Economía
LACEA Journal

The Scars of Civil War: The Long-Term Welfare Effects of the Salvadoran Armed Conflict

RESEARCH

LSE Press

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ABSTRACT

This paper estimates the long-term effects on human capital accumulation and subsequent labor market outcomes of in utero and early childhood exposure to the civil war in El Salvador (1980–92), the second longest and deadliest civil conflict in Central America. Identification is obtained from spatial and intertemporal variation in the intensity of the conflict drawn from historical archive data comprising records of human casualties, disappearances, and refugees. The results show that people born in highly violent areas during the civil war saw a reduction in their probability of being employed by 6 percentage points, and of getting a high-skilled job by 5 percentage points, 20 to 30 years hence. The civil war also reduced their education by 0.8 year, as well as their enrollment and literacy rates. Subgroup analysis indicates that exposed males and indigenous groups experienced the largest losses in human capital and had weaker performance in the labor market.

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KEYWORDS:
armed conflict; long-term impacts; El Salvador

JEL CLASSIFICATION CODES:
D31, I00, J13

TO CITE THIS ARTICLE:
Acosta, Pablo, Javier E. Baez, Germán Caruso, and Carlos Carcach. 2023. "The Scars of Civil War: The Long-Term Welfare Effects of the Salvadoran Armed Conflict." *Economía LACEA Journal* 22(1): 203–217. DOI: https://doi.org/10.31389/eco.414

DOI: 10.31389/eco.414

1. INTRODUCTION

Internal conflicts are a constant threat to economic development worldwide. Over half of the nations have experienced an armed conflict at some point in the last 50 years (Pettersson and Wallensteen 2015). After a drop at the end of the 20th century, there has been an upward trend in the number of internal conflicts since the early 2000s. The Uppsala Conflict Data Program (UPCP) globally recorded 40 armed conflicts with at least 25 battle deaths per annum for 2014, the highest number on record after 1999. Over 25% of these conflicts were civil wars that caused more than 1,000 battle deaths in a single year. The data also show that in 2014 the number of people forcibly displaced by armed conflicts worldwide reached close to 60 million, making it the highest annual increase since comparable records began in 1989 (United Nations High Commission for Refugees 2015).

Civil conflicts are a source of huge devastation, ranging from loss of lives and forced displacement, destruction of human capital, physical infrastructure and private property to disruption of economic and political systems. Those affected by violence and displacement usually experience higher perceived probabilities of extreme poverty in the short- and long-term (Moya and Cartner 2019). These hopeless beliefs can become self-confirming. Internal warfare has spillover effects in the form of refugees, crime and illegal trade into neighboring nations. At the macro level, countries often see growth slow down shortly after armed conflicts surge. Over time, however, most countries experience rapid post-war economic recovery, including a convergence of key factors of production (population and human capital) and standards of living (Blattman and Miguel 2010; Brakman et al. 2004; Davis and Weinstein 2002; Miguel and Roland 2006). Yet, at the micro level, a growing body of empirical research has been uncovering how wars inflict a subtler but long-lasting burden on the human capital of affected populations, undermining their long-term productivity and well-being (Akbulut-Yuksel 2017; Akresh et al. 2011; Bundervoet et al. 2009).

Empirical research has found that the impacts of conflict and other shocks on future health, education, and socioeconomic outcomes are particularly persistent and severe when the individuals are affected during the early stages of life (see papers by Maccini and Yang 2009, and Maluccio et al. 2009). The first thousand days, in utero and the first two years after birth, are critical for a child's physical and neurological development, as well as for the formation of human capital (Caruso and Karimi 2015; Leight et al. 2016; Neelsen and Stratmann 2011). Indeed, the rate of return to an investment made while a person is young is much higher than the rate of return to an investment of the same cost made at later age (Carneiro and Heckman 2003). The rationale behind this is that early investments are harvested over a longer horizon than those made later in life. In addition, early investments raise productivity and lower the costs of future investments.

During early childhood, children's nutritional status is affected by the quantity and quality of food they consume, and early deficits may bring negative, long-lasting consequences for children's health, education, productivity and earnings. For instance, undernourished children are more susceptible to infections, chronic diseases, and disabilities (Almond and Mazumder 2011; Rice et al. 2000) and present a higher risk of premature mortality related to these diseases (Behrman et al. 2004). However, more importantly, underinvestments during this stage of life result in lower physical and cognitive development. With insufficient energy, children fail to grow at a healthy rate (Aguilar and Vicarelli 2022; Hoddinott 2013). This lost growth is never fully regained, so these individuals end up shorter in height and with reduced body mass (Martins et al. 2004; Mansour and Rees 2012) compared to full adult potential if their diets had been adequate.

Furthermore, investments at early stages are fundamental to neurological and cognitive development (Moorthy 2021). Improved nutrition may increase educational attainment, the likelihood of completing primary school and secondary school, and the results of test scores (Alderman et al. 2006; Leon 2012; Maluccio et al. 2009). However, in the lack of sufficient investment during early childhood, in the future, these children are more likely to have reduced attention, lower IQs, reduced working memory, fewer motor skills, slower brain connections, among other consequences (Daniels and Adair 2004; Duque 2017; Hoddinott 2013). This in turn results in lower educational attainment, lower wages, lower likelihood of employment, more

DOI: 10.31389/eco.414

endangered livelihoods, lower productivity, and so on (Alderman et al. 2006; Alderman et al. 2001; Glewwe et al. 2001; Martins et al. 2004). Moreover, the effects of such shocks are stronger among children from poor families (Victora et al. 2010).

This paper contributes to the literature on the persistence of negative economic outcomes caused by adversities in early life. It contributes to the growing body of empirical research by providing evidence of the long-run human capital and productivity costs of civil wars. For this purpose, the paper investigates the labor market performance of adults who were exposed in utero or early childhood, critical periods for the formation of human capital, to the violence generated by the civil war in El Salvador (1980–1992), one of the longest and bloodiest conflicts in Central America. Little is known so far about the consequences of the Salvadoran Civil War on individual outcomes, and this study aims to fill that gap in the literature.

At the start of the war, El Salvador was already one of the poorest and most unequal countries in Latin America. In order to address the endogeneity between the socioeconomic conditions and the civil war, we exploit exogenous intertemporal and spatial variations in the intensity of the conflict as a source of identification, a plausible instrument to estimate the impact of civil war exposure on economic outcomes. As such, this paper relates to the empirical approaches employed by other important papers in the literature (Akresh et al. 2012; Annan et al. 2011; Bundervoet et al. 2009). We estimate a difference-in-differences model, factoring an index variable for war exposed areas (ranking the different Salvadoran departments) along with a cohort-based measure of years of exposure to the war. We combine data from the 2007 national population census with event information on the timing and geographic location of the conflict from historical data archives between 1981 and 1985.

The results indicate that the consequences of the conflict span far beyond the direct human and economic costs and are still being realized 20 to 30 years later as individuals affected early in life and still alive today, are entering the labor market. Exposure to the civil war reduced their probability of being employed by 6 percentage points and the probability of getting a high-skill job by 5 percentage points in the affected departments. In disentangling the mechanisms at play, we find that disruptions in human capital formation through reduced inputs (such as weaker nutrition, lower school enrollment, and destruction of facilities) played an important role. The country's most war-torn regions saw a reduction in school attainment of around 0.85 year. These negative effects are robust to the inclusion of several control variables, time trends, different sample specifications and placebo tests. Other outcomes related to psychological effects, shorter life expectancy and overall health outcomes were not explored in this paper due to lack of data. However, traditional literature for similar conflict situations has shown that these outcomes are likely to be affected as well.

The remainder of the paper is organized as follows. The next section provides an overview of the civil war in El Salvador and the country's context. Section 3 describes the data used in the analysis. Section 4 explains the empirical strategy, and Section 5 presents the empirical findings, including a discussion of the mechanisms behind the impacts and the results of the robustness analysis. Finally, Section 6 concludes.

2. CIVIL WAR IN EL SALVADOR

The roots of the civil conflict in El Salvador date back to the late 19th century. Land reforms initiated in the 1880s sought the abolition of communal land to support the expansion of an export-oriented coffee-based agriculture (Pérez Brignoli 2001). Land privatization was the embryo of social tensions and socioeconomic inequality, pitting a growing mass of dispossessed peasants attached to a strong culture of access to common land against a government-private sector alliance seeking the unlimited expansion of a coffee-based economy. Social discontent continued to grow through most of the first half of the 20th century, compounded by sharp drops in coffee prices, economic collapse following the Great Depression in 1929, frequent uprisings of peasants and indigenous people against the government and the landed elite, brutal repression and recurrent political instability. The following decades were marked by economic volatility, price

DOI: 10.31389/eco.414

fluctuations of major export crops such as coffee, cotton and sugarcane, and the oil crisis which led to rising food prices and decreased agricultural output.

The ousting of the military President Carlos Romero by a group of reformists and moderate officers on October 15, 1979, along with the assassination of a large number of Salvadorans such as businesspeople, union leaders, politicians, and human rights activists, tipped the sporadic violence of the 1970s between left and right wings into full-scale civil war. Indirect international involvement fueled additional violence and a human rights crisis. The Salvadoran conflict followed the victory of the Sandinista revolution in Nicaragua and the final years of the Cold War. This was seen by the US government as a serious threat of communist expansion in the region, prompting it to increase its military aid to the government and right-wing groups. In contrast, countries from the Eastern Bloc, in particular the Soviet Union, were crucial allies to the leftist factions.

The full-fledged war lasted for 12 years and resulted in more than 80,000 deaths. Given the small size of the population at the time of the war (around 4.6 million), the death toll is substantial, corresponding to an average homicide rate of approximately 150 deaths per 100,000 inhabitants. Beyond this burden of death, 8,000 disappearances were recorded, and more than a million people (nearly 22% of the pre-war national population) were forcibly displaced internally (Benítez Manaut 1988). Children were recruited as guerilla fighters, and death squads deliberately targeted civilians in rural villages and urban centers. In addition to the human costs, the conflict led to widespread devastation and destruction of key infrastructure. The intensity of the conflict peaked in years 1982 and 1983. From 1980 through 1992 the annual GDP per capita growth averaged –1.9% with a lower peak of –13.3% in 1980, and annual inflation averaged 18.1% with a high peak of 31.9% in 1986 (World Development Indicators 2019). Estimates based on synthetic counterfactual methods estimate an average annual loss of GDP per capita of 21.5% during the period of the conflict (Costalli et al. 2017).

Four different datasets, including those produced by the Commission for Human Rights in El Salvador, the files of the legal aid office of the Archbishopric of San Salvador and the acts of violence reported directly and by other organizations to the United Nations sponsored Truth Commission for El Salvador, concur that the first 3 years (1981–1983) represent the most violent period of the civil war (Hoover Green and Ball 2019). During this period, the USIP's Commission on the Truth received direct complaints concerning 5,375 victims of serious acts of violence (1993); and at least 164,297 displaced persons were reported in 1981 (Montes 1986).

However, in computations based on our own collected data for the years 1981 to 1985 (our sources of data include World Health Organization reports, historic municipal records and local newspaper reports about incidents at the time of the civil war), we assessed the number of deaths due to war operations at 17,912, the number of homicides at 10,635, and the number of displaced persons at 204,805. Figure 1 shows a map with the number of deaths by municipality due to war between 1981 and 1985. By 1985, 171 of the 262 municipalities in the country, 65.2% of the total, had been (directly) affected by the war.

3. DATA

We use two sources of data for this paper. The first is the Salvadoran National Population and Housing Census, collected by the National Institute of Statistics and Census (DIGESTYC) between May 12 and 25, 2007. The census surveyed close to 1.7 million households, which corresponds to an official count of approximately 5.7 million inhabitants. The instrument used for this paper asked questions about the characteristics of the dwelling (i.e., its geographic location, ownership, construction materials, access to basic services, among others), household composition and structure, ownership of basic assets and individual-level variables such as demographics (including ethnicity), school attainment, health status, labor participation, occupation, type of job, hours worked, remittances, migration and if the last-born child is still alive. Additionally, the census collected information on the date, department and municipality of birth for each individual counted.

DOI: 10.31389/eco.414

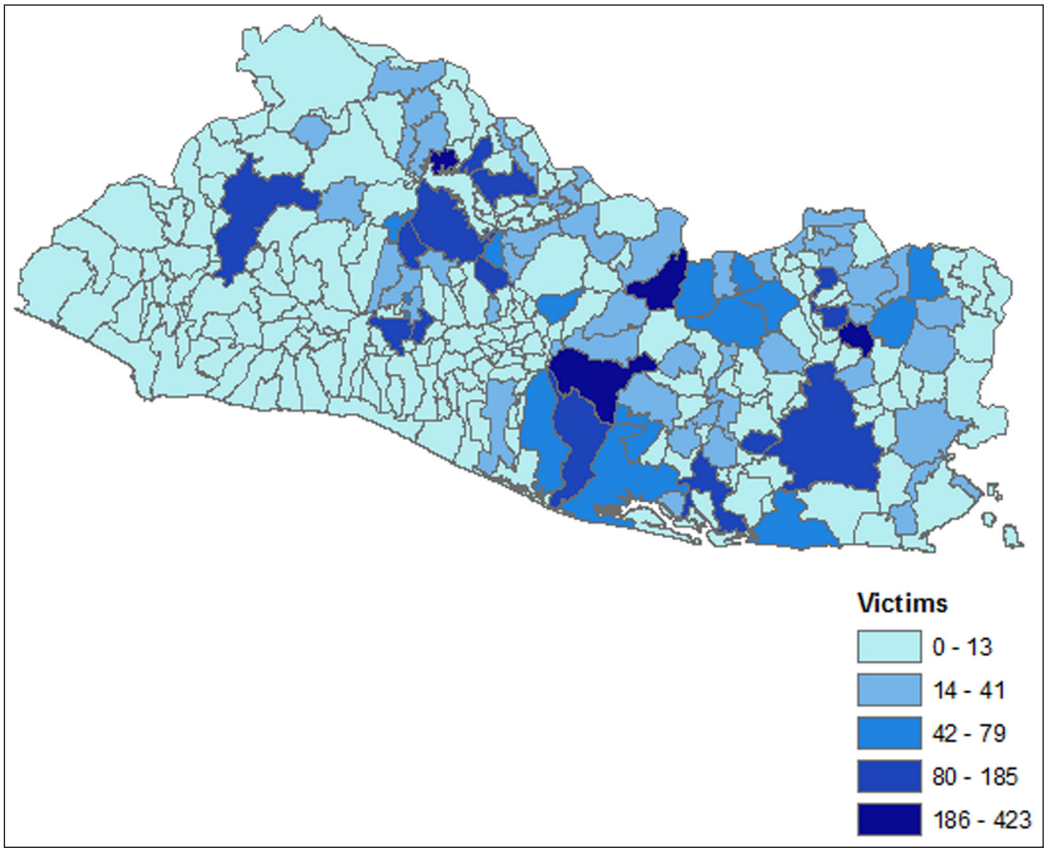

Figure 1 Average Number of Deaths Due to War by Municipality 1981–1985.

Source: Own elaboration based on municipality level violence data. This map shows the average number of death due to the war by municipality in 1981–1985.

We use a 10% random sample of the census to implement our empirical analysis. Table 1 shows how individuals within the sample are classified based on their cohort and district of birth. Summary statistics of the main variables used in this paper, including the dependent variables of interest, are shown in Table 2. Statistics related with human capital show evidence that 79.8% of the Salvadoran population can read and write, and most of them attend or attended an educational center (77.9%). On average, the total years of education for this population is 8.1 years. Labor market indicators show that 49.5% is employed and 25.9% is underemployed (working fewer than 40 hours per week). Internal migration has been important too, with 29.1% migrated, and 9.6% migrating during the civil war. Finally, population characteristics show that 54.9% of the population are women and 2.3% are indigenous.

Table 1 Sample structure.

Note: Table 1 shows the sample structure of our data. Our data is composed of individuals born between 1981–1985 and individuals born between 1940–1961. Those individuals born between 1981 and 1985 belong to the exposed cohort, as they were born during the years of the civil war in El Salvador. On the contrary, individuals born between 1940 and 1961 are used as a control group, as they did not experience war around the years they were born. Our sample is also geographically differentiated between high violence and low violence departments, according to the data we have on number of deaths due to war.

		COHORT	
		BORN BETWEEN 1981 & 1985	**BORN BETWEEN 1940 & 1961**
Departments	High intensity geographic area	Exposed cohort – Affected district	Non exposed cohort – Affected district
	Low intensity geographic area	Exposed cohort – Non affected district	Non exposed cohort – Non affected district

The second source collects data by municipality and department of victims during the period of civil war in El Salvador. The database contains different categories of victims between 1981 and 1985: homicide, suicide, transit accident, war victim, and displaced person. This study uses war victims and homicides as indicators of violence during the civil war. Evidence shows that during the civil war more than 76% of the victims recorded died because of war or homicide.

DOI: 10.31389/eco.414

	FULL SAMPLE		AFFECTED INDIVIDUALS		NOT AFFECTED INDIVIDUALS	
	(N = 1,269,242)		(N = 85,505)		(N = 1,183,737)	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
Individual Characteristics						
Male	0.45	0.50	0.47	0.50	0.45	0.50
Female	0.55	0.50	0.53	0.50	0.55	0.50
Indigenous	0.00	0.05	0.00	0.04	0.00	0.05
Years of Education	8.18	4.85	10.74	4.50	7.95	4.82
Literate	0.80	0.40	0.95	0.22	0.79	0.41
Attended educational center	0.78	0.41	0.94	0.25	0.77	0.42
Employed	0.50	0.50	0.54	0.50	0.49	0.50
High-Skill Job	0.17	0.37	0.21	0.41	0.17	0.37
Underemployed (<40 hours)	0.26	0.44	0.18	0.39	0.26	0.44
Underemployed (<30 hours)	0.12	0.32	0.09	0.28	0.12	0.32
Internal migration	0.10	0.30	0.07	0.25	0.10	0.30
Migrate During the War	0.29	0.46	0.25	0.43	0.30	0.46
Household Characteristics						
International migration	0.13	0.33	0.10	0.30	0.13	0.33
Last son is alive	0.96	0.19	0.99	0.10	0.96	0.19

Table 2 Summary Statistics, 2007 Census.

Notes: Table 2 shows descriptive statistics on the main characteristics of households and individuals by status of exposure to violence. High-skilled jobs include military, directors and managers, professionals, technicians. Underemployed variables take unitary values if individuals reported working less than 40 and 30 hours in the previous week. War refers to civil war. International migration takes unitary value if someone in the household migrated to another country.

Not all departments faced the same intensity of violence. This is reflected in the variation of homicide rates across departments. In order to identify the most affected departments without defining an arbitrary threshold, this work uses a cluster analysis method which allows us to identify the geographical areas with high and low intensities of violence. In particular, this paper clusters departments according to the number of victims.[1] The analysis is robust to different clustering techniques, outliers, and misclassification.[2]

Finally, to test for endogenous sorting, we conducted empirical analysis on a Census sample collected before the Civil War. To verify that the shock was indeed conditionally random and that families across departments were equally likely to be exposed to changes in violence, we compared descriptive statistics across departments.[3] In this analysis we found that there were no major differences across departments before the Civil War, which suggests that households across departments were equally exposed to changes in violence at the time of the conflict. These tables (Tables A8–A13) can be found in the online appendix.

We employ a difference-in-differences strategy that exploits plausibly exogenous, within-department cross-cohort variation in the intensity during the first five years of the war (1981–1985), the most violent period of the whole conflict. Identification is derived from a comparison of the

1 For splitting the sample, we have proceeded to cluster the municipalities according to their intensity of violence. Instead of relying on an aggregate indicator or focusing on one of them individually, our multivariate procedure allows us to exploit the multi-factor nature of civil war processes. Consequently, we build the clusters using k-means, the L1-norm, and the index of Calinski and Harabasz (1974) in order to determine the optimal number of clusters, which in this case happens to be two. We run this procedure 100 times, assigning a different random seed each time. This procedure provides us with 6 potential groupings. While there is a set of municipalities that is always assigned to the same group (35 to the high intensity of violence group and 28 to the other), there are 10 municipalities that switch groups. We also group the municipalities using the composite index (univariate procedure). The clusters according to the composite index are stable and never change.

2 Method for Cluster analysis (Calinski and Harabasz 1974).

3 Unfortunately, the microdata of this Census is not publicly available, and we used the report of the Census. From these tables we found that the characteristics of individuals across departments are reasonably similar.

DOI: 10.31389/eco.414

outcomes of similarly aged individuals in more and less affected departments. Basically, the empirical design relies on two sources of variation: i) across space, that is, comparison of identical birth cohorts (1981–1985) from "high" and "low" intensity geographic areas; and ii) across time, that is, comparison in "high" intensity areas of treated cohorts (born between 1981 and 1985) and cohorts old enough to have completed their education at the time of the shock (born right before 1961).[4] The underlying identifying assumption is that in absence of the war, the observed differences across different cohorts in each outcome would be similar across more and less affected departments. We present evidence below supporting the presence of parallel trends in labor market and schooling outcomes. The main estimation equation is specified as follows:

$$Y_{ijt} = \alpha + \beta(Exposed\,Cohort_t \times Affected\,District_j) + \delta_t + \gamma_j + \pi' X_{ijt} + u_{ijt} \quad (1)$$

where Y_{ijt} is the outcome of interest for individual *i*, from cohort *t* and born in department j; δ_t are cohort fixed effects; γ_j are department fixed effects; X_{ijt} is a set of regional- and individual-level control variables, including regional trends[5] and gender fixed effects; and u_{ijt} is a random, idiosyncratic error term. As the name suggests, the variable "Affected District" is an indicator variable that takes value equal to one if the department of birth of individual i was among the deadliest during the war and zero otherwise. This variable captures geographical variation in the level of violence caused by the conflict as measured by the homicides and war victims between 1981 and 1985 in department j. The variable "Exposed Cohort" is an indicator variable that takes value equal to one if the individuals were born during the deadliest period of the war (1981–1985) and zero otherwise. This variable captures all the time variation of the level of violence at the time of birth. The average treatment effect β measures the impact of the war on the outcome of interest Y.

To determine the affected departments, a cluster analysis methodology was used by department. Instead of defining an arbitrary threshold, we use a multivariate procedure which exploits clusters using k-means to identify the most violent group of departments, clustering them into two groups based on the distribution of the departments' rates of homicides and war victims as a proxy for level of violence. The clusters obtained are robust to multiple variations of the methodology.

This model identifies the average impact of the war under the assumption of "common trends" between groups in the absence of conflict. That is, the estimations in this paper assume that the trajectory of the individuals born in less affected departments is a valid counterfactual of the trajectory of the individuals in the more affected departments. This paper finds that trends for cohorts born before 1981 are indeed parallel.

Figure 2 shows an example of these trends for years of education. The figure shows the differential effect on years of education for affected individuals, relative to unaffected individuals. Such an effect is not statistically significant for all individuals who were above the age of 5 in 1980, meaning that those individuals in the control group (born between 1940 and 1961) who lived in war-affected zones were not different from individuals in the control group who lived in non-affected zones. The differential effect is significant only for those who were born up to 5 years before the civil war or during the civil war. For these individuals, we can find the effect of the civil war. In sum, this graph shows evidence in favor of the parallel trends assumption, as trends before the treatment are not different between individuals of the control group in violent and non-violent areas.

A final consideration is that individuals who survived the civil conflict may be different from those who did not. We acknowledge that this is a limitation of the identification strategy as a potential selection bias may arise from just looking at survivors. Unfortunately, we do not have pre-Civil War data to compare observables among those who died versus those who survived. Furthermore,

4 Although results were consistent when including cohorts who received the shock while in schooling age (born between 1961–1981), they were ultimately left aside from our analysis as our data availability does not allow us to know if the individuals born in 1961–1980 were in affected or non-affected districts at the time of the war. This problem would have been compromising our identification strategy.

5 Regional trends are composed by the interaction of birth departments with the cohort. In this way, we are capturing the temporal effect by the age (cohort) of individuals.

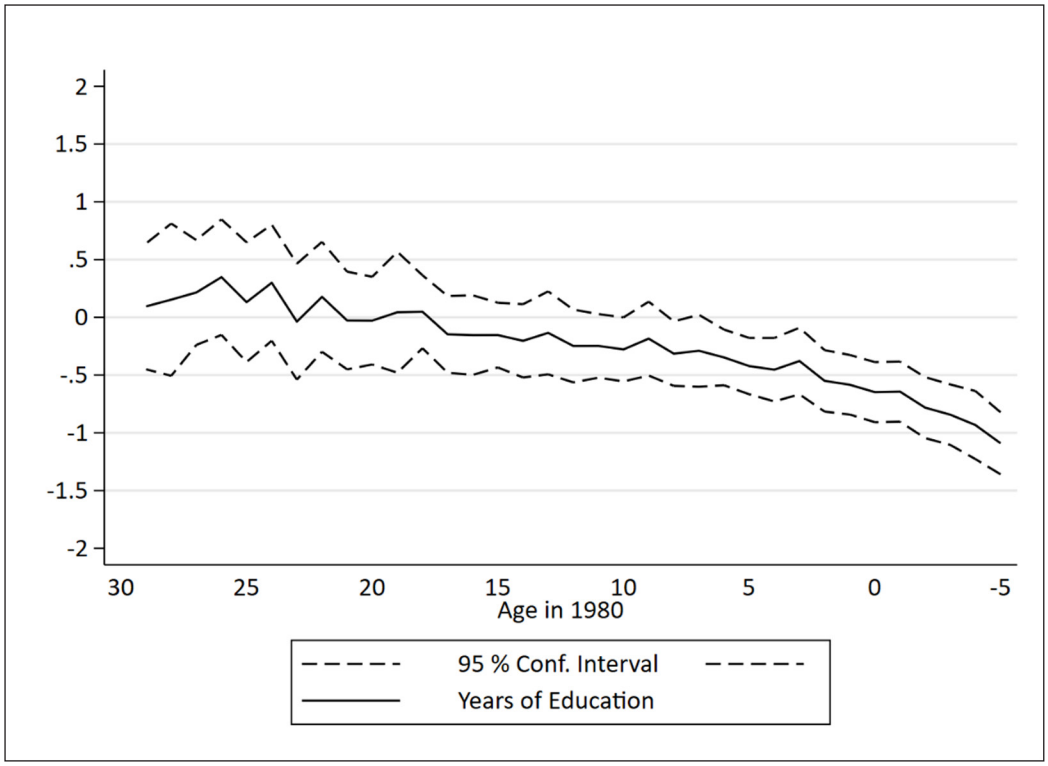

Figure 2 Parallel Trends – Effects of the Civil War on Education by age.

Note: Difference-in-differences estimates of the effect of violence on years of education by age in 1980. The figure plots coefficients and 95% confidence intervals for γ_k in the following regression model:

$$Y_{ikm} = C + \alpha_m + \rho_k + \pi_{ikm} + V_M + \sum_k (V_M + d_{ikm})\gamma_k + \varepsilon_{ikm},$$

where Y_{ikm} is years of schooling of individual i from cohort k born in district $_m$; α_m and ρ_k are district and cohort fixed effects, respectively; π_{ikm} are the regional trends; V_M equals 1 if district m faced high levels of violence during 1980–1985; and d_{ikm} is a dummy variable that equals 1 if individual i belongs to cohort k, where k represents the age of individuals in 1980 (the excluded cohort in the d_{ikm} set is individuals aged 29). The figure shows the differential effect on years of education for affected individuals. Such an effect is not statistically significant for all individuals who were above the age of 5 in 1980, meaning that those individuals in the control group (born between 1940 and 1961) who lived in war-affected zones were not different from individuals in the control group who lived in non-affected zones. The differential effect is significant only for those who were born up to 5 years before the civil war or during the civil war. For these individuals, we can find the effect of the civil war. In sum, this graph shows evidence in favor of the parallel trends assumption, as trends before the treatment are not different between individuals of the control group in violent and non-violent areas.

there could also be an association between violence and fertility. This is particularly relevant if women of certain characteristics (e.g., education) are less likely to have an additional child due to changes in violence, given that it could introduce some bias in the results. To seek if such association exists, we performed an analysis similar to that for other outcomes but using the total number of children per woman as dependent variable and restricting the samples according to mothers' characteristics (literate/illiterate, attended school/not attended school). The results suggest that exposure to violence had only a mild effect[6] on the number of children born per woman for literate women and women who attended school. However, the magnitude of a potential selection bias is likely to be small, as the decrease in 0.07 only represents a decrease of 4% relative to the average number of children per woman (1.89) and as the difference between the coefficients of literate and illiterate women is not statistically different.[7]

4. EMPIRICAL ANALYSIS

4.1 RESULTS

i) Labor Market Outcomes

Table 3 reports the results of estimating Equation 1 using as dependent variable several labor market outcome indicators. The model specification for each outcome includes controls for district fixed effects and regional trends.[8] We initially investigate the impact of the civil conflict on the labor engagement of individuals in the sample. The results show that two decades after the war finished, the employment rate of those born in a violent area at the time of the war was reduced by 6 percentage points due to the conflict (column 1). This impact is large in a sample where the average labor force participation is 50%, and it is statistically significant at 99% of confidence.

6 Significant at 10%, but not at 5%.

7 p-value = 0.927.

8 Results are robust to inclusion of fixed effects as shown in table A.1–A.2. of the Annex. Results are also robust to continuous specifications of the violence exposure variable as shown in tables A.3–A.4 of the Annex where main outcomes are regressed against the victims count variable.

	(1)	(2)	(3)	(4)
	EMPLOYED	HIGH-SKILL JOB	UNDEREMPLOYMENT	INTERNATIONAL MIGRATION
Exposed Cohort* Affected District	−0.0602*** (0.0147)	−0.0497*** (0.0148)	0.0259** (0.0094)	0.0173* (0.0094)
Gender	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Regional Trends	Yes	Yes	Yes	Yes
Outcome means	0.50	0.17	0.26	0.13
Observations	1,269,242	682,531	561,957	1,263,096

Table 3 Effects of the Civil War on Labor Market and Migration Outcomes.

Notes: 1) Clustered at department level standard errors in parentheses, 2) *** p < 0.01, ** p < 0.05, * p < 0.1, 3) For International Migration, each person in the household was asked if at least one person of the household emigrated to another country, 4) All regressions were specified at the individual level, 5) We employ a difference-in-differences strategy that exploits plausibly exogenous, within-department cross-cohort variation in the intensity of violence during the first five years of the war (1981–1985). Identification is derived from a comparison of the outcomes of similarly aged individuals in more and less affected departments. The diff-in-diff specification includes cohort fixed effects, department fixed effects, regional trends and gender fixed effects.

In columns 2, 3, and 4, we analyze the differential impact on other labor market outcomes. We find that being born in a highly violent area during the war also reduced the probability of later getting a high-skill job[9] by 5 percentage points. Our estimates indicate that in violent departments the war also increased people's future probability of underemployment by 2.6 percentage points. Finally, the war also affected the probability of migrating internationally. Exposure at birth to the civil war increased the international migration rate by almost 2 percentage points.

ii) Human capital

Table 4 presents the results of our main specification for the effect of war exposure on human capital accumulation. We find that being born in a violent department at the time of the war reduced the years of education by 0.8 year (column 1). These impacts represent a reduction of 11% in a sample with a mean of eight years of education. In columns 2 and 3, we analyze the differential impact on other human capital outcomes. The direction of this effect coincides with similar exercises carried out for Colombia (Duque 2014; Fergusson and Riaño 2020), Guatemala (Chamarbagwala and Moran 2011) and Peru (Leon 2012) but its intensity is significantly higher than precedent evidence which records a reduction of 0.2 to 0.3 years of education conditioned to having been born or been a young child in an affected district during the violent years. We find that exposure to war also reduces the literacy rate by about 8 percentage points. In addition, our estimates indicate that being born in a department with high intensity of civil war violence decreased by 8 percentage points people's probability of ever being enrolled at school. Finally, our estimations suggest that the war had a negligible effect on the probability of the last-born child not being alive, which decreased by 0.65 percentage points.[10] The effect of the war on the number of children per woman was unsignificant, even when restricting the sample based on individual characteristics (literacy, attendance to school).[11]

4.2 DIFFERENTIAL IMPACTS BY GENDER, MIGRATION STATUS AND FOR INDIGENOUS POPULATION

Tables 5, 6, and 7 show the results of our main specification for the effect of war exposure by gender, by migration status and ethnicity respectively, on both the probability of being employed and years of education. For migrants, we also analyzed the effects on the probability of being in a high-skill job and on underemployment.

9 High-skill jobs include managers, professionals, technicians and associate professionals, and armed forces occupations. On average, high-skilled workers earn $4 per day while low-skilled workers earn $1.38.

10 p-value = 0.039.

11 Under certain assumptions about the quantity and quality trade-off of children, it could be argued that if women chose to have less children due to their exposure to violence, our estimates could be biased. However, results in Table A.5 of the Annex suggest that exposure to violence only has a mild, negligible effect on the number of children per woman.

	(1)	(2)	(3)	(4)
	YEARS OF EDUCATION	LITERACY	ATTENDED TO SCHOOL	LAST-BORN CHILD IS NOT ALIVE
Exposed Cohort*Affected District	−0.8493*** (0.2767)	−0.0804*** (0.0098)	−0.0831*** (0.0099)	−0.0065** (0.0028)
Gender	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Regional Trends	Yes	Yes	Yes	Yes
Outcome means	8.20	0.80	0.78	0.04
Observations	990,965	1,269,242	1,269,243	541,020

Table 4 Effects of the Civil War on Human Capital and on the probability that the last-born child is not alive.

Notes: 1) Clustered at department level standard errors in parentheses, 2) *** p < 0.01, ** p < 0.05, * p < 0.1, 3) For "Last-born child is not alive", the regression analysis was run for the subsample of woman that had children, 4) We employ a difference-in-differences strategy that exploits plausibly exogenous, within-department cross-cohort variation in the intensity of violence during the first five years of the war (1981–1985). Identification is derived from a comparison of the outcomes of similarly aged individuals in more and less affected departments. The diff-in-diff specification includes cohort fixed effects, department fixed effects, regional trends and gender fixed effects.

Our results show that the negative effects of the war are stronger for males and for the indigenous population. For instance, Table 5 shows that having been born in a violent department reduces the probability of being employed by about 8 percentage points for males and 4 percentage points for females. Moreover, having been born in a violent department reduces the years of education by one year for males compared to 0.7 year of education for females.

	MALE		FEMALE	
	(1)	(2)	(3)	(4)
VARIABLES	EMPLOYED	YEARS OF EDUCATION	EMPLOYED	YEARS OF EDUCATION
Exposed Cohort * Affected District	−0.0797*** (0.0144)	−1.0064*** (0.2713)	−0.0403** (0.0141)	−0.7127** (0.2871)
Cohort FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Regional Trends	Yes	Yes	Yes	Yes
Outcome means	0.35	8.40	0.68	8.00
Observations	571,757	464,556	697,485	526,408

Table 5 Effects of the Civil War by Gender.

Notes: 1) Clustered at department level standard errors in parentheses, 2) *** p < 0.01, ** p < 0.05, * p < 0.1, 3) All regressions were specified at the individual level, 4) We employ a difference-in-differences strategy that exploits plausibly exogenous, within-department cross-cohort variation in the intensity of violence during the first five years of the war (1981–1985). Identification is derived from a comparison of the outcomes of similarly aged individuals in more and less affected departments. The diff-in-diff specification includes cohort fixed effects, department fixed effects, regional trends and gender fixed effects. To look at heterogenous effects, we separated the sample by men and women.

For non-migrants, the decrease in the probability of being employed and being in a high-skill job is stronger. However, the probability of underemployment increases more among migrants. In Table 6 we find that the probability of being employed fell 7 percentage points for non-migrants and 5 percentage points for migrants. Similarly, the probability of being in a high-skill jobs decreased 5.5 percentage points for non-migrants and 3.9 percentage points for migrants. On the contrary, the probability of underemployment increased 2.8 percentage points for non-migrants and 3.5 percentage points for migrants. We also ran regressions on the impact of the civil war on human capital outcome, by their status of migrants or non-migrants. Such results can be found in the online appendix, in Table A7. In sum, the effects were larger for those who did not migrate than for those who did migrate.

Furthermore, in Table 7 we find that exposure to the war reduced the probability of being employed for indigenous people (11 percentage points) more than for non-indigenous (6 percentage points). Being exposed to the war had an impact on human capital accumulation, but the results for non-indigenous people are not significant and thus inconclusive.

VARIABLES	MIGRANTS			NON MIGRANTS		
	(1)	(2)	(3)	(4)	(5)	(6)
	EMPLOYED	HIGH-SKILL JOB	UNDEREM-PLOYMENT	EMPLOYED	HIGH-SKILL JOB	UNDEREM-PLOYMENT
Exposed Cohort*Affected District	−0.0497** (0.0092)	−0.0385** (0.0083)	0.0351*** (0.0108)	−0.0699** (0.0162)	−0.0551*** (0.0167)	0.0282*** (0.0090)
Gender	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Regional Trends	Yes	Yes	Yes	Yes	Yes	Yes
Outcome means	0.53	0.20	0.23	0.48	0.16	0.27
Observations	371,603	213,396	561,957	897,639	469,135	385,883

Table 6: Effects of the Civil War on Labor Market Outcomes by Internal Migration.

Notes: 1) Clustered at department level standard errors in parentheses, 2) *** p < 0.01, ** p < 0.05, * p < 0.1, 3) All regressions were specified at the individual level, 4) We employ a difference-in-differences strategy that exploits exogenous, within-department cross-cohort variation in the intensity of violence during the first five years of the war (1981–1985). Identification is derived from a comparison of the outcomes of similarly aged individuals in more and less affected departments. The diff-in-diff specification includes cohort fixed effects, department fixed effects, regional trends, and gender fixed effects.

	INDIGENOUS		NON-INDIGENOUS	
	(1)	(2)	(3)	(4)
VARIABLES	EMPLOYED	YEARS OF EDUCATION	EMPLOYED	YEARS OF EDUCATION
Exposed Cohort* Affected District	−0.1110** (0.0380)	−1.5950** (0.9736)	−0.0602*** (0.0147)	−0.8489*** (0.2776)
Gender	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Regional Trends	Yes	Yes	Yes	Yes
Outcome means	0.49	7.10	0.50	8.2
Observations	2,766	1,780	1,266,476	989,184

Table 7 Effects of the Civil War for Indigenous Populations.

Notes: 1) Clustered at department level standard errors in parentheses. 2) *** p < 0.01, ** p < 0.05, * p < 0.1 3) All regressions were specified at the individual level. 4) We employ a difference-in-differences strategy that exploits plausibly exogenous, within-department cross-cohort variation in the intensity of violence during the first five years of the war (1981–1985). Identification is derived from a comparison of the outcomes of similarly aged individuals in more and less affected departments. The diff-in-diff specification includes cohort fixed effects, department fixed effects, regional trends and gender fixed effects. To look at heterogenous effects, we separated the sample by indigenous and non-indigenous individuals.

The indigenous population represents a minority of the El Salvador population, 0.23% according to the most recent projections based on the 2007 census (ECLAC 2014). Far from being spatially clustered, they reside all throughout the national territory occupying 13 of the 14 districts (UNICEF 2009). The Country Technical Note on Indigenous Peoples Issues (IFAD 2017) has already documented greater vulnerability of the indigenous population regarding their occupation. Estimates presented in that document shows that a high proportion of indigenous people carry out unpaid, independent, and domestic jobs while a lower proportion is engaged in formal jobs in the public and private sectors. Also in line with our findings, the same document reveals that the current school attendance rate for the population over six years of age is almost identical for the indigenous and non-indigenous population. Nevertheless, the population that never attended school is almost 8.5 percentage points higher for indigenous people, which would indicate that inequality of educational access would have been greater for past generations, and gaps are putatively narrowing.

4.3 ROBUSTNESS CHECKS

We conducted several falsification tests and robustness checks on our identification strategy. First, we estimated our main specification for cohorts whose labor and educational outcomes were not at all affected by the war. In particular, we focused on those who completed their investments in human capital accumulation by the time the war started. Therefore, we defined as "non-

DOI: 10.31389/eco.414

exposed" or "born before war" those born before 1950. Table 8 shows no effect on human capital accumulation, except for the likelihood of the last-born child not being alive for this non-exposed cohort. In this regression we find that being in a war affected district but having completed the investments in human capital before the time of the war does not yield significant impacts of the war on years of education, on literacy, nor on school attendance.

VARIABLES	(1)	(2)	(3)	(4)
	YEARS OF EDUCATION	LITERACY	ATTENDED TO SCHOOL	LAST-BORN CHILD IS NOT ALIVE
Born Before War* Affected District	−0.2651 (0.1620)	0.0305 (0.0244)	0.0279 (0.0262)	0.0071** (0.0032)
Gender	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Regional Trends	Yes	Yes	Yes	Yes
Outcome means	7.40	0.74	0.71	0.05
Observations	663,519	1,066,17	1,066,175	533,552

Table 8 Effects of the Civil War on Human Capital and on the probability that the last-born child is not alive for Non-Exposed Cohorts.

Note: 1) Clustered at department level standard errors in parentheses, 2) *** p < 0.01, ** p < 0.05, * p < 0.1, 3) For "Last-born child is not alive", the regression analysis was run for the subsample of woman that had children, 4) All regressions were specified at the individual level, 5) We employ a difference-in-differences estimation for non-exposed cohorts. The diff-in-diff specification includes cohort fixed effects, department fixed effects, regional trends and gender fixed effects.

We also ran the same specification for outcomes such as age or gender, which cannot be affected by the impact of war. If the regression would yield significant effects of war on gender or age, then our results could be considered spurious. However, in Table 9 we show that the specification does not generate spurious significant coefficients, as the regression does not yield any significant results. Additionally, we simulate false locations and false times for the armed conflict. To this end, we ran our same regression 100 times with randomly generated armed conflicts (either different departments or times from the control group). In 96 of the trials our results were not significant at the 10% level. These results are exhibited in Table A.14.

VARIABLES	(1)	(2)
	AGE	MALE
Exposed Cohort*Affected District	0.0147 (0.0088)	0.0113 (0.0077)
Gender	Yes	No
Cohort FE	Yes	Yes
District FE	Yes	Yes
Regional Trends	Yes	Yes
Outcome means	41.70	0.41
Observations	1,269,24	1,269,242

Table 9 Effects of the Civil War on Unrelated Outcomes.

Notes: 1) Clustered at department level standard errors in parentheses, 2) *** p < 0.01, ** p < 0.05, * p < 0.1, 3) We conducted several falsification tests and robustness checks on our identification strategy. For this test, we ran the same specification as for the main results presented in this paper, but for outcomes such as age and gender, which cannot be affected by the impact of the war. This is because the age of a person cannot be affected by violence. In this way, by using outcomes for which the coefficients should not be significant (this is exactly what happens), we show that the specification does not generate spurious significant coefficients.

Finally, we ran an alternative specification including cohorts born between 1961–1980. Tough impact on this cohort were in interesting to analyze as they were exposed to shock while in schooling age, we ruled it out of our main analysis as our data only allow us to know where the individuals were at birth and were therefore unable to know if they resided in affected or non-affected district at that specific stage of their life. Results of Tables A.15–A.16 show that our main model is robust to the inclusion of the mentioned cohort and that there are no sample composition issues.

5. CONCLUSIONS

This paper has shown the long-lasting effects of El Salvador's civil conflict in the 1980s on employment and human capital outcomes, particularly on education and on the probability that the last-born child is not alive. Our findings are consistent with those reported in the existent literature. Cohorts that were more exposed to conflict, vis-à-vis those non-exposed or less-exposed cohorts, are more likely to remain trapped in low-income situations and have fewer labor-market opportunities due to deteriorated human capital.

The war provoked a welfare reduction for the people exposed to it as well as long-term effects for future generations. These effects have not been uniformly distributed across the society. Thus, the stronger the exposure was, the more difficult it is to make these scars disappear. In particular, these impacts would require stronger state presence and increased governance in the form of development policies aimed at reducing regional gaps in territories that were greatly affected by the civil war.

These findings call for policy actions to help victims of conflict and their descendants improve their standard of living. While many countries have instituted war reparation benefits to victims (including El Salvador), interventions targeted to actively improve education and labor market policies are recommended since they can better help to overcome the main barriers for sustained income generation. However, more research is needed to identify the best policy outcomes to improve the life quality of groups specifically affected by conflict versus others affected by recurrent economic shocks that can have different long-lasting impacts on individuals.

ADDITIONAL FILE

The additional file for this article can be found as follows:

- **Annex.** Annex tables can be found online in the following link. DOI: https://doi.org/10.31389/eco.414.s1

ACKNOWLEDGEMENTS

We thank Melanie Gross and Marcos Puig Insua for their excellent research assistance.

COMPETING INTERESTS

The authors have no competing interests to declare.

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TO CITE THIS ARTICLE:
Acosta, Pablo, Javier E. Baez, Germán Caruso, and Carlos Carcach. 2023. "The Scars of Civil War: The Long-Term Welfare Effects of the Salvadoran Armed Conflict." *Economía LACEA Journal* 22(1): 203–217. DOI: https://doi.org/10.31389/eco.414

Submitted: 03 September 2020
Accepted: 29 March 2022
Published: 08 November 2023