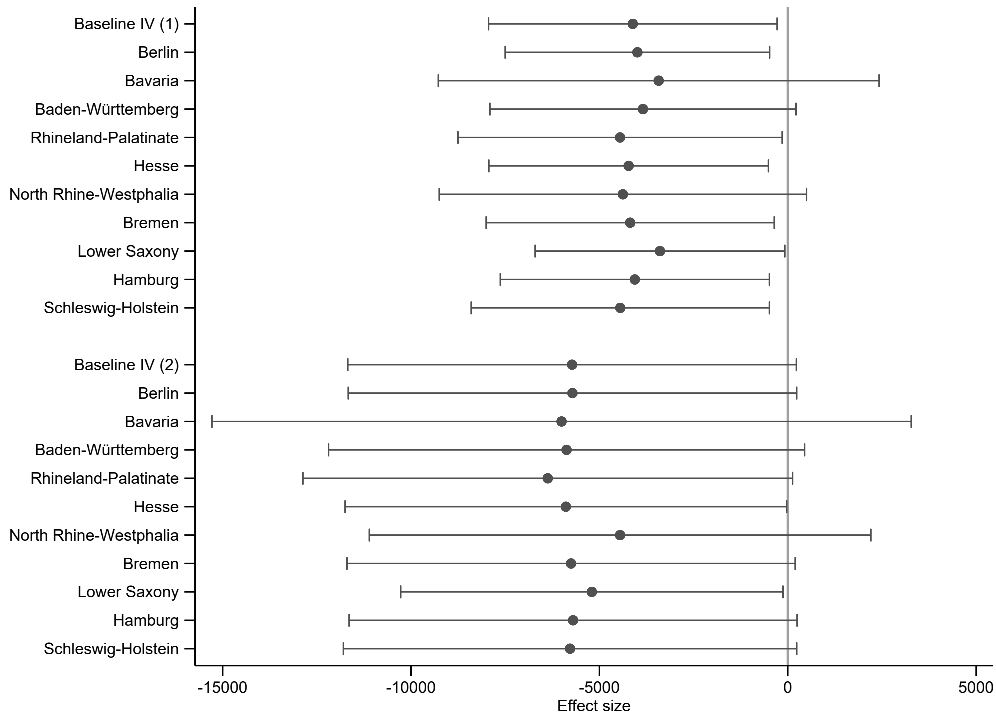
In the mediation analysis, we use different measures of lifetime income depending on the sample. For the first-generation sample, we base the measure on a person's pension—or pension entitlement in the rare cases where somebody is not yet retired. We rank all individuals according to the pension or pension entitlement and use the rank, standardized to the sample size such that the variable ranges from zero to one, as the mediator. We apply this rank transformation to make the mediator comparable to that of the second-generation sample.

In case of the second-generation sample, pension entitlements are missing for a relatively large part of the sample. Further, the sample is younger than the first-generation sample and there is a larger variation in age within the sample, such that we chose a different measure. We use the rank of a person according to her current labor market earnings, relative to persons of the same age. To calculate the rank of labor market earnings, we group all individuals into five-year age groups. For each age group, we run a Mincerian regression of current gross labor market earnings regressed on age, education, and labor market experience. We predict the labor market earnings a person had if she had the maximum age within that age group to account for the within-age differences in that group. We rank each person according to the predicted income within that age group and standardize the rank with the group-specific number of observations.

B Robustness: Estimation without Specific Federal States



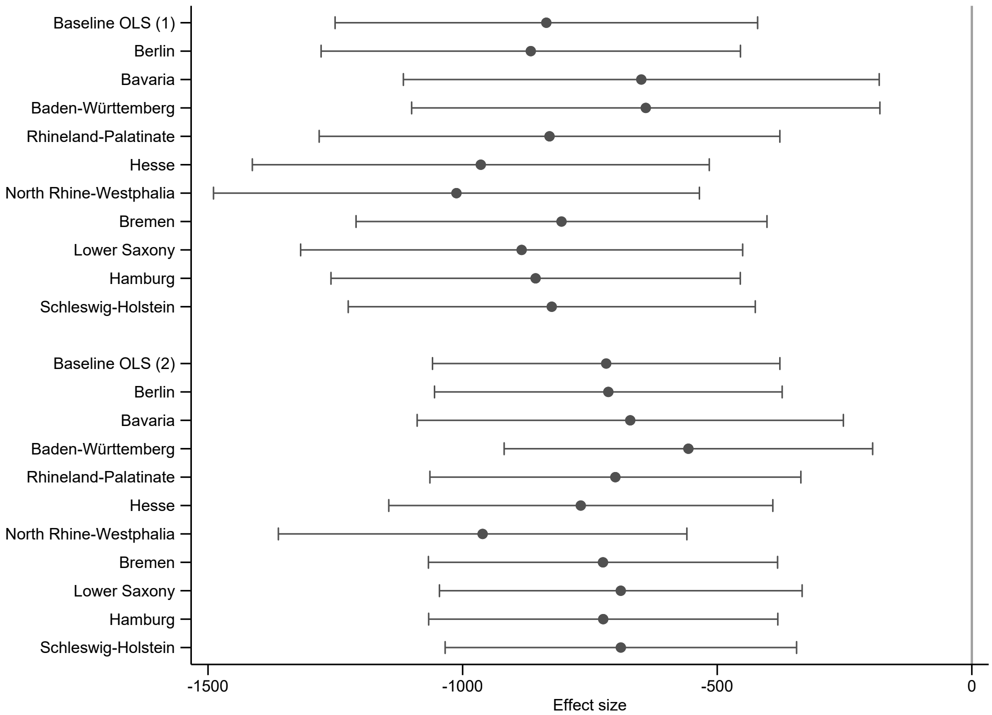
(a) Net worth, OLS, first generation



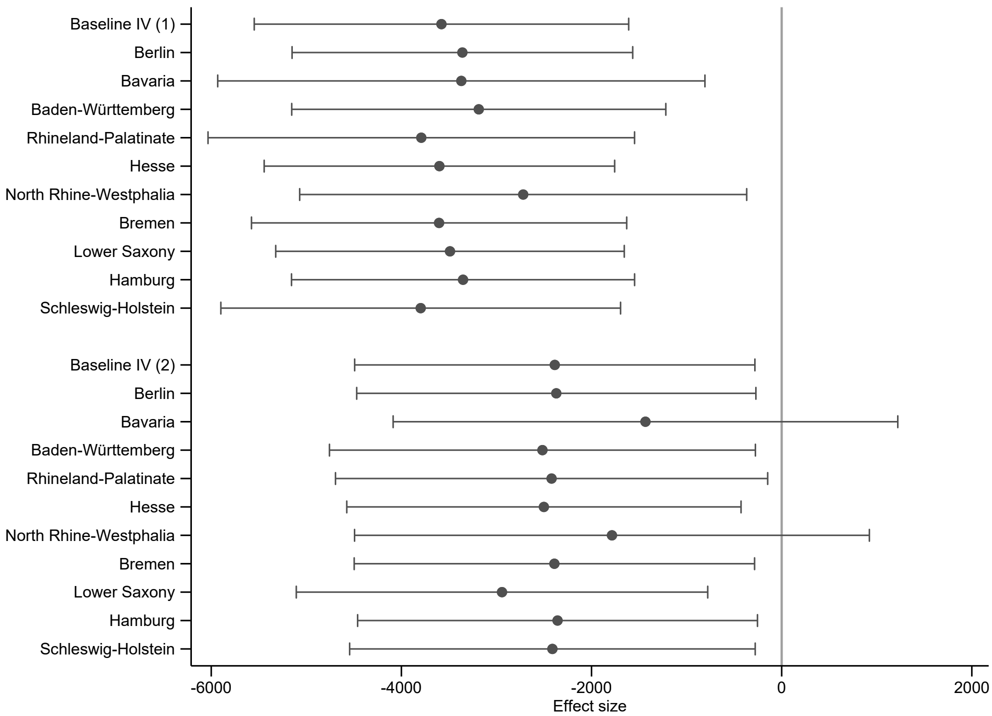
(b) Net worth, IV, first generation

Figure 5: Effect of destruction, first generation, 1931-1945 cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions, in which observations born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



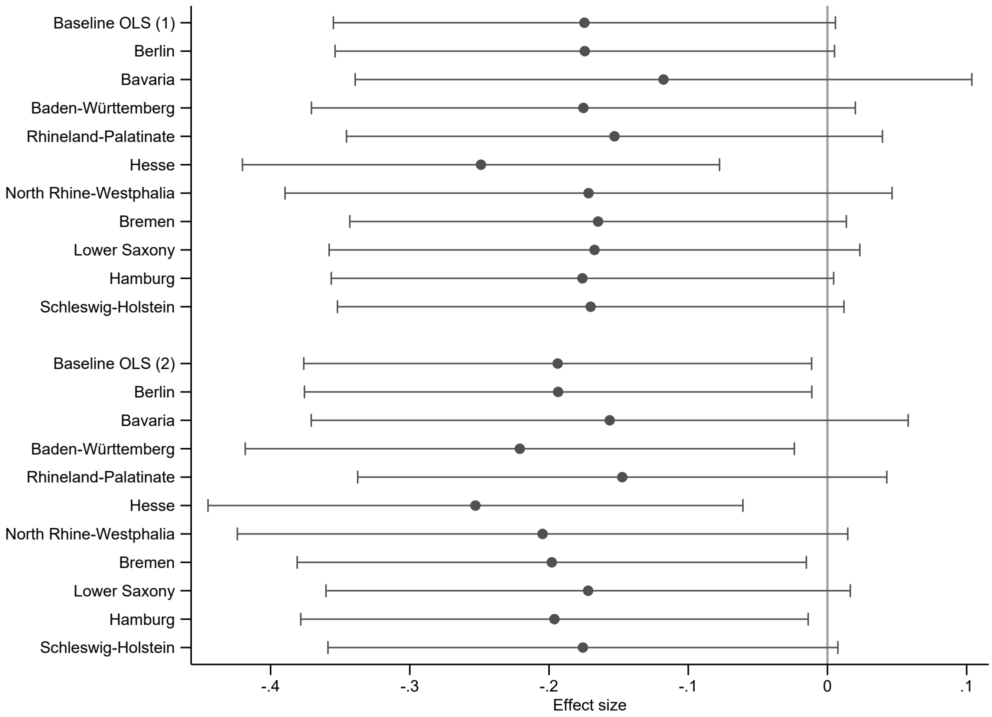
(a) Net value primary residence, OLS, first generation



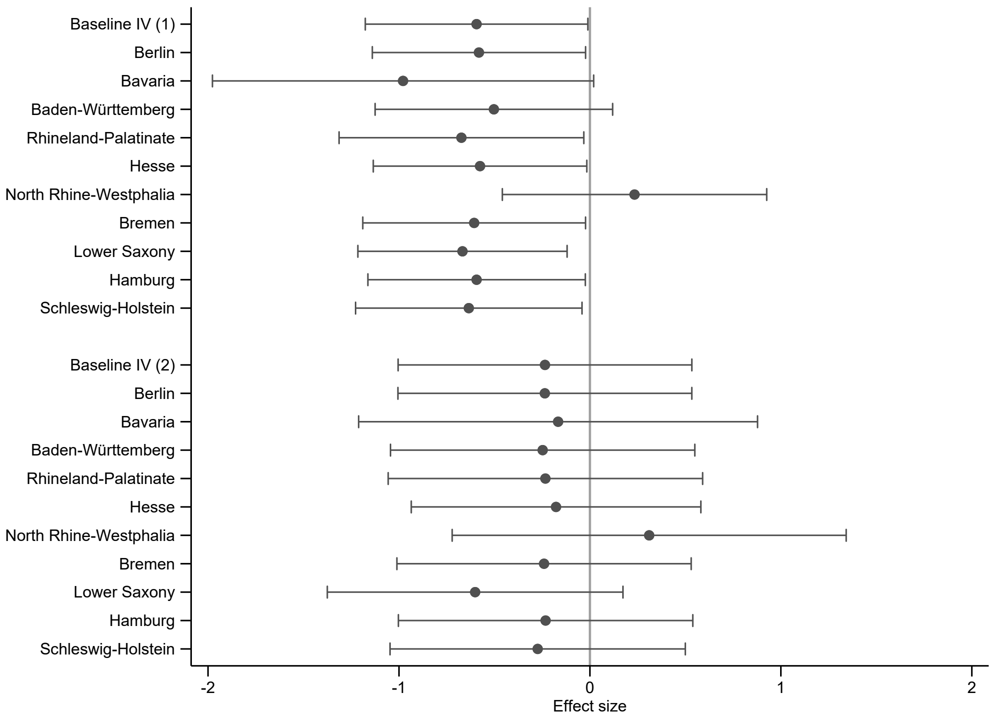
(b) Net value primary residence, IV, first generation

Figure 6: Effect of destruction, first generation, 1931-1945 cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



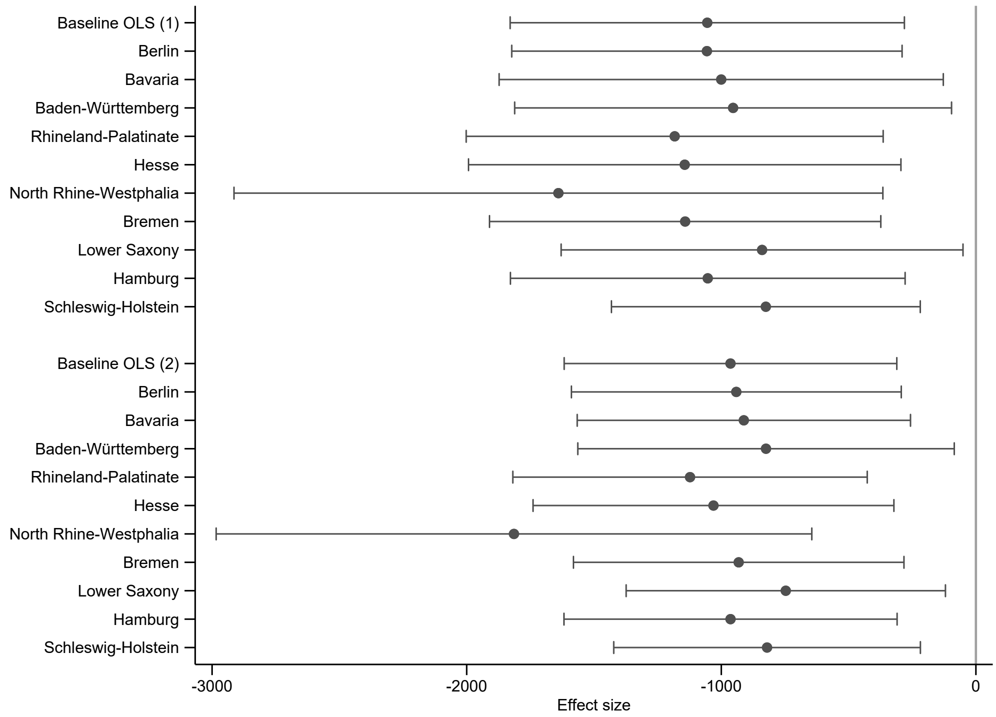
(a) Homeownership, OLS, first generation



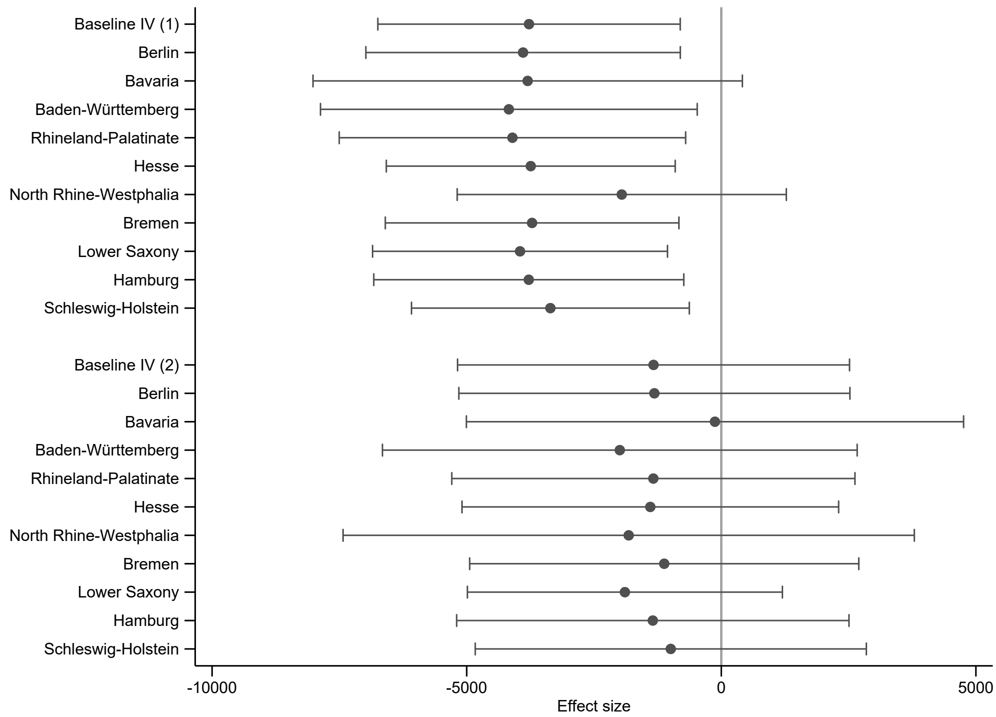
(b) Homeownership, IV, first generation

Figure 7: Effect of destruction, first generation, 1931-1945 cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions, in which observations born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



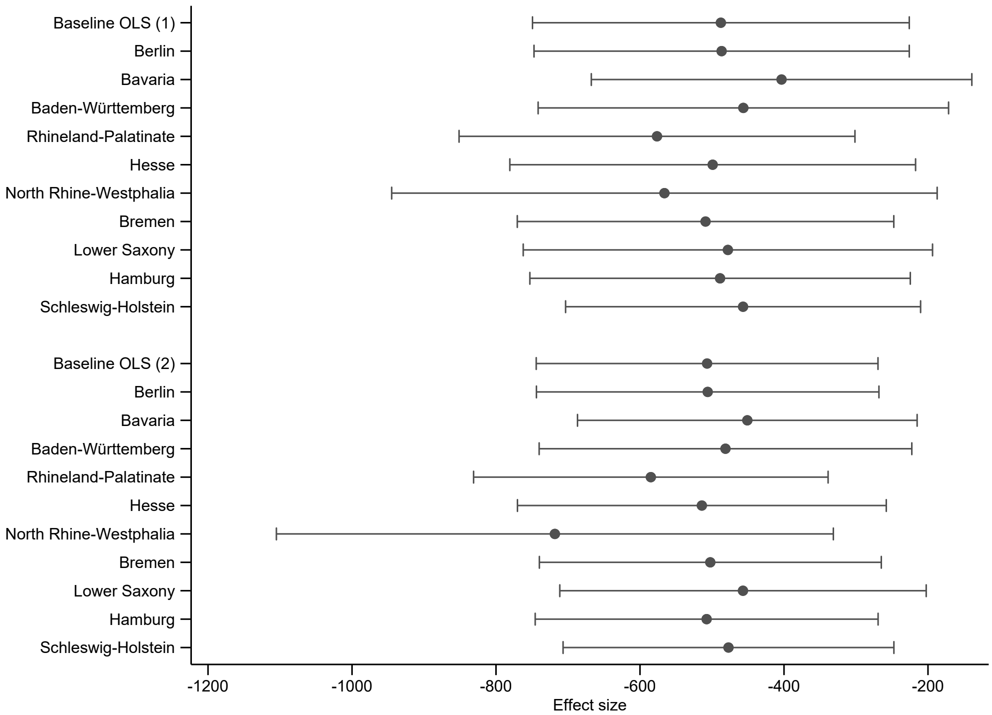
(a) Net worth, OLS, second generation, fathers



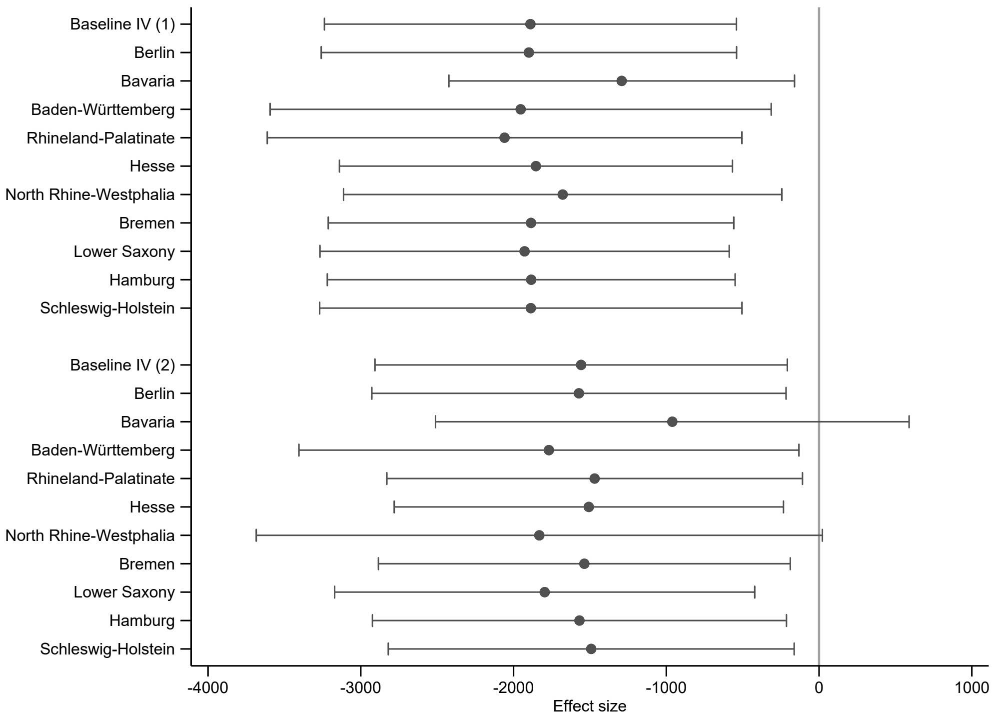
(b) Net worth, IV, second generation, fathers

Figure 8: Effect of destruction, second generation, 1931-1945 father cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations whose father was born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



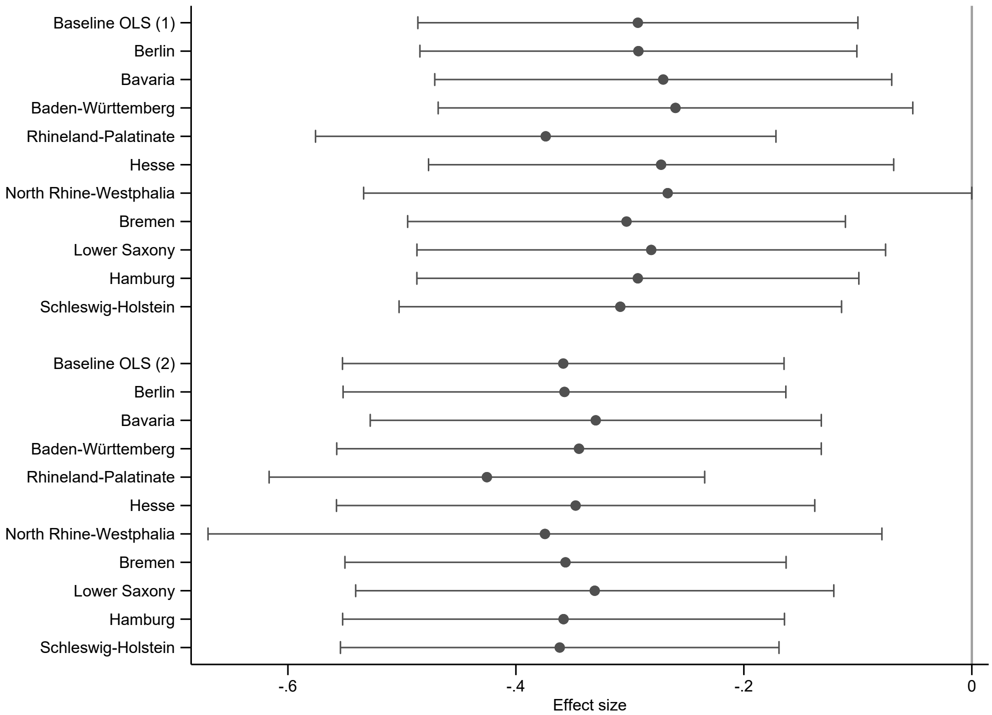
(a) Net value primary residence, OLS, second generation, fathers



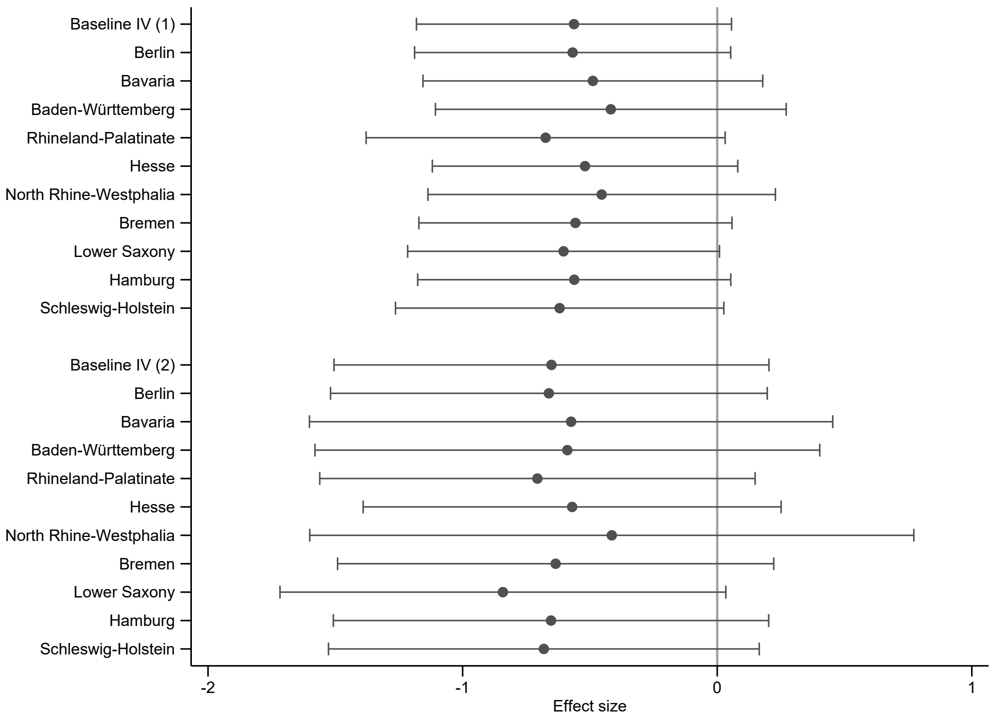
(b) Net value primary residence, IV, second generation, fathers

Figure 9: Effect of destruction, second generation, 1931-1945 father cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations whose father was born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



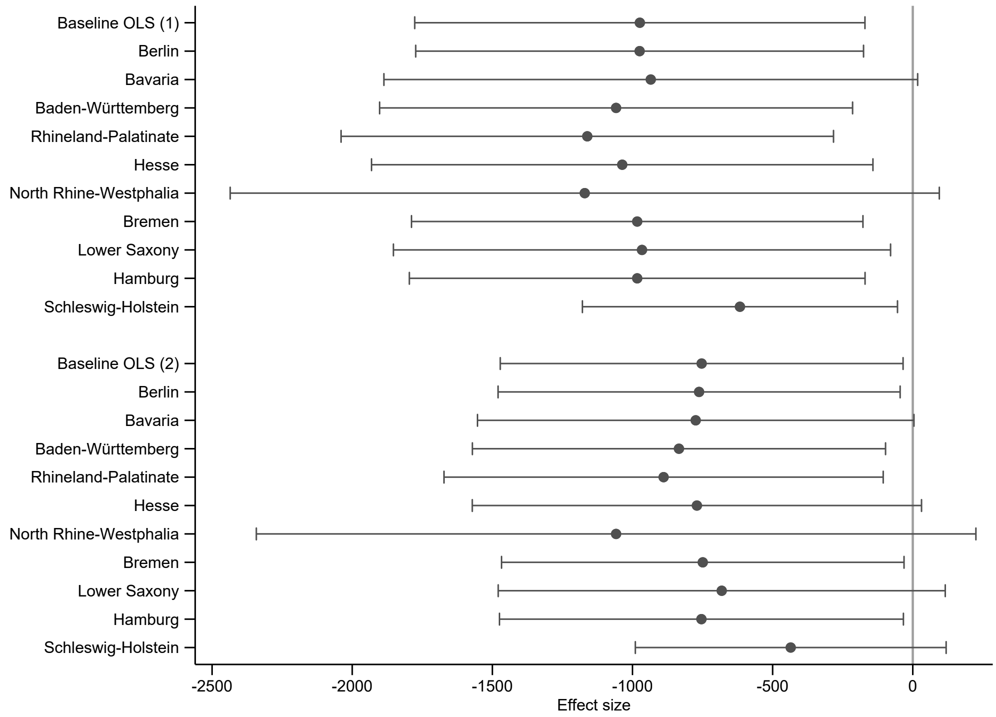
(a) Homeownership, OLS, second generation, fathers



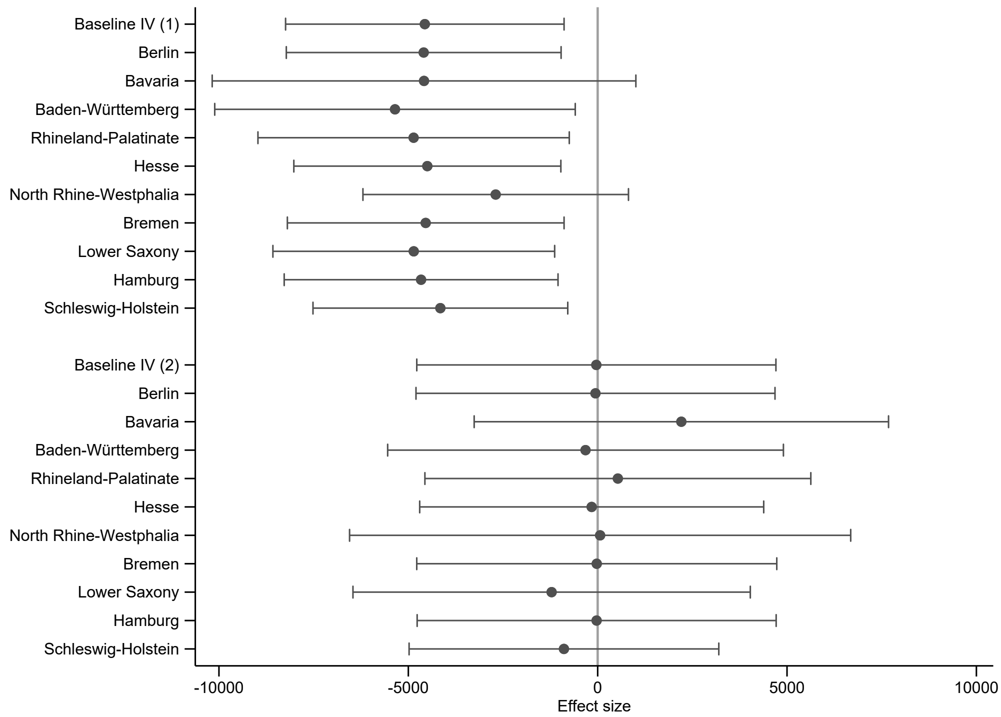
(b) Homeownership, IV, second generation, fathers

Figure 10: Effect of destruction, second generation, 1931-1945 father cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations whose father was born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



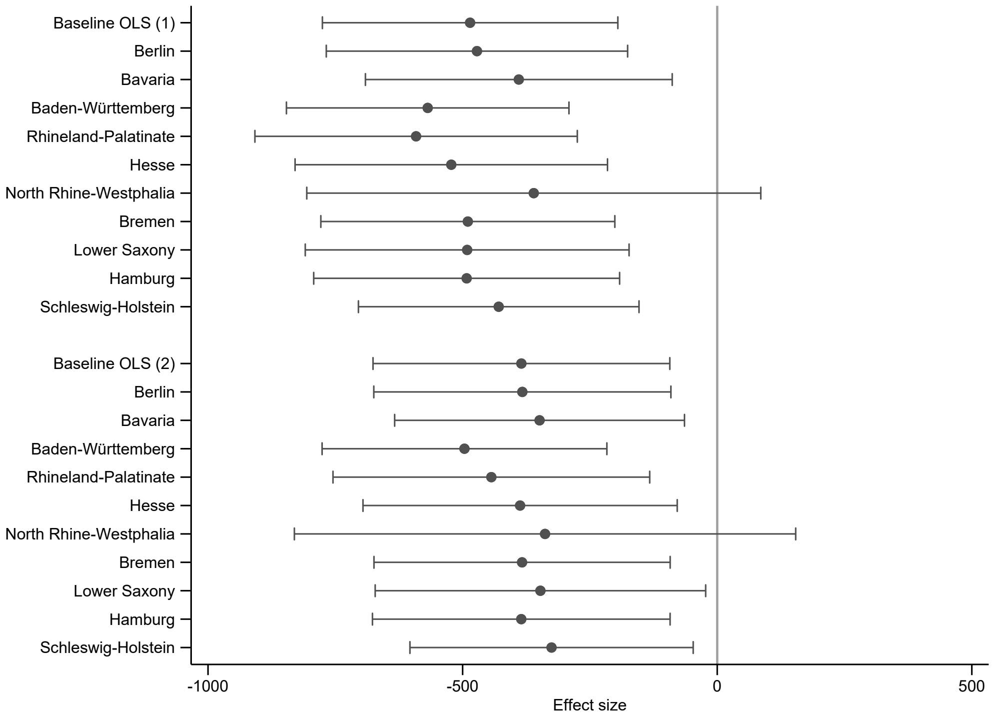
(a) Net worth, OLS, second generation, mothers



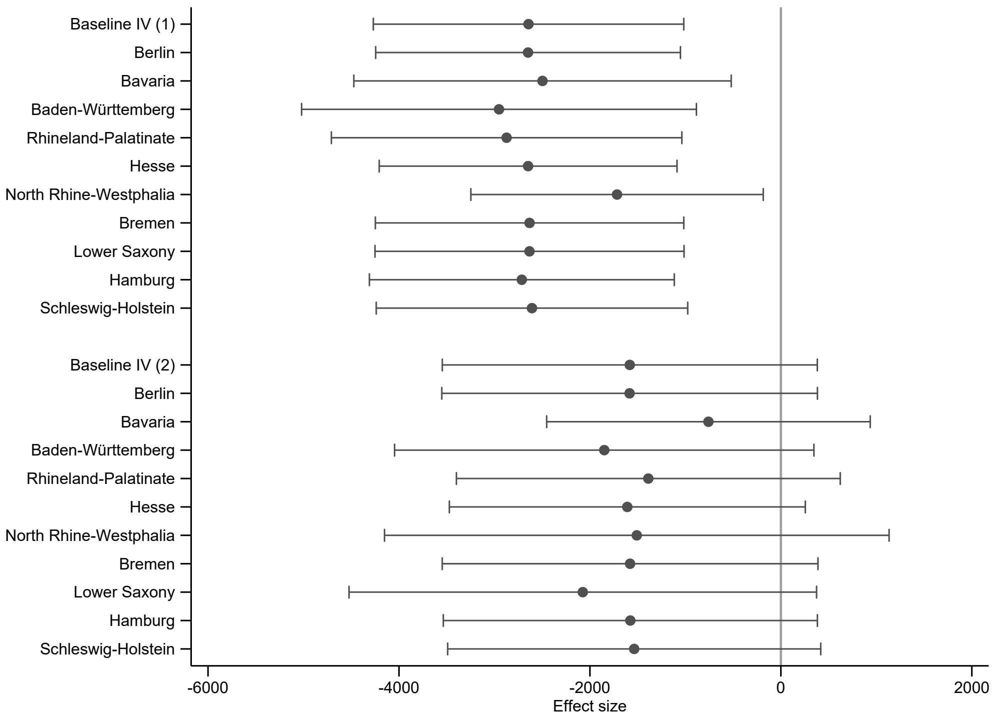
(b) Net worth, IV, second generation, mothers

Figure 11: Effect of destruction, second generation, 1931-1945 mother cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations whose mother was born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



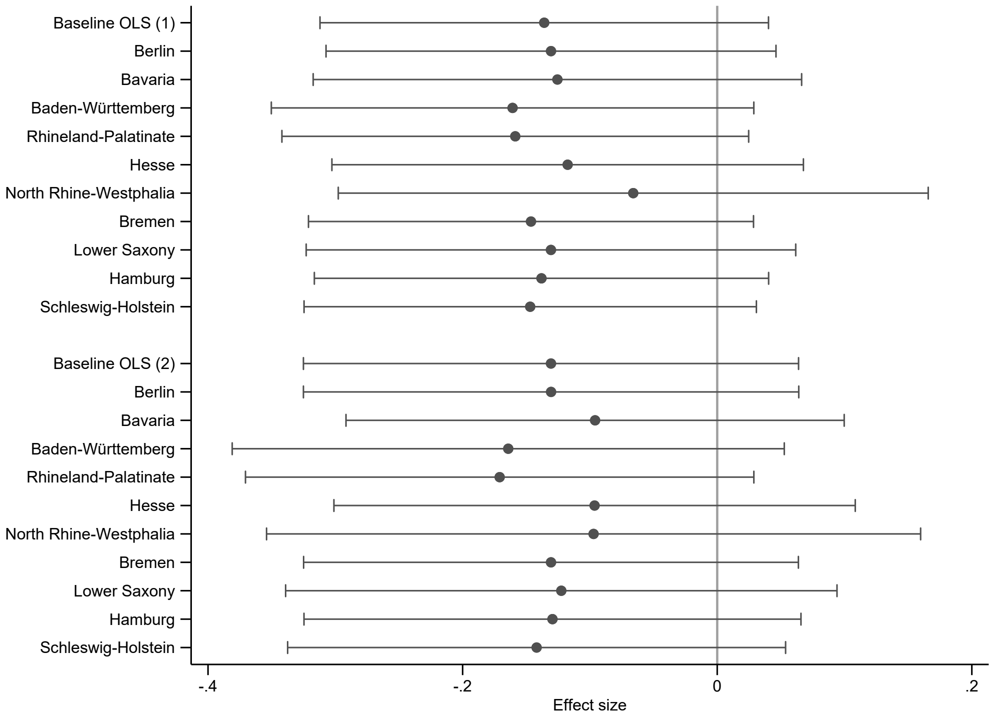
(a) Net value primary residence, OLS, second generation, mothers



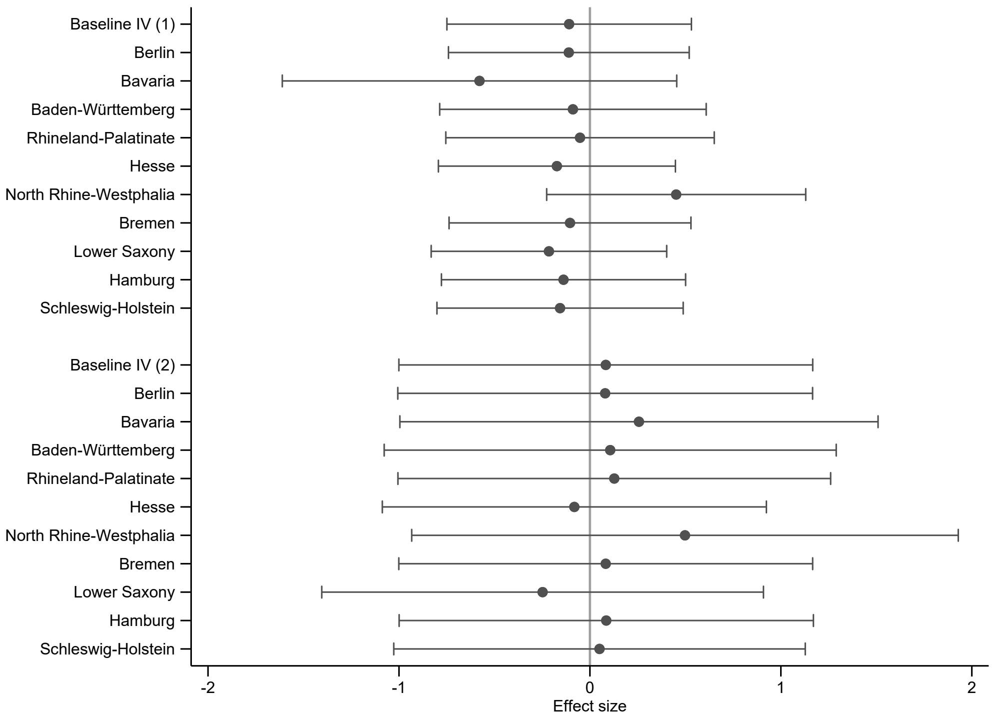
(b) Net value primary residence, IV, second generation, mothers

Figure 12: Effect of destruction, second generation, 1931-1945 mother cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations whose mother was born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.



(a) Homeownership, OLS, second generation, mother



(b) Homeownership, IV, second generation, mothers

Figure 13: Effect of destruction, second generation, 1931-1945 mother cohort.

Note: The graph shows the point estimates of the effect of destruction and the 95% confidence interval for regressions in which observations whose mother was born in a specific federal state are dropped. The federal state is shown on the ordinate axis. Data: SOEP v35.