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Research Article

Fewer children, better futures: How war shapes family choices

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Fewer children, better futures: How war shapes family choices

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Abstract

BACKGROUND
Most research on the demographic impact of war focuses on how highly disruptive conflicts impact family life, often overlooking how less destructive wars shape family strategies. Understanding family adaptation in these contexts is essential for a nuanced view of war's demographic effects.

OBJECTIVE
This study examines whether exposure to the Spanish Civil War (SCW) led families with reproductive flexibility to shift from larger families to a greater investment in childhood quality.

METHODS
We use retrospective microdata from the 1991 Spanish Sociodemographic Survey, applying regression discontinuity designs to exploit variation in exposure to the SCW by birth cohort and provincial violence intensity. Outcomes analyzed include sibship size, child labor, and early child mortality.

RESULTS
Exposure to the SCW reduced family size and improved child outcomes – less child labor and reduced early child mortality – especially among families with greater reproductive flexibility and in high-violence provinces. Robustness checks confirm that these effects are not driven by modernization and other secular trends.

CONCLUSIONS
When children are not explicit targets of violence and families retain certain agency, wars can prompt a strategic shift toward fewer, better-supported children. These adaptive responses concentrate among families able to adjust their reproductive plans and in areas most affected by violence.

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CONTRIBUTION

This study challenges the assumption that wars uniformly harm child development. By highlighting family adaptation during less disruptive conflicts, it expands understanding of the demographic consequences of war and underscores the importance of conflict heterogeneity and family agency in demographic research. Our approach can also be applied to ongoing conflicts where violence does not primarily target children.

1. Introduction

In the social sciences, there is an expanding interest in documenting war's negative impact on health outcomes, human capital, income and livelihood, risk of migration, social capital, and subjective well-being (Vesco et al. 2025; Dias et al. 2025). Much of the demographic literature on how wars impact family dynamics traditionally focused on fertility drops and family size, but violent conflicts also have an obvious impact on child well-being (Geltman et al. 2005; Van Os et al. 2016), emotional regulation, social functioning (Slone and Mann 2016), and parenting (Eltanamly et al. 2021; Sim et al. 2018), often lasting well beyond the conflict's duration (Albúrez-Gutiérrez et al. 2024; Aparicio Fenoll and González 2020). We contribute to this tradition by proposing how, under certain war conditions, strategic family adjustments in response to violence may improve childhood quality. Specifically, we claim that warlike conditions can serve as a catalyst for investment strategies resulting in fewer but better-supported children. Our argument is that the increasing fear and insecurity caused by violence can eventually accelerate the transition toward a quality-over-quantity approach to family formation and childrearing, but only when two interrelated circumstances are met: (1) Children are not explicit targets of the conflict (with zero to limited excess mortality of children); (2) families are still early in their reproductive trajectories, giving them room to recalibrate fertility and intensify investments in their offspring.

The first of these two conditions relates to the nature of conflict. Exposure to violent conflicts can prompt families to adopt protective behaviors, such as expanding investments in children's overall development and well-being. However, for these adaptive strategies to result in measurable improvements in childhood quality, the conflict must not reach a level of complete disruption of civil life. Total wars generate far-reaching demographic shocks (Marwick 1988), often featuring children as legitimate targets of violence and severely restricting the functioning of civil society. Under this setting, families are largely deprived of the agency needed to buffer their children from the adverse effects of the conflict due to population displacement, violence-induced mortality, and systemic breakdowns. Conversely, conflicts that are less damaging to daily

civil life and do not explicitly target children provide more room for parental volition to be consequential. In these contexts, families can more readily implement protective and nurturing practices, allowing strategies enhancing childhood quality to manifest in tangible improvements in children's well-being and development.

The second condition concerns families' ability to adapt their fertility and childrearing choices. Quality-enhancing adjustments are most likely among younger households, which – encumbered by fewer childrearing commitments – can postpone or forgo additional births while redirecting resources toward the health, education, and protection of their existing children. Younger families are the ones possessing the flexibility to adjust both their reproductive plans and their investments in each child in response to the evolving circumstances of war. In contrast, while families that already have several children or whose children are older when the conflict begins may also value childhood quality, their capacity to translate these preferences into observable outcomes is limited by existing commitments and reduced reproductive flexibility. In other words, for them shifts in parental priorities are less likely reflected in measurable indicators of childhood quality.

In a nutshell, this paper claims that, under the above-mentioned circumstances, wars can provide extra opportunities for children within certain families. To test our argument, we analyze retrospective data from Spain, focusing on the period surrounding the Spanish Civil War (SCW).

The SCW began on July 18, 1936, as a coup against a legally constituted democratic government and lasted until April 1, 1939. The war has been depicted as the culmination of escalating social and political tensions within the fragmented political landscape of the Second Spanish Republic, established in 1931. The right-wing rebels received support from foreign powers, such as Nazi Germany and fascist Italy, while the Republicans aligned with the left-wing bloc receiving aid from the Soviet Union and an international brigades of volunteers (Payne 2012; Preston 2007). The war was fought primarily with outdated weaponry and lacked the large-scale destruction seen in later global conflicts. The SCW inflicted immense suffering (Santos and Casanova 1999), with significant regional and temporal differences; more than half of the victims behind the lines were killed during the first four months of the war (Ledesma and Leira-Castiñeira 2025).[3] Indeed, mass executions began immediately after the war's outbreak, peaking early on, around August and September 1936, and continuing into autumn (Payne 2012). Violence was highly selective and strategic, primarily targeting political opponents and ideological adversaries (Preston 2007; Ledesma and Leira Castiñeira 2025). For instance, the clergy

[3] Provinces with the greatest number of killings fell into the hands of the rebels during the first months of the war; the Battle of Málaga marking the turning point. Provinces conquered by Nationalist forces in the last months of the war are at the bottom of the ranking of killings. They include Basque Country, Catalonia, and Madrid (Ledesma and Leira Castiñeira 2025).

was the only social group targeted for complete repression, though without any intent to eradicate Catholics as a whole (Payne 2012), and targeting was greater where the clergy enjoyed a better social reputation (Aguilar et al. 2025). In Republican-held areas, violence also targeted landowners, supporters of right-wing parties, and suspected Nationalist advocates. Nationalist violence was systematically inflicted against leftist politicians, trade unionists, and Republican sympathizers. Bombings during the SCW were limited in scope. Although air raids on cities such as Barcelona, Durango, Guernica, and Madrid were traumatic for those affected, their scale was modest, a stark contrast to such raids during the Second World War (Payne 2012: 236).

The scale of human loss, though profound, was measurable. Total excess mortality (encompassing combat, repression, and indirect causes for those over age 1) is estimated to be approximately 346,000 deaths during the three years of conflict. This figure rises to 540,000 when extending the calculation to include the severe post-war years of 1940–1942, reflecting the long-term consequences of malnutrition and collapsed infrastructure (Ortega and Silvestre 2006). Yet, overall, violence against civilians was selective rather than indiscriminate. Crucially to our paper, the mortality was also highly selective by gender, offering key insights into the conflict's nature (Ledesma and Leira-Castiñeira 2025). Excess mortality was overwhelmingly concentrated among men, accounting for approximately three of every four excess deaths (Ortega and Silvestre 2006). This exceeds the excess male mortality in Italy or France during the Second World War. Conversely, adult women did not register a significant excess of mortality during the conflict years themselves. This stark difference highlights the selective nature of the violence, which was focused primarily on military mobilization and political purges rather than indiscriminate attacks on the civilian population. The comparative preservation of civilian life suggests that a degree of civil agency remained. This retained agency is the fundamental condition that allows us in this paper to observe and analyze volitional, strategic family adjustments in reproductive and investment behaviors during the conflict period.

As expected, the war had a significant impact on reproduction and family dynamics (Vidal and Recaño Valverde 1987).[4] But since the conflict did not fully dismantle societal structures and since essential services broadly continued to operate, the situation offers

[4] Fertility trends in Spain can indirectly be described using the source of empirical evidence used in this paper: the 1991 Sociodemographic Survey. Figure A-1, in the appendix, indicates stability in birth numbers in the years preceding the SCW, particularly from at least 1921, so given life expectancy in 1991, this sample is representative. The first sign of fertility reduction appears among those born between 1930 and 1933, which we identify as the pivotal cohort with which to assess the war's impact. From that point, and especially approaching 1936, there is a sharp decline in cohort size, followed by a pronounced rebound beginning gradually around 1939 and accelerating with the end of the 1940s famines and the economic growth of the 1959 developmental period.

an excellent opportunity to explore how less disruptive wars reshape family investment strategies to enhance childrearing quality.

In sum, compared to other 20th-century conflicts, such as the Russian Civil War, the Second World War, or the Balkan Wars of the 1990s, the SCW stands out as a relatively low-intensity conflict (Payne 2012: 183, 234). Notably, much of the country's productive and civil infrastructure was preserved (Carreras i Odriozola and Tafunell Sambola 2003; Catalan 1995), as evidenced by the continued functioning of essential services, including schools, despite the difficult circumstances imposed by the war (Serra 2009).

The rest of the paper is organized as follows: The next section reviews the literature to which we contribute. We then outline our theoretical expectations regarding how less disruptive conflicts influence childhood quality among families with the capacity to adapt. Afterward, we describe the data, introduce the indicators of childhood quality used in our empirical analyses, and provide an overview of the context of the SCW, along with a detailed explanation of our analytical methods. Finally, we present our findings and discuss how the degree of disruption to civil life shapes the impact of wars on fertility and family investment in childrearing strategies.

2. The effect of war on childbearing and childrearing: A complex relationship

Wars generally impose severe shocks that reduce individuals' and families' ability to make intentional and autonomous decisions regarding childbearing and childrearing (Cetorelli 2014). The most extensively studied pattern in demographic research concerns war's tendency to decrease fertility, often explained by extreme disruptions to biological fertility (Abu-Musa et al. 2008) and the interruption of essential services (Agadjanian and Prata 2002; Blanc 2004; Brodeur and Kattan 2022; Cetorelli 2014, 2015; Grabill 1944), a situation that exacerbates maternal and infant mortality (Betsi et al. 2006; Blanc 2004; Lindstrom and Kiros 2007). All this hinders crucial micro-level interactions essential for family formation and destabilizes family structures. Examples include slowed marriage markets (Thiede et al. 2020; Woldemicael 2008, 2010), economic hardship and income losses due to the deaths of primary wage earners (Vandenbroucke 2014), and population displacement (Lindstrom and Berhanu 1999; Schindler and Brück 2011).

Despite adversity, wars can also represent turning points for family childrearing (Schindler and Brück 2011; Urdal and Che 2013), particularly where infant mortality rates are high (Hossain, Phillips, and LeGrand 2007; Kraehnert et al. 2019; Torrisi 2020) and depending on socioeconomic status (Baynes et al. 2023). Much psychological research has explored the impact of wars on parenting and parent–child dynamics, including attachment styles and coping mechanisms (Slone and Mann 2016). Parenting

practices appear to shift with the intensity of violence. Under extreme danger to family life, parents become primarily concerned with keeping their children alive and safe (El-Khani et al. 2016). This leads to reduced parental warmth and increased harshness toward children as a consequence of declining quality of life, stress, and post-traumatic stress (Halevi et al. 2017). However, when living under threat but not outright danger, parents exhibit more warmth and even overprotectiveness (Eltanamly et al. 2021). This distinction is crucial, as parenting works as an important moderator of traumatic disorders (Slone and Mann 2016). Indeed, parents exposed to wars can be extremely protective, warm (Slone and Shoshani 2017; Sriskandarajah, Neuner, and Catani 2015), and future-oriented, caring for their children's long term prospects (Akesson and Sousa 2020). Along this line, we argue that families facing the uncertainty, hardship, and instability of war may respond not necessarily by having more children (Perelli-Harris, Gerber, and Hilevych 2024) but rather by investing more heavily in the upbringing of fewer children.

How does this happen? First, we claim that wars prompt important adjustments in preferences for each of the components of the quantity–quality trade-off (Becker and Lewis 1973), a fundamental dilemma for parents deciding how to allocate limited resources, such as time, money, and attention. (For a review of the empirical and theoretical development of this idea, see Doepke et al. 2023.) Crucially to our argument, this juncture is especially pronounced in resource-scarce settings (Hagen, Barrett, and Price 2006), where high fertility rates often decline as parents prioritize the educational and health outcomes of fewer children.[5] Second, we suggest that exposure to war can prompt a reallocation of resources toward enhancing quality rather than increasing the size of the sibship in families whose lifelong fertility is not yet completed. This idea aligns with historical demographic studies of major social upheavals. For instance, Caldwell (2006) suggests that mindset changes associated with insecurity play a crucial role in fertility declines, often outweighing the impact of material conditions. Marwick (1988) elegantly presents wars as irrational events that nevertheless catalyze rationalization and modernization, producing psychological shocks that lead to significant social change.

Building on these insights, we derive a number of expectations that inform our empirical analysis of how families exposed to war adjust the quantity and quality dimensions of childrearing (sibship size, incidence of child labor, and infant mortality):

H1: Quantity effect: Exposure to war reduces the number of children per family.

[5] Evolutionary models of human reproduction have often seen variation in fertility as the local optimization of the trade-off between offspring quantity and offspring quality of life (Lawson, Alvergne, and Gibson 2012; Lesthaeghe 2010). During the second demographic transition, parents have increasingly prioritized their children's development, allocating more resources to ensure access to quality education, health care, and opportunities for a better future.

H2: Quality effect: Families exposed to war invest more in childhood quality.

Beyond these, we have two complementary identification expectations designed to ensure that shifts in quantity and quality crucially manifest among families with reproductive flexibility and as a consequence of war:

H3: Families with reproductive flexibility (those with fewer children or those in which the mother is younger when the war begins) are more likely than other families to consequentially adjust childrearing quantity and quality at the war's onset.

H4: The impact of war exposure on the outcomes of interest is expected to be greater in provinces with higher levels of wartime violence.

Although violence during the SCW did not target children's lives or their everyday routines, the severity of conflict varied markedly across provinces. Hypothesis 4 exploits this heterogeneity, predicting that the war's effects will be most evident in provinces that experienced comparatively higher levels of violence, where uncertainty about the future increases. We exploit this spatial heterogeneity – combined with temporal variation in birth timing relative to the war's onset – to identify the conflict as a pivotal catalyst for families' adoption of quality-enhancing strategies. By integrating temporal (proximity to the war's outbreak) and spatial (provincial casualty rates) dimensions of violence, we isolate the direct effects of wartime conditions on family size and childhood quality outcomes, distinguishing them from broader historical trends or unobserved confounders.

3. Data

Spain is a country generally characterized by weak social statistics, with one notable exception: the 1991 Sociodemographic Survey (Encuesta Sociodemográfica, or ES-91), conducted by the Spanish National Institute of Statistics (INE). This dataset is the primary source of information on the evolution of the Spanish population over most of the 20th century as it provides comprehensive demographic details, including on family structure, fertility history, and child survival outcomes. One of the key advantages of this survey is its high level of detail regarding population trajectories. Given life expectancy in 1991, ES-91 is representative of populations born from 1920 onward, making it particularly valuable for our analysis. The original sample size by decade of birth is shown in Table 1.

Table 1: ES-91 sample size by birth cohort

Birth cohort	N	%
(1901–1920)	21,946	13.97
(1921–1930)	23,344	14.86
(1931–1940)	19,394	12.35
(1941–1950)	17,469	11.12
(1951–1960)	25,673	16.34
(1961–1973)	32,861	20.92
(1974 onward)	16,413	10.45
Total	157,100	100.00

ES-91 is perfect for this study because it enables us to examine the family dynamics of individuals directly exposed to the SCW. The sample includes respondents born before, during, and after the conflict, allowing for a comparative analysis of how different cohorts experienced family formation under varying social and economic conditions. Our focus is on individuals whose parents likely began forming their families either shortly before or during the war. To distinguish households with reproductive flexibility on the eve of the war (1936), we mark the pivotal cohort by respondents born in 1930–1931 or households formed by mothers born in 1909–1910, depending on the specific indicator of quality analyzed.[6] This framework marks meaningful turning points, as these families were expanding just prior to the war and subsequently experienced its impact.

Our analyses are organized into two separate blocks. The first section examines the impact of the SCW on quantity, or family size, while the second section explores explicit dimensions of childhood quality. We begin by analyzing the probability that the respondent has no siblings (0/1). A substantial body of research demonstrates that having fewer siblings is positively associated with child development, particularly in cognitive and educational outcomes. This relationship is largely explained by the well-known resource dilution hypothesis, which posits that parental resources – such as time, attention, and financial means – are inherently limited and must be divided among all children in the family (Becker and Lewis 1973; Blake 1981; Jæger 2009). As family size increases, the amount of resources available to each child decreases, potentially hindering their intellectual and educational development. Empirical studies consistently find that children in smaller families tend to attain greater educational success than those from larger families (Hill and Palacios 2020). Thus the resource dilution hypothesis provides a robust framework for understanding why growing up with fewer siblings can enhance developmental outcomes. As a complementary measure, we also consider in our analyses

[6] Due to sample size limitations, we use cohort groups of different birth years in our regression analyses rather than individual birth years. Grouping by cohort allows us to increase the number of individuals across birth cohorts, thereby enhancing the statistical robustness of our analyses.

the probability of having large sibships – i.e., having three or more siblings. For this analysis, the dependent variable is binary: coded as 1 if the respondent has three or more siblings and coded as 0 if the respondent has fewer than three or no siblings. This conventional threshold yields results consistent with those obtained using alternative definitions, such as the probability of having two or more siblings.

The second section explicitly addresses indicators of childhood quality independently of quantity considerations. We first examine whether the respondent was working (0/1) at age 10 or before. Then we extend our analysis to include a conventional measure of family environment quality: infant mortality. Early childhood survival is widely recognized as a key indicator of child well-being (Lawson, Alvergne, and Gibson 2012). Under-3 mortality rates, in particular, are closely watched, as they reflect not only the health status of children but also the effectiveness of health interventions, such as vaccination, medical treatment of infectious diseases, and adequate nutrition. High child mortality is typically the result of a combination of acute family and community failures, including inadequate access to quality health care, making it a powerful indicator of the type of challenges families may confront during wartime. Moreover, because most deaths in early childhood are preventable with timely and high-quality care, child mortality rates serve as an outcome-based measure of the quality care provided by families and communities.

To capture the impact of the conflict in childhood mortality, we estimate the probability that the respondent reports the death of a sibling born during the SCW. Specifically, we run two separate models, for siblings born in 1936 (the year the war began) and for those born in 1939 (the year it ended). During the conflict, child survival worsened in practically all Spanish provinces (Alonso and García Soler 2009). Given that our argument for this indicator centers on families' capacity to reorganize their size and structure in response to the war, our reference point shifts from the respondent's birth year to that of the mother. In particular, we investigate whether mothers born in 1909–1910 – who reached ages 25 and 26 at the onset of the SCW – were less likely than other mothers to experience the death of a child before age 3. Table 2 provides a description of all variables involved in the analyses presented in the empirical sections.

Table 2: Summary of variables involved in the analyses

	Variable	N	Mean	SD	Min	Max
Respondent characteristics	Year of birth	140,687	942.6	19.22	901	973
	Female	140,687	1.533	0.4989	1	2
	Respondent is the eldest	140,687	0.3361	0.4724	0	1
Family characteristics	Father didn't complete primary school	139,001	0.7027	0.4571	0	1
	Father completed primary school	139,001	0.1739	0.379	0	1
	Father completed secondary school or more	139,001	0.1234	0.3289	0	1
	Father died during SCW	140,687	0.0296	0.1695	0	1
	Mother's year of birth	132,490	914.5	19.51	845	963
Dependent variables (quantity)	Having no siblings	139,225	0.06492	0.2464	0	1
	Having three or more siblings	139,225	0.5385	0.4985	0	1
(quality)	Worked at age 10 or before	115,901	0.09141	0.2882	0	1
	Sibling born 1936 and survived to age 3	89,037	0.01222	0.1099	0	1
	Sibling born 1939 and survived to age 3	83,298	0.01028	0.1009	0	1

Additionally, as explained above, our identification strategy relies on two complementary expectations (formulated as Hypotheses 3 and 4) that exploit different sources of variation in war exposure and family adaptability. The first one concentrates on birth order heterogeneity, contrasting families whose first child was born on the eve of the war with those whose eldest child was born earlier, as they experienced fundamentally different reproductive pressures. Second, to test whether our results reflect genuine war impacts rather than spurious temporal trends, we use variation in conflict-related casualties across Spanish provinces as a proxy for the degree of disruption experienced by families exposed to war conditions. As argued before, while the idea that the SCW did not target children or shut down basic services held true throughout the country, some regions were more severely affected by violence than others. We take advantage of this variation in the incidence of violence to test the underlying assumption that higher casualty rates should create greater shifts toward quality-over-quantity strategies among families as uncertainty about the future intensifies. War intensity is operationalized using the percentage of a provincial population that died as a consequence of military operations during the SCW. Then provinces are dichotomized based on the median casualty rate, with categories for high-violence provinces (above median) and low-violence provinces (below median). This approach profits from the spatial heterogeneity in violence intensity that characterized the SCW, when some regions experienced intense fighting and high civilian casualties while others remained relatively peaceful.[7]

[7] Provinces classified in our analyses as having a high exposure to violence (measured by the proportion of victims out of the total population) are Barcelona, Córdoba, Cuenca, Girona, Huelva, La Rioja, Lugo, Orense,

4. Methods

In the main analyses of our paper, we employ a regression discontinuity design (RDD), a quasi-experimental econometric technique that concentrates on a predetermined cutoff or threshold to estimate causal effects. In contexts where treatment assignment is based on a specific variable, individuals situated just above and just below this threshold can be considered comparable, allowing us to identify treatment effects in the absence of randomized experiments.

While RDD is commonly applied in policy intervention studies, it is equally well suited for examining historical events, such as the SCW. The war's abrupt onset in 1936 created a clear historical discontinuity, disrupting demographic trends and family life courses in a way that lends itself to quasi-experimental analysis. By focusing on narrow birth cohorts – specifically 1930–1931 for children and 1909–1910 for mothers (see below)[8] – we are able to capture the jump in outcomes associated with exposure to wartime uncertainty. This approach allows us to isolate the effects of the war from the ongoing trends toward modernization that characterized prewar Spain.

Unlike ordinary regression models, which estimate average differences across broader groups, the RDD focuses on local changes around the cutoff, providing a more precise test of whether the war triggered abrupt shifts in family behavior. By modeling preexisting trends on both sides of the cutoff and conducting extensive sensitivity analyses, we ensure that the observed discontinuities reflect the impact of the war itself rather than secular demographic changes. This design is well suited to our substantive

Cantabria, Sevilla, Valencia, Álava, Badajoz, Castellón, Guadalajara, Huesca, Málaga, Navarra, Asturias, Soria, Toledo, Vizcaya and Zaragoza. Comprehensive, historian-validated records of SCW casualties covering the entire territory do not exist, and those available are not fully accurate, bias-free, or entirely reliable (Lorenzo Lacruz 2010). For this reason, we rely on provincial-level data from civil registry inscriptions, specifically deaths caused by military operations, as compiled by the conservative historian Ramón Salas Larrazábal in his book *Pérdidas de la Guerra* (Salas Larrazábal 1977). We recognize several potential sources of bias in this dataset, including under-reporting in provinces that remained under Republican control for extended periods, inconsistencies in registration procedures across territories, and unregistered deaths resulting from wartime disruptions or deliberate omission. Despite these limitations, Salas Larrazábal's compilation remains the most comprehensive provincial-level dataset available for our analysis, and we assume that any measurement errors are unlikely to systematically bias our results in a way that would undermine our identification strategy. Alternative measures used in previous research were rejected for conceptual and methodological reasons. Victimization measures derived from surveys are inherently shaped by endogenous experiences and identities, introducing significant recall and selection biases (Balcells 2012). The number of mass graves (Aparicio Fenoll and González 2021) is also problematic, as graves are a highly localized indicator of extreme violence and their distribution reflects logistical and historical contingencies, such as burial practices and accessibility, rather than the overall intensity of repression. Not all sites of violence resulted in mass graves, and grave sizes vary widely. Moreover, many areas with documented repression lack surviving graves, particularly in urban contexts where violence often took other forms.

[8] While single-year cohorts might provide even sharper cutoffs, we use two-year intervals to ensure adequate statistical power, and our results are robust to narrower windows.

interest in measuring how a major historical shock altered family decision-making and investment in childhood quality.

The general form of an RDD model involves a continuous variable, Z, that defines the assignment to a treatment or condition at a given threshold $Z = z_0$. The outcome variable, Y, is assumed to follow a linear function on either side of the cutoff. In this study, our RDD models are specified as follows:

$$Y_i = \alpha + \tau D_i + f(Z_i) + \beta X_i + \varepsilon_i, \quad (1)$$

where Y_i represents the outcome for individual i; α is the constant term; D_i indicates the cutoff point, with $D_i = 1$ if $Z_i \geq z_0$ and $D_i = 0$ otherwise; τ is the treatment effect of interest (in this case, the impact of war exposure on fertility and child survival); $f(Z_i)$ is a function capturing variation on either side of the selected threshold; βX_i represents a set of covariates to account for additional factors influencing the outcome; and ε_i is the conventional error term.

This specification allows the RDD to estimate the treatment effect, τ, by comparing individuals just above and just below the threshold; any discontinuity in the outcome can be attributed to the treatment, assuming continuity in the underlying variables. By controlling for unobserved confounding factors, the estimates remain unbiased. Thus through RDD we model the effects of war exposure on family outcomes. Specifically, we compare respondents from different birth cohorts on either side of the defined cutoff. The treatment in our analysis is defined by the respondent's exposure to the SCW during critical periods. As stated above, we use two types of cutoff points in our analyses, each selected to align with the logic of the corresponding dependent variable.

For the analyses where the outcome of interest is at the individual (respondent) level – such as the risk of working before age 11 or the number of siblings – we set the cohort cutoff at respondents born in 1930 and 1931. These individuals were children about to start primary education during the SCW and thus were directly exposed to its disruptions during key formative years. This cohort is well suited for examining how wartime conditions influence individual educational and labor market trajectories, as well as for testing the resource dilution hypothesis, which posits that children in smaller families benefit from greater parental investment in their education and well-being.

Conversely, child mortality reflects broader family decisions and constraints, and it is therefore best analyzed with reference to the mother's age and reproductive history. For these analyses, we shift our focus to the mother's birth cohort, specifically mothers born in 1909 and 1910. These women were in their mid-20s at the onset of the war, placing them in the midst of their childbearing years. By using maternal age as our reference, we are able to capture family-level adaptations in response to wartime uncertainty, particularly regarding decisions about fertility and child survival. This

approach reflects the fact that sibling mortality is an outcome shaped by family-wide strategies and resource allocation rather than by individual circumstances alone.

By employing these distinct analytical strategies, we are able to provide a comprehensive assessment of how war reshaped both individual life courses and family strategies regarding childrearing quantity and quality.

5. Results

5.1 Analysis of the effect of war on the quantity of children

5.1.1 Probability of having no siblings

We begin our analysis by examining whether exposure to the SCW affected family size, and more specifically the probability that respondents born in 1930–1931 grew up as only children. Table 3 presents our discontinuity estimates, which reveal a consistent pattern supporting our theoretical expectations. The regression coefficient assesses the discontinuity in the probability of having no siblings for individuals born in the pivotal cohort.

Table 3: Regression discontinuity estimates for the probability of having no siblings by provincial violence intensity

	All provinces (1)	High-violence provinces (2)	Low-violence provinces (3)
Discontinuity estimate	0.011	0.014	0.0083
	(0.0051)	(0.0075)	(0.0068)
N	135,140	64,857	70,283

Notes: Standard errors in parentheses; all models control for respondent sex.

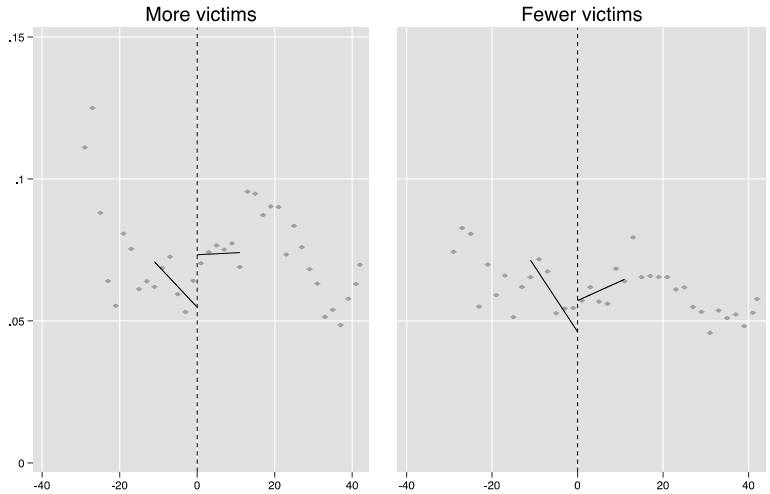
Across all provinces (first column), individuals born during the critical period of 1930–1931 were 1.1 percentage points more likely to have no siblings compared to those born in immediately preceding cohorts. This effect represents a meaningful shift in family structure, suggesting that families exposed to the onset of war adjusted their fertility decisions toward smaller family sizes.

The provincial heterogeneity analysis provides crucial validation for our identification strategy. The effect is substantially stronger and less uncertain in high-violence provinces, where the probability of being an only child increased by 1.4 percentage points. In contrast, the effect in low-violence provinces is smaller in magnitude (0.83 percentage points) and fails to reach significance. This pattern is consistent with our theoretical framework: Families in areas experiencing greater

wartime violence were more likely to implement quality-over-quantity strategies, concentrating their limited resources on fewer children.

The regression discontinuity plots (Figure 1) provide visual confirmation of these findings. Using the estimates from Models 2 and 3 in the previous table, the graph illustrates the trend in the probability of having no siblings before and after the pivotal cohort (1930–1931) and highlights how this probability changes at the cutoff point. The left panel, showing high-violence provinces, displays a clear discontinuity at the 1930–1931 threshold, with a notable jump in the probability of having no siblings. The right panel, representing low-violence provinces, shows a much smaller and less pronounced discontinuity, corroborating our statistical findings.

Figure 1: Regression discontinuity estimates for the probability of having no siblings by provincial violence intensity



Note: Estimates obtained from Models 2 and 3 in Table 3.

These results provide strong initial evidence that the SCW prompted families to reduce fertility, with the strongest effects concentrated in areas where conflict intensity was highest. This pattern supports our hypothesis that wartime uncertainty triggered volitional family responses rather than merely reflecting mechanical demographic disruptions.

5.1.2 Probability of having three or more siblings

To further explore the impact of the SCW on family size, we analyze the probability of respondents having three or more siblings – a direct indicator of growing up in a large family. Table 4 summarizes our regression discontinuity estimates. Results are reported for the full sample and, separately, for families in which the respondent is the eldest child. This distinction allows for a test of Hypothesis 3. Our expectation is that families with fewer children prior to the conflict – those where the respondent is the eldest child – were more likely to consequently adjust their childbearing decisions in response to the war. Across the full sample, we find that being born in 1930–1931 is associated with a 3.2 percentage point reduction in the probability of having three or more siblings ($p < 0.05$). This negative effect is consistent with our hypothesis that wartime uncertainty led families to limit sibship size. When we disaggregate by birth order, the results reveal the expected pattern. Among respondents who were not the eldest child, the estimated effect is negative but not significant. In contrast, for respondents who were the eldest child, the reduction in the probability of having three or more siblings is larger, at 4.4 percentage points.

Table 4: Regression discontinuity estimates for the probability of having three or more siblings by birth order

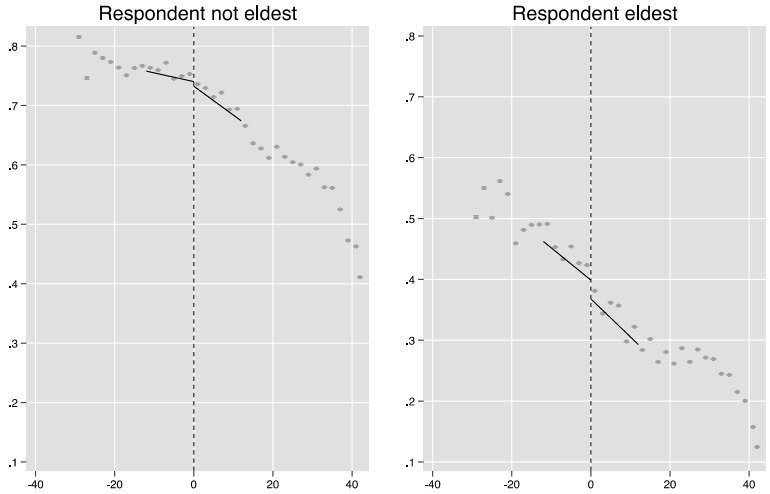
	All respondents (1)	Respondent not eldest (2)	Respondent is eldest (3)
Discontinuity estimate	–0.032	–0.011	–0.044
	(0.0099)	(0.011)	(0.018)
N	133,522	88,279	45,243

Notes: Standard errors in parentheses; all models control for respondent sex and paternal education.

The regression discontinuity plots reinforce these findings (Figure 2). For non-eldest respondents, the discontinuity at the 1930–1931 threshold is minimal. However, for eldest children, there is a clear and substantial drop in the likelihood of having a large number of siblings at the cutoff. This pattern confirms our theoretical expectation that families with greater demographic flexibility – those whose first child was born just before the war – were more able to adjust their fertility downward in response to the conflict.

Overall, our findings support the expectation that the SCW led to a significant reduction in family size, especially among families with the capacity to adapt their reproductive strategies. This is consistent with the view that the conflict accelerated a shift toward smaller families as a volitional response to uncertainty and resource constraints.

Figure 2: Regression discontinuity plots for the probability of having three or more siblings by birth order



Note: Estimates obtained from Models 2 and 3 in Table 4.

To provide a more nuanced test of our theoretical framework, we next combine our two identification strategies by examining how the effect of war exposure on family size varies across both birth order and provincial violence intensity. Table 5 presents the regression discontinuity estimates disaggregated by these dimensions.

Table 5: Regression discontinuity estimates for the probability of having three or more siblings by birth order and provincial violence intensity

	High-level violence		Low-level violence	
	Respondent not eldest (1)	Respondent is eldest (2)	Respondent not eldest (3)	Respondent is eldest (4)
Discontinuity estimate	–0.039	–0.047	–0.017	–0.0064
	(0.027)	(0.027)	(0.015)	(0.016)
N	23,013	22,230	46,301	41,978

Notes: Standard errors in parentheses; all models control for respondent's sex and paternal education.

The results reveal a certain hierarchy of effects that strongly supports our theoretical predictions. The largest and clearest reduction in the probability of having three or more siblings occurs among eldest children in high-violence provinces, where the effect reaches 4.7 percentage points. This represents the combination of maximum potential to

adjust childrearing (firstborn status) and maximum exposure to wartime uncertainty (high provincial violence). In contrast, the smallest effect is observed among eldest children in low-violence provinces, where the estimated reduction is only 0.64 percentage points and statistically indistinguishable from zero. This pattern is precisely what our theory predicts: Families with demographic flexibility but minimal war exposure show little adjustment in their fertility behavior. For non-eldest respondents, the effects are intermediate and generally neglectable, regardless of provincial violence levels. This confirms that families with a higher number of existing children at the onset of the war had limited capacity to adjust their reproductive strategies, even when facing intense wartime conditions. These findings prove that the war impact on family size was neither uniform nor mechanical but rather concentrated among families best positioned to implement strategic responses to wartime uncertainty.

5.2 Analyses on the effect of war on the quality of childhood

This section provides empirical evidence that tests our hypotheses concerning the war's impact on childhood quality outcomes. Consistent with the previous analyses on number of siblings, our regression models are estimated on the entire sample as well as on subsamples defined by whether the respondent is the eldest child or not. In addition, we estimate these models across gradients of wartime violence to test Hypothesis 4.

5.2.1 Probability of working before age 11

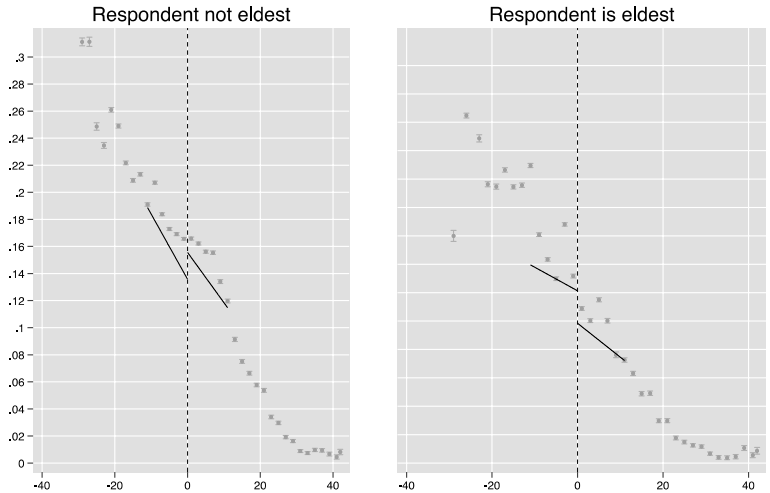
We first examine whether exposure to the war affected the likelihood that children entered the labor force at an early age, using the probability of working before age 11 as the relevant outcome. Across the full sample, Table 6 shows no effect of being born in 1930–1931. When we split the data by birth order, a clear pattern emerges: The estimate remains small and insignificant for respondents who were not the eldest child, but for firstborns it is negative, indicating a 2.8 percentage point reduction in the likelihood of working before age 11.

Table 6: Regression discontinuity estimates for the probability of working before age 11 by birth order

	All (1)	Respondent not eldest (2)	Respondent is eldest (3)
Discontinuity estimate	–0.0022	0.011	–0.028
	(0.0084)	(0.010)	(0.014)
N	111,058	74,324	36,734

Notes: Standard errors in parentheses; all models control for respondent sex, number of siblings, and paternal education.

Figure 3: Regression discontinuity plots for the probability of working before age 11 by birth order



Note: Estimates obtained from Models 2 and 3 in Table 6.

The regression discontinuity plots confirm that among the non-eldest respondents, there is little evidence of a discontinuity at the 1930–1931 cutoff. However, for eldest children, the plot shows a certain downward shift in the probability of working before age 11 at that cutoff. These findings suggest that the reduction in child labor as a response to wartime uncertainty was concentrated among families with greater demographic flexibility – those whose first child was born just before the war. This pattern aligns with our hypothesis that, under the pressure of conflict, families able to adapt their strategies prioritized childhood quality, lowering the likelihood that their firstborn children entered the labor force at an early age.

To further examine how wartime exposure affects child labor, we disaggregate our results by both birth order and provincial violence intensity (Table 7). The results reveal a partial alignment with our theoretical expectations. In high-violence provinces, both eldest and non-eldest respondents show negative point estimates for the probability of working before age 11 (–2.7 and –2.9 percentage points, respectively), suggesting reduced child labor among war-exposed cohorts across levels of violence. The pattern in low-violence provinces presents a more convenient picture. Among eldest children in these areas, the effect remains small and neglectable (–0.83 percentage points), consistent with our expectation. However, among non-eldest respondents in low-violence provinces, we observe a 3.0 percentage point increase in the probability of working before age 11.

Table 7: Regression discontinuity estimates for the probability of working before age 11 by birth order and provincial violence intensity

	High violence		Low violence	
	Respondent not eldest (1)	Respondent is eldest (2)	Respondent not eldest (3)	Respondent is eldest (4)
Discontinuity estimate	–0.029	–0.027	0.030	–0.0083
	(0.021)	(0.019)	(0.015)	(0.015)
N	18,388	18,346	38,358	35,966

Notes: Standard errors in parentheses; all models control for respondent's sex and paternal education.

Although the data are not shown here, we also obtain strong statistical support for the complementary childhood quality outcome of school attendance at age 10. Using this measure – a direct indicator of families' investments in their children's human capital development – we find that belonging to the 1930–1931 cohort significantly raises the probability of being enrolled at age 10. The largest and most precisely estimated gains appear among firstborn children in the most violent provinces. A more detailed study of the SCW's educational consequences (Manzano and Cebolla-Boado 2025) likewise reports positive wartime effects on attainment at both the primary and lower secondary levels.

5.2.2 Child survival: Sibling mortality before age 3

We finally turn to our analysis of child survival outcomes, shifting our analytical focus from the respondent's birth cohort to that of the mother. Recall that this approach reflects the fact that child mortality represents a family-level outcome shaped by maternal childrearing strategies and resource allocation decisions during reproductive years. Specifically, we examine mothers born in 1909–1910, who were aged 25–26 (prime

childbearing years) at the onset of the SCW, when wartime uncertainty would most directly influence family investment decisions.

Table 8 presents regression discontinuity estimates for the probability that a sibling died before age 3, disaggregated by the sibling's birth year and provincial violence intensity. For siblings born in 1936, the year the war began, we observe a consistent pattern of reduced mortality among mothers in the war-exposed cohort. Across all provinces, the probability of sibling death before age 3 decreases by 0.67 percentage points, though this effect is uncertain. However, when we disaggregate by provincial violence intensity, we see a clear pattern that strongly supports our theoretical framework. In high-violence provinces, mothers born in 1909–1910 experienced a 1.5 percentage point reduction in the probability of losing a sibling born in 1936 before age 3. Conversely, in low-violence provinces, the effect is small and positive (0.41 percentage points), indicating no meaningful improvement in child survival. For siblings born in 1939, the final year of the war, we observe remarkably similar patterns. The overall effect across all provinces is a 0.72 percentage point reduction in early child mortality, again neglectable. However, the provincial disaggregation reveals the same theoretically consistent pattern: a significant 1.3 percentage point reduction in high-violence provinces compared to a negligible effect in low-violence areas.

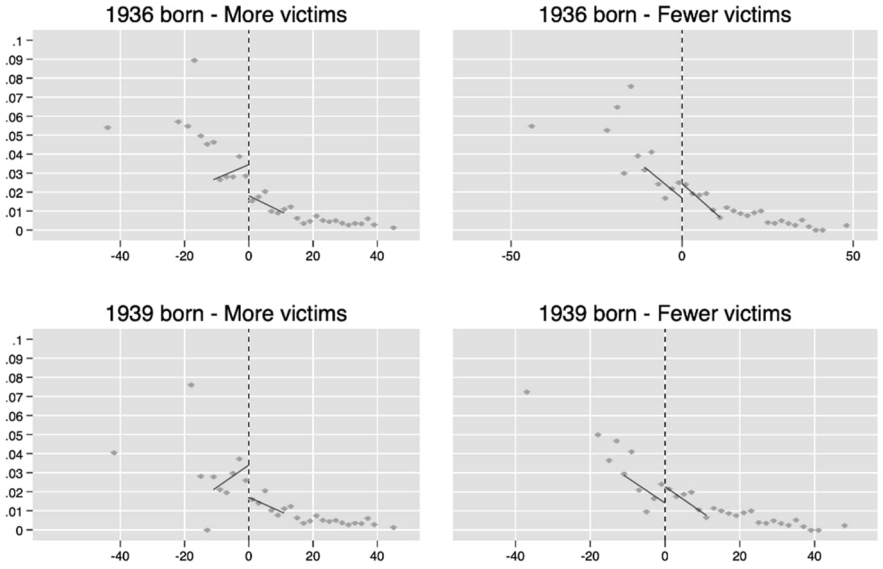
Table 8: Regression discontinuity estimates for the probability of sibling death before age 3 by sibling birth year and provincial violence intensity

	Sibling born 1936			Sibling born 1939		
	All provinces (1)	High violence (2)	Low violence (3)	All provinces (4)	High violence (5)	Low violence (6)
Discontinuity estimate	–0.0067	–0.015	0.00041	–0.0072	–0.013	–0.0014
	(0.0042)	(0.0062)	(0.0057)	(0.0045)	(0.0066)	(0.0061)
N	85,988	40,404	45,584	81,014	38,038	42,976

Notes: Standard errors in parentheses; all models control for paternal education.

These results provide compelling evidence that mothers with reproductive flexibility – those in their prime childbearing years when the war began – responded to wartime uncertainty by investing more heavily in child survival. The consistency of effects across both the 1936 and 1939 birth cohorts suggests that this represents a sustained strategic response rather than a temporary adjustment. The concentration of effects in high-violence provinces reinforces our interpretation that these improvements in child survival reflect volitional family responses to wartime conditions rather than secular trends. The magnitude of these effects – 1.3 to 1.5 percentage point reductions in early child mortality – represents meaningful improvements in child survival rates, particularly given the challenging conditions of wartime Spain.

Figure 4: Regression discontinuity plots for the probability of sibling death before age 3 by sibling birth year and provincial violence intensity



Note: Estimates obtained from Models 2–3 and 5–6 in Table 9.

6. Robustness checks

To ensure the validity of our findings, we conduct a comprehensive series of placebo tests by systematically shifting the key intervention dates in our analysis by five years. This approach allows us to test whether our observed effects are genuinely attributable to the historical events we study or whether they might reflect spurious correlations or preexisting trends in the data. For all respondent-based dependent variables, we shift our analysis from the original treatment period of 1930–1931 to a placebo period of 1944–1945. This approximately 15 years temporal shift maintains the same analytical framework while testing a period when the specific intervention we examine was not occurring, providing a crucial counterfactual scenario. The cutoff for this test provides an interesting reference point, corresponding to the harsh context of famines and isolation resulting from autarky during the first Francoism. Similarly, for the maternal cohort analysis focusing on infant mortality outcomes, we move the cutoff from the original

period of 1909–1910 to a placebo period of 1923–1924. This displacement preserves the temporal structure of our identification strategy while examining periods that should theoretically show no treatment effects if our main results are valid.

The logic underlying these placebo tests is straightforward: If our empirical strategy correctly identifies causal effects, we should observe no significant treatment effects when applying the same methodology to these artificially shifted time periods. Conversely, finding significant effects in these placebo periods would raise concerns about the validity of our identification assumptions and suggest that our main results might be capturing spurious relationships rather than true causal impacts. The comprehensive results from these placebo exercises are presented in Table 9, demonstrating the robustness of our empirical approach across different cohorts and outcome measures.

Table 9: Regression discontinuity estimates using placebo cutoffs: All dependent variables

		High violence	Low violence		
Having no siblings	Discontinuity estimate	0.00018	–0.017		
		–0.01	–0.0086		
	N	64,857	70,283		
		Respondent not eldest – high violence	Respondent not eldest – low violence	Respondent eldest – high violence	Respondent eldest – low violence
Having three or more siblings	Discontinuity estimate	–0.024	–0.02	0.0098	0.026
		–0.022	–0.019	–0.025	–0.026
	N	42,274	46,770	22,583	23,513
Works before 11	Discontinuity estimate	0.018	–0.015	0.0088	–0.0088
		–0.013	–0.013	–0.014	–0.015
	N	36,235	38,764	18,648	18,797
Infant mortality	Discontinuity estimate	0.00083	–0.00051	–0.0020	–0.0060
		(0.0037)	(0.0025)	(0.0090)	(0.0054)
N		21,782	25,388	11,628	12,385

Notes: Standard errors in parentheses; all models control for paternal education.

The absence of clear effects in these placebo periods strongly suggests that our main results are not artifacts of model specification or underlying trends but rather reflect genuine discontinuities associated with the actual timing of war exposure.

Finally, our results remain stable after controlling for urbanization (proportion of the population in the province living in the city capital) and GDP per capita, which further proves that our results are not confounded with secular modernization.

7. Summary of results and discussion

The evidence presented in this paper suggests that wars, under specific circumstances, can improve childhood quality when families possess enough flexibility to adapt their reproductive and childbearing strategies. Our findings show that exposure to the SCW led families with adaptive capacity to concentrate resources on fewer children and, eventually, higher-quality childhoods. Specifically, we find that respondents born in the early 1930s (1930–1931) who were exposed to the war not only had fewer siblings but more importantly benefited from more heavy investments in their quality of life. These children experienced significantly higher school enrollment rates, reduced child labor, and improved survival outcomes during the war and subsequent famine years. These positive outcomes were particularly pronounced among eldest children and in high-violence provinces, proving that our argument applies to families with a certain reproductive flexibility who perceived the strongest incentives to prioritize child well-being over family size during wartime. This, we claim, results from deliberate family strategies rather than mechanical responses to war-related disruptions. Our results challenge the assumption that wars uniformly harm child development, instead showing that with limited disruption to civilian life and sufficient family flexibility, conflicts can accelerate a beneficial transition toward quality-over-quantity investment strategies, with lasting positive impacts on child outcomes.

These results go in line with other theoretical arguments in more historiographic literature suggesting that wars, as external shocks to family dynamics, can catalyze social change and modernization processes. Our findings also align with patterns observed during other historical crises and social upheavals. For example, Glen H. Elder Jr.'s *Children of the Great Depression* (2018) documented how families prioritized the well-being of their children, particularly younger ones, even in the face of severe economic hardship. While Elder did not explicitly address family size as a mechanism, his work highlights the critical role of enhanced family investment strategies during crises. Similarly, our study finds that families during the SCW concentrated resources on fewer but better-supported children, echoing this focus on quality over quantity.

In our view, the positive impacts of war on childhood quality are often overlooked in the literature, primarily due to the focus on cases involving highly destructive wars or violent conflicts of such nature that children and civic life are directly targeted. Examples include the Second World War, African wars characterized by ethnic cleansing, indiscriminate violence in rural Colombia, and the conflicts in the former Yugoslavia. Such examples often align with the concept of disruptive or total wars (Marwick 1988), which impose severe non-volitional constraints on fertility and social life, preventing the expression of fertility-reducing volitional mechanisms, such as a clearer preference for childhood quality over child quantity.

We think the literature should pay greater attention to less disruptive wars. While these conflicts undoubtedly generate great violence, destruction, and social unrest, they also leave room for the emergence of volitional mechanisms shifting family priorities. This nuanced perspective provides a more comprehensive understanding of how wars shape fertility and family strategies. It is in this sense that the SCW not only serves as a powerful historical case study but also holds significant heuristic value for future research.

Furthermore, this type of conflict may also become more prevalent in the coming years. As military technologies become increasingly precise, allowing assailants to reach very specific targets, we may observe the type of impact that mirrors the conditions of the SCW. The nature of some modern conflicts, such as the Ukraine/Donbas conflict (from 2014, particularly prior to the full-scale invasion) or the localized Nagorno-Karabakh War in 2020, may allow some families to adapt their strategies, just like, we claim, the SCW did. The argument that families may reduce family size while investing more in childhood quality is particularly relevant in contexts where the demographic transition associated with the quantity–quality trade-off remains incomplete. In such settings, families retain the flexibility to make adaptive choices amid uncertainty and resource constraints. While the full effects of modern conflicts are still unfolding, the SCW provides evidence that non-disruptive wars may accelerate transformative shifts in family investment strategies even as broader modernization processes evolve unevenly.

Finally, it is worth noting that our research may have some limitations. First, the retrospective nature of the data could introduce recall biases. However, the specific nature of our life course outcomes mitigates this concern more effectively than studies focusing on ephemeral or less salient events. Findings around the variable most susceptible to recall error – child survival – are reliable, as proven by the consistency of our findings across two distinct sibling birth cohorts (1936 and 1939) and its strong interaction with provincial violence intensity. Had results been driven by random recall error, we would not expect to see such a clear and theoretically predicted pattern concentrated among mothers with maximum flexibility and in high-violence areas. Second, our analysis relies on the 1991 Sociodemographic Survey, which, while comprehensive, may not fully capture the variability in family responses across all regions of Spain. Third, our proxy of regional incidence is likely to reflect biases of different kinds, including under-reporting of victimization in regions controlled by the Nationalists early in the conflict. Additionally, our findings may be context specific, and caution should be taken when generalizing to other conflicts or modern-day contexts. Finally, the absolute magnitude of our estimated effects may appear modest. Yet their relative substantive significance is substantial. An approximate 8% to 10% reduction in the probability of having a large family, coupled with a significant protective buffer against early child mortality,

represents a decisive volitional shift in reproductive strategy in response to an extreme, sudden shock.

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Coauthorship statement
Both authors contributed equally to all aspects of the research and writing of this manuscript.

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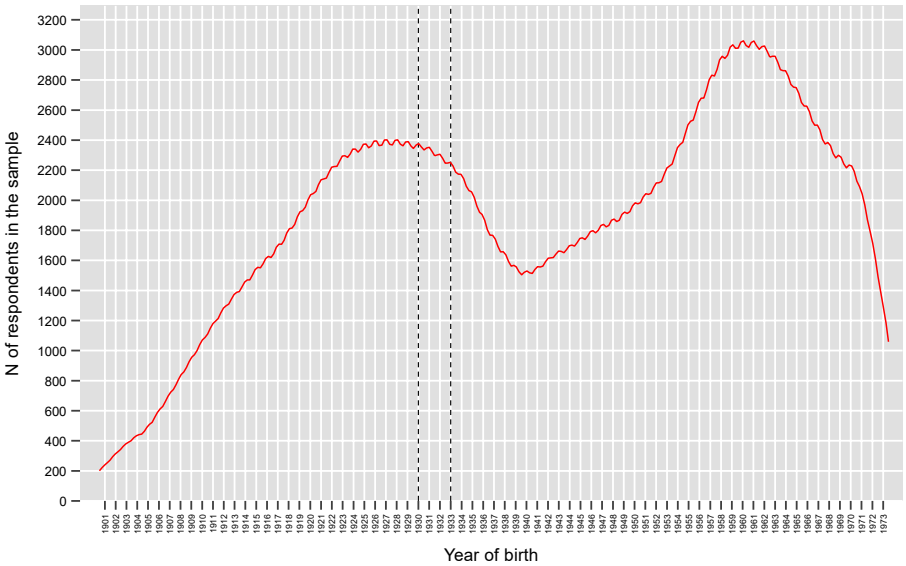
Appendix

Figure A-1: Evolution of ES-91 sample size by respondents' year of birth (Kernel density estimation)



Red line: kernel density; Dashed black lines: cutoff in RDD