

# ON WAR AND SCHOOLING ATTAINMENT: THE CASE OF BOSNIA AND HERZEGOVINA<sup>†</sup>

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## Abstract

The subject of civil war has received significant attention in recent years, due to numerous episodes of intrastate armed conflict around the world. However, more work remains to be done in terms of quantifying the effects of civil wars on individuals' welfare, as well as in uncovering the precise mechanisms through which the relationship operates. This study uses a unique data set that contains information on war casualties of the Bosnian War 1992–1995 at the municipality level, and exploits the variation in war intensity and birth cohorts of children, to identify the effects of the civil war on the schooling attainment of children. I find that individuals in the cohorts affected by war are less likely to complete secondary schooling, if they resided in municipalities that experienced higher levels of war intensity. In addition, I find no significant effects of war on the completion of primary schooling. By using ancillary evidence, I argue that these results are consistent with the hypothesis that the Bosnian War influences schooling attainment through youth soldiering, and not other direct mechanisms such as undermined school infrastructure and the exodus of teachers. Furthermore, the organization of war schools was particularly successful, which may have muted the effects on primary schooling.

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## 1. Introduction

The subject of civil war has received significant attention in recent years, due to numerous episodes of intrastate armed conflict around the world, especially in Africa, Caucasia, the Balkans, and the Middle East. According to Collier, Hoeffler, and Rohner (2008), there were 84 civil wars across the globe in the period 1965–2004. More than 50 countries have been involved, of which 23 have experienced repeat civil wars.<sup>1</sup> The demographic consequences of civil wars are tremendous, as millions of people are killed or displaced from their homes. Stewart, Huang, and Wang (2001), for instance, estimate that over 12 million people – mostly civilians – were killed in 25 major civil wars, while the UNHCR (2008) reports that more than 20 million people have been internally displaced by civil wars by the end of 2007.<sup>2</sup>

Despite the prevalence of civil wars and the ensuing human losses, most researchers have limited their attention to country-level statistics in examining conflict and few have employed intrastate variation in conflict to examine its impact on welfare at the individual-level hitherto. For instance, scholars who seek the causes of civil wars have argued that a variety of socio-economic and institutional factors at the aggregate level make armed conflict feasible and profitable (Collier and Hoeffler, 1998; Collier and Hoeffler, 2004; Collier, Hoeffler, and Rohner, 2008; Miguel, Satyanath, and Sergenti, 2004), while those who examine the impact of wars have focused on the macroeconomic indicators, finding no effect in the long-run (Davis and Weinstein, 2002; Brakman, Garretsen, and Schramm, 2004; Miguel and Roland, 2006). Due to the increasing availability of data from conflict regions in recent years, however, researchers now find it possible to examine conflict at the intrastate level. In particular, recent research suggests that children who are born in regions experiencing civil conflict are impacted with lower height for age z-scores (Akresh, Verwimp, and Bundervoet, 2007; Bundervoet, Verwimp, and Akresh, 2008), while exposure to civil conflict is found to have adverse effects on school enrollment and attainment (Merrouche, 2006; Shemyakina, 2007; Akbulut-Yuksel, 2008; Akresh and de Walque, 2008; Sanchez and Rodriguez, 2008).<sup>3</sup> Nevertheless, more work remains to be done in terms of quantifying the effects of civil wars on individuals' welfare, as well as in uncovering the precise mechanisms

through which the relationship operates.

My main contribution in this paper is the use of a unique data set that contains information on war casualties at the intrastate level of Bosnia and Herzegovina (hereafter, Bosnia), which, alongside cohort differences, allows me to identify the effects of the civil war in Bosnia 1992–1995 (hereafter, the Bosnian War) on schooling attainment. My empirical strategy exploits the variation in birth cohorts of children – which determines whether they were in primary and secondary schools during the war – and that in war intensity, represented by the number of war casualties per capita, across Bosnian municipalities.<sup>4</sup> A secondary contribution of this paper is that I am able to discuss the mechanisms through which civil war affects schooling attainment, given the availability of data on individuals' physical and mental health, war damage to housing units, and out-migration during the war.

My empirical results suggest that individuals in the affected cohorts are less likely to complete secondary schooling, if they resided in municipalities that experienced higher levels of war intensity. In particular, I estimate that a one standard deviation increase in the number of war casualties per capita decreases the likelihood of secondary school completion by at least 3 percentage points. On the other hand, I find no significant effects of war on the completion of primary schooling. Using ancillary evidence, I argue that these results are consistent with the hypothesis that the Bosnian War influences schooling attainment through youth soldiering, and not other direct mechanisms such as undermined school infrastructure and the exodus of teachers. Furthermore, the organization of war schools was particularly successful, which may have muted the effects on primary schooling.

In general, the findings in this paper resonate with the existing literature. For instance, Ichino and Winter-Ebmer (2004) and Akbulut-Yuksel (2008) find that Germans who were in the schooling cohorts during World War II received less education than their counterparts. As well, Merrouche (2006), Shemyakina (2007), Akresh and de Walque (2008) and Sanchez and Rodriguez (2008) find that exposure to civil war reduces schooling attainment in Cambodia, Tajikistan, Rwanda and Columbia respectively, and most of them rule out lower quality of school infrastructure as a pos-

sible mechanism. Overall, the congruency of these findings should not be taken lightly. Apart from the loss of human lives, civil wars can also significantly decrease the schooling attainment of children, which may worsen their longer term welfare and impede the economic growth of their countries [see Krueger and Lindahl (2001) for a literature review of the long-run effects of education on growth].

The rest of this paper is organized as follows. Section 2 constitutes a brief history of the Bosnian War and a discussion on the possible channels through which it may have affected schooling attainment. A description of the data and the identification strategy are laid out in Sections 3 and 4. Section 5 provides the empirical analyses and robustness checks. Section 6 concludes.

## **2. Background to the Bosnian War**

Bosnia is a country on the Balkan peninsula of Southern Europe, with a long history of ethnic diversity and conflict. Being strategically located at the crossroads between east and west, it has historically been a battleground for major military powers, including the Illyrians, Romans, Hungarians, and Ottomans, before finally being established by Josip Broz Tito as one of the six federal units – Bosnia, Croatia, Macedonia, Montenegro, Serbia and Slovenia – under the Socialist Federal Republic of Yugoslavia (SFRY) in 1943.

According to the SFRY census in 1991, the population of Bosnia was 4.4 million, containing large groups of Bosniaks (44 percent), Serbs (31 percent) and Croats (17 percent). Although ethnic diversity was also analogous to religious diversity – as the majority of Bosniaks are Muslims, and almost all Serbs and Croats are Orthodox Christians and Roman Catholics respectively – all Bosnians share the same heritage of being South Slavs and speak essentially the same language.

In general, inter-ethnic relations in Bosnia were amicable under the SFRY, as Tito managed to enforce a strict policy of “brotherhood and unity” by suppressing ethno-nationalism among the various *narods* (“nationalities” or “ethnicities”). According to Vulliamy (1994), Bosnians who lived in towns and cities were more tolerant for a multi-ethnic state than those living in rural areas, and those who could not assimilate to the urban lifestyle were waiting for the right moment to reignite the spirit of ethno-nationalism.<sup>5</sup> Indeed, shortly after Croatia, Macedonia and Slovenia declared

independence in 1991, the SFRY began to dissolve and civil war broke out in Bosnia between the pro-independence Bosniak-Croat coalition and the Serbs who boycotted the referendum for independence.

When the Bosnian War began in April 1992, the Serbs were led by Radovan Karadzic, the leader of the Serbian Democratic Party (SDS), who was a strong proponent of the Greater Serbia agenda, alongside the President of Serbia, Slobodan Milosevic. While Greater Serbia was originally a nationalistic call for an end to the oppression and exploitation of Yugoslav Serbs, it was soon used as a propagandistic tool to psych them up for the “ethnic cleansing” of Serb-controlled territories (Burg and Shoup, 1999). As a result, waves of Serb aggression – led by the Chetniks, a Serbian nationalist paramilitary organization – marked the earliest events of the Bosnian War which killed and displaced thousands of Bosniaks and Croats (Vulliamy, 1994). From 1993 onwards, however, the Bosniak-Croat alliance fell apart – due partly to the increasing call for a Croatian Union of Herzeg-Bosna among the Croat leaders – and the war was officially fought on three fronts.

By and large, most of the fighting took place in the East and Northeast regions of Bosnia. These regions were vital to the Serb nationalists because they were adjacent to Serbia and served as a corridor to the Serb-dominated enclaves in Croatia. Notably, both regions had a substantial non-Serb population prior to the war, which presented itself as an obstacle to the Serb aggressors. In the later stages of the war, Central Bosnia became a hot spot as it was important to the Croat nationalists who wanted to establish the Croatian Union of Herzeg-Bosna in that region.

In August 1995, the North Atlantic Treaty Organization (NATO), prompted by widespread massacres, conducted sustained air strikes against the Serb strongholds, thus internationalizing the conflict in its final stages (Owen, 1997a; Owen, 1997b). Subsequently, all three ethnic groups signed the Dayton Peace Agreement in December 1995, concluding four years of conflict in Bosnia. The agreement partitioned Bosnia by an Inter-Entity Boundary Line (IEBL) into two ethnically-divided entities – the Bosniak-Croat Federation of Bosnia and Herzegovina (FBiH) and the Serb Republika Srpska (RS). Overall, the human cost of the war was tremendous. The Research and Documentation Center (RDC) reports that approximately 96,000 civilians and soldiers were killed

or missing, and the Bosnian Ministry for Human Rights and Refugees (MHRR) estimates that 2.2 million people were displaced from their homes, half of whom sought refugee protection outside Bosnia. These figures imply a startling casualty rate of 22 deaths per thousand, and a displacement rate of one in every two people, making the Bosnian War one of the most violent conflicts in recent history.

## **2.1 Bosnian War and Schooling Attainment**

While the Bosnian War was undoubtedly violent, how pervasive were its effects on the completion of schooling for the affected cohorts? And through what channels? In this section, I explore several mechanisms that are applicable to Bosnia.

In the pre-war days, Tito considered education to be one of the most important activities for the development of the SFRY, and made sure that the Yugoslav state retained a firm control over education so as to cement the multi-ethnic state. A system of free schooling and the adoption of eight years of mandatory primary schooling (for those aged 7–15) ensured that the completion of primary schooling was virtually universal.<sup>6</sup> That said, many students did not go on to attend secondary schooling, which required another four years of general or technical studies (for those aged 16–19), and few attended university.<sup>7</sup>

On the whole, most individuals between the ages of 7–19 were in school at the time when conflict broke out, and their education must have been affected in one way or another over the course of nearly four years of battle. First of all, the most direct channel of impact is the reduction in accessibility to education. According to the UNHCR, approximately 34 percent of housing units were damaged by artillery shells during the war, of which many were completely destroyed. This suggests that many school buildings and other educational facilities may have also been damaged or destroyed. Furthermore, many localities were forced to convert schools into refugee centres or hospitals to accommodate displaced persons who fled their homes in search of safer areas within Bosnia (Mazowiecki, 1994). Apart from the destruction and dispossession of school infrastructure, the out-migration of teachers may have also impacted accessibility to education. In fact, the UNHCR estimates that more than one million people sought refugee protection overseas,

and some of these may have included teachers and other educators. To some extent, the military draft may have further diminished the ranks of teachers.

Nevertheless, the impact of undermined infrastructure and teacher exodus may have been muted, as several reports suggest that the remaining teachers continued to organize classes during the war, and attendance appeared to be relatively high (Mazowiecki, 1994). These so-called “war schools” were conducted in makeshift classrooms in homes, cafes, garages and basement shelters, often without proper equipment, electricity or heat, as the danger from artillery shelling and the destruction of school infrastructure forced schooling to go underground.<sup>8</sup> Moreover, it was extremely difficult to organize war schools in cities and enclaves under siege, as the school year was truncated and class schedule was irregular – due to the variability in the intensity of shelling and sniper fire. In fact, teachers were a scarce resource; not only were they shared among two or more schools, they also had to take on multiple administrative duties such as coordinating class schedules and securing premises (Berman, 2001). In particular, while it was possible to organize classes for primary education with a standardized curriculum, coordinating secondary education was incredibly challenging, because the variety of subjects across general and technical vocations meant that (i) secondary schools could not benefit from resource-sharing and (ii) finding the appropriate teachers for every subject was difficult. That said, these efforts ensured that the education system was not completely incapacitated during the war, and in terms of relevance to this study, may have diminished the effects of the war on the completion of primary (and possibly secondary) schooling.

Of course, the demand side of schooling matters too. For example, the military draft may have affected some of the older students who may have been encouraged to fight alongside adult soldiers. In fact, some students were reportedly alternating between attending war schools and showing up on the front lines for duty (Berman, 2001). However, one should note that the most apparent effect of soldiering – incompleteness of schooling due to death – cannot be ascertained in this study, so any estimate of soldiering effects will strictly be a lower bound of the true effects.<sup>9</sup>

Several other demand factors can also be seen from the parents’ perspective. For instance, to

attend school during the war meant having to commute amidst constant artillery shelling and sniper fire; therefore, parents, who inevitably fear for the safety of their children, may have discouraged them from going. In addition, in the case of displaced families, parents may be in a state of shock or feel uncertain about the duration of their stay, and thus feel less inclined to send their children to school. There is also the possibility that parents substituted away from schooling expenditure towards the consumption of basic necessities, especially when livelihoods were taken away, as suggested by Shemyakina (2007) and Akresh and de Walque (2008). While there is no direct evidence to support or refute this hypothesis for Bosnia, it is likely that this channel of influence on primary schooling is minimal, given that primary schooling is free. Also, substitution effects are only possible given the availability of war schools, which implies that these (substitution) effects, especially on secondary schooling, are of second-order at best.

While schooling may have been disrupted during the war, the affected cohorts could have resumed schooling after the war. In particular, this study looks at the schooling attainment outcomes six years after the end of the conflict, which implies that individuals in the affected cohorts would have had sufficient time to catch up on their secondary education (and for most, primary education). Consequently, I ought to consider not only the immediate effects of the Bosnian war, but also any lingering effects it may have imprinted on Bosnia's education system.

One glaring consequence of the war on Bosnia's education system is the establishment of ethnic segregation. Before the war, the Yugoslav regime maintained a common curriculum to keep dissidents of socialism at bay. However, the revival of ethno-nationalism (that helped propel the war) propagated during the war, which resulted in ethnically segregated schools that conduct classes in their own language and curriculum. Effectively, ethno-politics created segregated schools and used it to perpetuate intolerance and division among ethnic groups in Bosnia, which may have influenced schooling attainment post-war (Bozic, 2006). For instance, some returning refugees from the minority ethnic group were uncomfortable with their local school's use of an ethnocentric curriculum that is different from their own, and many resorted to bussing their children to faraway municipalities so as to attend schools of their ethnicity (OSCE, 2007).

To summarize, there are several channels through which the war may have affected schooling attainment, including reduced accessibility to education, a fall in demand due to soldiering commitments or parental indisposition, and other (adverse) lingering effects on the education system. Whether any of these mechanisms are important remains an empirical question that I will address later on.

### **3. Data**

The empirical bases of this paper are the data on municipality-level war casualties from the Bosnian Book of Dead Project 1991–1995, and the individual-level information from the Bosnian Living Standards Measurement Surveys (LSMS) 2001–2004. In addition, I construct municipality-level wartime statistics with the help of other data sources. The rest of this section introduces the data that I use in this paper.

#### **3.1 The Bosnian Book of Dead**

The Bosnian Book of Dead Project 1991–1995 (also known as the Human Losses in Bosnia and Herzegovina Project) was conducted by the Research and Documentation Center (RDC) in Sarajevo. Being an independent, nongovernmental, nonprofit, and nonpartisan entity, the RDC's primary role is to investigate, document, and publish accurate and unbiased statistics on genocide, war crimes and human rights violations that took place during the Bosnian War.

The project collected a variety of statistics, including the number of war casualties – a collective term used in this paper to refer to individuals who were killed or missing – which are documented based on death records and statements by surviving family members and witnesses. Around 85 percent of the records are relatively complete – containing the victim's vital information at the time of death, including name, age, ethnicity, location of residence and death, military or civilian status, and some even include a picture of the deceased. After years of careful documentation and cross-referencing with a wide variety of other databases, the Bosnian Book of Dead is not only methodologically sound, but also the largest and most complete data on war casualties inflicted in the Bosnian War (Ball, Tabeau, and Verwimp, 2007).

To gain a basic understanding of the data, I construct Table 1 to show the descriptive statistics

of war casualties by region of suffering. As of August 2008, the Bosnian Book of Dead reveals that 96,749 individuals were killed or missing, an average of 849 casualties per municipality. From Table 1, it is evident that most of the victims (around 60 percent) are soldiers, and Bosniaks constitute the majority of casualties. The East and Northeast regions have the highest number of casualties; however, in terms of the casualty rate – defined as the number of war casualties per capita in each municipality – Central Bosnia also appears to be a region of considerable suffering. In fact, for the purpose of reflecting the severity of violent conflict, the casualty rate is probably most suitable.<sup>10</sup> Thus, for empirical purposes, I will use municipality-level casualty rate as the proxy for war intensity.<sup>11</sup>

### **3.2 The BiH Living Standards Measurement Survey**

The Bosnian LSMS 2001-2004, conducted by the World Bank, is a nationally-representative household survey that covers 25 municipalities (14 from the FBiH, and 11 from the RS) out of 146. The sampling procedure is as follows. First, each municipality is assigned one of six cells, by entity (FBiH or RS) and type (urban, rural or mixed), using information from the 1991 SFRY census. Then, municipalities are independently sampled from each cell, with a probability that is proportional to population size. Among the chosen municipalities, 5,400 households were randomly selected in 2001, approximately half of which were re-interviewed for the panel. The attrition rate across waves is around 5 percent, which is relatively low compared to other national panels.

The key variables that I use from the LSMS are schooling attainment, individual characteristics and migration history, all of which are contained inside the first wave. However, several other variables which are important to this study – ethnicity, subjective health, and physical disabilities, for instance – are only available in subsequent waves from the panel. Therefore, in order to maintain a balanced sample, I will only be using the panel for this paper.<sup>12</sup> Overall, around 5,000 individuals remain in the sample.

The key outcome variable on schooling attainment is derived from the LSMS variable, “the highest level of diploma obtained”. I construct dummies for primary and secondary school completion by checking if an individual reports having at least a primary or secondary school leav-

ing certificate. In my sample, around 85 percent of individuals have completed primary school, of which two-thirds have completed secondary schooling or more. I also use migration data to match each individual's pre-war municipality of residence to its corresponding casualty rate. It turns out that the individuals in my sample resided in 75 pre-war municipalities, which gives me a fair degree of geographical variation in terms of analyzing the effect of war intensity.

Table 2 shows the summary statistics of primary and secondary schooling attainment, by age group and municipality-level casualty rate. I discard individuals who are aged 14 and below, because students normally do not complete their primary education before the age of 15. Notice that the youngest age group (aged 15–28 in 2001) constitutes the affected cohorts, that is, these individuals were aged 7–19 in the years 1992–1995 and should have been attending either primary or secondary school. In particular, those aged 7–15 (or 13–24 in 2001) would have been in primary schooling, and those aged 16–19 (or 22–28 in 2001) would have been in secondary school. From Table 2, a quick comparison-in-means between individuals from the high and low casualty municipalities in columns (1) and (5) indicate that the affected cohorts may have lower completion rates in primary and secondary schooling. However, by doing the same comparison for other (unaffected) cohorts, we can see that differences in schooling completion existed prior to the war. On the whole, Table 2 suggests the possibility of a pre-existing correlation between conflict intensity and schooling attainment, which I will deal with in Section 4.

Several health variables are also available from the later waves in the LSMS. For instance, I use responses from self-reported health (ranked “very poor” to “excellent”), physical disabilities (“yes” or “no”) and the frequency of recalling war trauma (from “not at all” to “extremely often”) to construct dummies. A novel feature of the Bosnian LSMS is that a symptom inventory – the Hopkins Symptom Checklist (HSCL) – was included and can be used to calculate a depression score (1–4) which corresponds to the likelihood of significant emotional illness. This depression score allows me to construct a dummy for depression, based on a well-known cutoff of 1.75 (Derogatis, Lipman, Rickels, Uhlenhuth, and Covi, 1974).<sup>13</sup>

### **3.3 Other Data**

In this paper, I rely on data from the Bosnian Federal Office of Statistics (FOS) to estimate pre-war and post-war conditions. I use the statistical yearbooks (1987, 1988, 1989, and 2001), which contain primary schooling information such as the number of schools and teachers, to construct measures for the pre-war quality of primary schooling for each municipality. In particular, I divide the number of primary schools (and teachers) by the population aged 0-14, to obtain “schools per capita”(and “teachers per capita”). Even though I also have information on the number of students, I choose not to adopt school size or teacher-student ratios because they may be endogenous (as enrollment usually is).

Typically, wartime data is difficult to obtain because the collection and processing of data is weakened when organizations are diverted to conflict-related issues. However, the UNHCR has managed to survey the extent of damage to housing units in 1995, which I will employ in auxiliary tests to check if the destruction of school infrastructure could have affected schooling attainment. In addition, the UNHCR also keeps a register of out-migrants (internally displaced persons and international refugees), which reflects the migration patterns that took place during the war. This data allows me to construct a per capita measure of out-migration, which I will use to test for the impact of teacher out-migration.

Notably, as Bosnia has 109 municipalities before the war, and 146 after (due to the division of several municipalities by the IEBl), constructing pre-war per capita measures for the new municipalities is cumbersome. Fortunately, the 1991 SFRY census reports data at the commune (sub-municipality) level, which enables me to compute accurate population figures for municipalities that only existed after the war. Using this data, I am able to compute war casualty rates (see Section 3.1) and the number of out-migrants per capita for each municipality.

#### **4. Identifying the Effects of War**

The estimation of war effects is a particularly challenging task, as unobserved pre-war conditions may determine both post-war outcomes as well as war intensity (or incidence), causing endogeneity bias in an OLS estimation. For instance, if a low level of initial income is a strong predictor for violent conflict – as argued by (Collier, Hoeffler, and Rohner, 2008) – which in turn decreases in-

come, then a simple comparison-in-means of post-conflict income across conflict and non-conflict localities cannot be attributed to war itself, as it may simply reflect pre-war differences in income that might have persisted in the absence of war.

In the case of Bosnia, schooling completion rates for the affected cohorts are lower in municipalities that experienced a higher war intensity, but the same differences also exist for the unaffected cohorts, suggesting that differences in schooling attainment were already present before the war (Table 2). That said, Kondylis (2007) argues that pre-war schooling attainment in Bosnia is uncorrelated with war intensity, so the main concern here is not that pre-war schooling attainment influences war and post-war schooling attainment, but rather that an unobserved factor is driving all of the above.

To examine the issue further, I use the sample of municipalities with high and low casualty rates – as defined by casualty rates above the 67th percentile and below the 33rd percentile respectively – and run fitted polynomial regressions of the mean schooling completion by cohort (Figure 1). From the top panel on primary schooling, it is apparent that no reasonable conclusion can be made as the completion rates in high and low casualty municipalities are not substantially different. On the other hand, the bottom panel on secondary schooling reveals that the completion rates in high casualty municipalities are significantly lower than those in low casualty municipalities, even after taking the completion rates of older cohorts into account.

On the whole, there exist differences in schooling completion by war intensity, but I cannot rule out the possibility of a spurious correlation. Thus, to be sure that war effects are correctly identified, I will adopt a difference-in-difference approach to account for any unobserved pre-war differences across municipalities. In particular, I exploit the variation in war intensity and the birth cohorts of children – which determines whether they were in primary and secondary schools during the war – by interacting war casualty rate  $WAR$  with a dummy for the affected cohorts  $AFFECTED$  in the following baseline regression:

$$SCHOOL_{ijkt} = \beta(WAR_j \times AFFECTED_t) + \alpha_j + \gamma_k + \delta_t + X_{ijkt}\theta + \varepsilon_{ijkt} \quad (1)$$

where  $SCHOOL_{ijkt}$  refers to the measure of schooling attainment for individual  $i$  who is born in year  $t$ , and is from municipality  $j$  (and  $k$ ) before (and after) the war;  $\alpha_j$  and  $\gamma_k$  are pre-war and post-war municipality fixed effects;  $\delta_t$  are the birth cohort fixed effects; and  $X_{ijkt}$  is a vector of individual characteristics, which includes sex, ethnicity, and a dummy for parental secondary schooling completion.  $\varepsilon_{ijkt}$  represents a vector of unobserved individual characteristics. The coefficient  $\beta$  measures the average effect of war intensity on the schooling attainment of affected cohorts. The identification of the impact comes from the difference in schooling attainment between the affected and unaffected cohorts from high casualty municipalities, relative to those from low casualty municipalities. Put another way, the identification exploits the fact that particular cohorts face possible disruption to their schooling simply because they are unfortunate to be of the “wrong” age in a “bad” municipality during the war.

Although the difference-in-difference approach eliminates  $\alpha_j$  and thus takes care of unobserved pre-war differences across (high and low casualty) municipalities, the identification strategy also relies on the behavior of two other components – post-war municipality conditions  $\gamma_k$  and unobserved individual characteristics  $\varepsilon_{ijkt}$ . In the case of  $\gamma_k$ , if the schooling attainment of unaffected cohorts does not increase after the war, then the identifying assumption reduces to the following: that the affected cohorts have an equal chance of resuming schooling, regardless of their municipality of origin. As for  $\varepsilon_{ijkt}$ , any unobserved individual traits that may be systematically different across (high and low casualty) municipalities may lead to a selection bias. I will deal with both of these concerns in the next section.

## 5. Empirical Analysis

Following the discussion above, I perform the empirical analyses to identify the effects of war on schooling attainment. Firstly, I run the difference-in-difference regression in equation (1), by using two different measures of schooling attainment – a dummy for having completed primary school, and a dummy for having completed secondary school – and present the results in Table 3. In all cases, the standard errors are clustered at the pre-war municipality level to allow for any unobserved correlation within municipalities.

For both measures of schooling attainment, I first run the difference-in-difference regression on the interaction of cohort dummy and war casualty rate without controls [columns (1) and (4)], then with individual controls [columns (2) and (5)], and finally with individual controls, cohort and municipality fixed effects [columns (3) and (6)]. The last specification – analogous to the one presented in equation (1) – reveals that war effects are only evident for the completion of secondary schooling. In fact, according to the results in column (6), the  $\beta$  coefficient is -1.534 and is statistically significant at the 1 percent level. This implies that a one standard deviation increase in war casualty rate – the equivalent of around 21 deaths per thousand – reduces an affected individual’s likelihood of completing secondary schooling by 3 percentage points.

Combining the evidence from Figure 1 and Tables 2 and 3, we can see that primary schooling was virtually impervious to the Bosnian War, while secondary schooling was significantly affected. A couple of explanations emerge from the previous discussion in Section 2.1. Firstly, while there may have been a substantial exodus of teachers, the impact of the war may have been muted by the organization of war schools by those who stayed behind; however, they may have been successful at providing primary schooling but not secondary schooling, because the former has a standardized curriculum that is easy to manage (Berman, 2001). Secondly, the military draft may have pulled secondary students away from school, while primary students were probably too young to become voluntary combatants. That said, we have not ruled out other plausible mechanisms, such as undermined school infrastructure, although it is difficult to imagine how that could only have an impact on secondary but not primary schooling.

Following the discussion in Section 4, I need to find support for the assumption that the affected cohorts have an equal chance of resuming schooling, regardless of their municipality of origin. Firstly, I look at two supply-side factors – schools and teachers per capita, as defined in Section 3.3 – and compare them for municipalities with high and low casualty rates. From Figure 2, we can see that pre-war differences diminish after the war, which suggests that schooling attainments across municipalities are unlikely to be driven by post-war supply-side factors. Furthermore, I need to check if refugees, who, as a result of moving from high to low casualty municipi-

palities, are systematically selecting destinations with better (or poorer) schooling facilities, which may cause my estimates to suffer from a positive (or negative) bias. To this end, I run a difference-in-difference regression by replacing the schooling attainment measure with a migration dummy variable that denotes whether an individual had migrated during the war [column(7), Table 4]. The  $\beta$  coefficient is statistically insignificant, which suggests that affected cohorts in high casualty municipalities are no more likely to move during the war.

Another possible source of bias is the fact that certain unobserved traits may be correlated with both schooling attainment and the probability of migrating. For instance, if individuals of higher ability are more likely to achieve a higher level of schooling and also tend to migrate during the war, then my estimates may suffer from selection bias. However, in column(7) of Table 4, we can see that parental secondary schooling completion does not seem to affect the likelihood of migration, which implies that selection by ability is unlikely, to the extent that parental schooling is a reasonable proxy for unobserved ability of the individual.

Finally, I run difference-in-difference regressions with the logarithm of reported monthly earnings being the dependent variable, to check whether the adverse effects on secondary schooling could have trickled down to earnings [column(8), Table 4]. It turns out that the  $\beta$  coefficient is negative but imprecisely estimated, which suggests that returns to education may be insignificant.<sup>14</sup>

## 5.1 Robustness Checks

The preceding section may have given us a glimpse into the effects of war on schooling attainment, but more needs to be done in terms of verifying the robustness of my results as well as in uncovering the exact mechanisms that are important. For the rest of this section, I will only consider the sub-sample of individuals who are above the age of 19, since this is the only group that showed evidence of war effects in Table 3.

First of all, I check to see if the war effects on secondary schooling are different by gender. Column (1) of Table 4 shows that the effects are strongly driven by males, whereas column (2) reveals no significant effect for females. Moreover, the  $\beta$  coefficient increases (substantially) by 30 percent when the sample is limited to males, indicating that the male sample is probably driving

our previous result. In general, this evidence is consistent with either or both of the following hypotheses: (i) budget-constrained parents substitute away from expenditure on their son's education towards the consumption of other goods, and (ii) youth soldiering is a significant driver of lower secondary schooling attainment.

Next, as the coding of cohort dummies are based on the average student's schooling age, I also conduct a sensitivity test by increasing (and decreasing) the number of cohorts by one to see if this may have any effect on the estimation. From columns (3) and (4) of Table 4, we can see that the  $\beta$  coefficients remain statistically significant, and the magnitudes differ only slightly – from the original -1.534 to between -1.464 and -1.613 – when a single cohort is added or removed. This suggests that the war effects are precisely estimated even when we account for the fact that some students may have taken more (or less) time to finish their secondary schooling.

To investigate the possible impact of a reduction in accessibility to education, I repeat the difference-in-difference regressions by replacing casualty rates with (i) the percentage of damaged housing units and (ii) the number of out-migrants per capita for each municipality. Columns (5) and (6) report the results for these specifications, suggesting that neither one of the determinants of accessibility matter.<sup>15</sup> In this case, the results are particularly helpful for ruling out a couple of scenarios that were suggested in the previous section. Firstly, I suggested that the exodus of teachers might have contributed to the relative success of primary over secondary war schools; however, this seems improbable now that I do not find any significant effects of out-migration to secondary schooling attainment. Secondly, I mentioned that undermined school infrastructure could be one of the mechanisms driving the war effects on secondary schooling; since secondary schooling attainment of affected cohorts is unresponsive to the extent of housing damage, this is also unlikely.

Thus far, the evidence points to the fact that war effects on primary schooling are probably muted by the successful organization of war schools. Moreover, the war effects on secondary schooling are unlikely to be driven by undermined school infrastructure or the exodus of teachers, but possibly by the effects of youth soldiering – to the extent that front line duties kept the af-

affected individuals from attending war schools. The remaining task is to consider the set of health outcomes – in particular, the ones that represent emotional health – to verify the importance of youth soldiering. To this end, I use the sample of affected cohorts and run difference-in-difference regressions by replacing the schooling attainment measures with a bunch of health outcomes. The objective here is to compare the health of the affected cohorts by war intensity and by age group (primary and secondary schooling).

In column (1) of Table 5, I use a dummy for subjective health – which equals one if the individual reports her health as being “fair” or better – and find that the  $\beta$  coefficient is negative but statistically insignificant. Then, in columns (2), (4) and (5), we can see that the  $\beta$  coefficients are positive but imprecisely estimated, which means that war intensity neither impact the frequency of recalling painful events from the war nor the likelihood of being physically disabled (due to the war or not). Nonetheless, the signs of these coefficients suggest that the affected cohorts in the secondary schooling age group may be less healthy than their primary schooling counterparts due to the war. In fact, from column (3), we can see that older affected cohorts are more likely to suffer from depression, by using a depression indicator that is derived from the HSCL. The  $\beta$  coefficient of 0.355 implies that a one standard deviation increase in war casualty rate increases an affected individual’s probability of emotional illness by around 1 percentage point. The fact that the affected cohorts in the secondary schooling age group show strong signs of lower schooling attainment and a higher probability of emotional illness confirms the relative significance of youth soldiering (Blattman and Annan, 2007). Overall, the evidence suggests that youth soldiering is an important mechanism through which the Bosnian War has affected individuals’ welfare.

## **6. Conclusions**

In this paper, I explain the detrimental effects of the Bosnian War on the affected cohorts, who were in the process of completing their primary and secondary schooling during the war. I attempt to identify empirically the war effects by using a unique data set that contains information on war casualties at the intrastate level. By exploiting the variation in war intensity and the birth cohorts of children – which determines whether they were in primary and secondary schools during the

war – I account for the unobserved pre-war differences across municipalities, to correctly identify war effects. I find that war intensity significantly reduces the schooling attainment of affected cohorts, and in particular, a one standard deviation increase in war casualty rate – the equivalent of 21 deaths per thousand – reduces an affected individual’s likelihood of completing secondary schooling by 3 percentage points. However, I find no noticeable effects on primary schooling, and I argue that this could well be the result of the successful organization of war schools at the primary level. I also find ancillary evidence that supports the hypothesis that the Bosnian War influences schooling attainment through youth soldiering, and not other direct mechanisms such as undermined school infrastructure and the exodus of teachers.

While the existing economics and political science literature on examining civil conflicts is vast, until recently, few empirical works have examined the microeconomic impact of civil wars. Among those, none has made use of a methodologically-sound war casualty data set to estimate war effects. To my knowledge, this study is the first to directly estimate the effects of a civil war by using intrastate casualty rates, and will contribute to the general literature on quantifying the welfare costs of civil wars. In addition, this paper registers an attempt to infer the mechanisms through which civil wars affect individuals’ welfare, and is the one of the first in the economics literature to document youth soldiering effects on schooling attainment and emotional health.

Given that civil wars lower schooling attainment, which may worsen individuals’ longer term welfare and impede the economic growth of their countries, the results of this paper not only provide policy-makers with important insights on war effects, but also reaffirms the importance of aid spending on the post-war rebuilding of the education sector. While the results of this study are both important and interesting, it is unfortunate that there is no available data to measure the reach and success of the Bosnian war schools, which, in my opinion, is a spectacular human feat in times of war. Should this sort of data becomes available in the future, it will be fruitful to examine its impact on schooling attainment, especially as a comparison to the results of this study.

## Notes

<sup>1</sup>Collier, Hoeffler, and Rohner's (2008) figures rely on data from the Correlates of War (COW) Project, which is originally provided by Singer and Small (1994) and recently updated by Gleditsch (2004). Civil wars are defined by armed conflicts that are not interstate, and which result in at least 1,000 battle deaths per year.

<sup>2</sup>Stewart, Huang, and Wang's (2001) estimate of war casualties reflects 25 major civil wars – in countries where over 0.5 percent of the population were killed – during the period 1970–1995, according to data provided by Sivard (1996). The exact number of displaced persons reported by the UNHCR (2008) is 26 million, of which approximately 23 million are displaced by civil wars.

<sup>3</sup>Several other authors have also examined the impact of civil wars by looking at other microeconomic outcomes. For example, exposure to war violence in Sierra Leone is associated with increased political awareness (Bellows and Miguel, 2006), while the Angolan civil war may have erected barriers to entry that benefited incumbent diamond mining companies (Guidolin and Ferrara, 2007).

<sup>4</sup>Kondylis (2007) uses the same approach on the Bosnian war casualty data to construct a measure of conflict severity. However, to the extent that I am using an updated version (August 2008) of the data, our measures may differ slightly.

<sup>5</sup>In fact, Vulliamy (1994) reports that Sarajevans regard the Bosnian War as one between the *raja* ("urbane and tolerant person") and the *papak* ("hillbilly").

<sup>6</sup>Since 2004, mandatory schooling has been increased to nine years, which effectively lowers the level of difficulty for the first two years (although many schools continue to abide by the eight-year system). This, however, should not affect my sample, as I am looking at individuals aged 15 or older in 2001, who would have started primary school when they were seven years old (under the eight-year system).

<sup>7</sup>In my sample, more than 90 percent of Bosnian adults aged 50 and below completed primary schooling, of which around 57 percent went on to complete secondary schooling and beyond.

<sup>8</sup>During the war, an incredible network of coordination was built on the enduring cooperation between parents, teachers, students, municipal and local government bodies, to ensure that students continued their schooling, and importantly, a sense of normalcy was maintained. Specifically, schools operated at the local level, with a fair bit of centralized initiatives developed or sanctioned by the Ministry of Education and the Pedagogical Institute. In fact, explicit guidelines – which contained the “Basic Work Programs” that laid out the abbreviated school curricula and instructions for adapting to local conditions – were pre-tested in focus groups and passed down to teachers (Berman, 2007).

<sup>9</sup>In fact, according to Blattman and Annan (2007), the stress on families of losing a child may also have a negative impact on the psychological health or schooling of the remaining siblings, and these negative externalities of soldiering are also excluded from any estimates of soldiering effects.

<sup>10</sup>For example, in terms of the number of war casualties, Srebrenica – a Bosniak enclave that suffered one of the worst massacres during the Bosnian War – has the highest at 8862 but Kalinovik – which hosted several concentration camps – has one of the lowest at only 242. If we consider the casualty rate instead, both Srebrenica and Kalinovik will be among the top 10 percentile of all municipalities, which better reflects the intensity of conflict.

<sup>11</sup>In choosing the measure of war, one possibility is to exploit the variation in the timing of war for different localities (Akresh, Verwimp, and Bundervoet, 2007; Bundervoet, Verwimp, and Akresh, 2008). However, when the Bosnian War began in Eastern Bosnia in early 1992, ethnic violence quickly spread to the rest of the country by the end of the year, so it is difficult to implement a timing measure of war. Hence, I adopt a measure for war intensity instead.

<sup>12</sup>Furthermore, the design of the first wave resulted in the oversampling of urban households, because municipalities that were larger – and probably more urban – were chosen with higher probabilities. This problem was compensated in the panel design, by retaining all rural and mixed municipalities while sub-sampling only the urban ones. As a result, the first wave, though having the merit of having the largest sample, has a disproportionately urban representation when used

on its own.

<sup>13</sup>The HSCL questions in the Bosnian LSMS were developed by the Harvard Program in Refugee Trauma. Out of the original 25 questions, only those on depression were included in the survey, and one was dropped based on the pilot test results. The depression score is simply the average of the score on the remaining 14 questions. Barring further clinical evidence, the common cutoff of 1.75 is preferred.

<sup>14</sup>This is similar to Merrouche's (2006) results on the earnings of Cambodians, although it is likely that both of our samples on earnings are selected – given the high unemployment rates – and should not be interpreted as a non-effect of schooling on earnings.

<sup>15</sup>These conclusions are similar to the findings of Merrouche (2006), Shemyakina (2007) and Akresh and de Walque (2008), who find that lower quality of school infrastructure is not a significant mechanism through which civil war affects schooling outcomes. That said, in the case of Germany during World War II, Akbulut-Yuksel (2008) concludes that the destruction of schools and the absence of teachers appear to be an important channel.

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**Table 1 - Descriptive Statistics (War Casualties)**

	Average across municipalities	Region of suffering						Central
		West	Northwest	North	Northeast	East	Southeast	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
War casualties	849 (1148)	856 (812)	707 (1112)	835 (539)	1462 (2091)	923 (773)	328 (635)	752 (475)
Casualty rate	0.022 (0.030)	0.017 (0.012)	0.013 (0.011)	0.016 (0.007)	0.031 (0.055)	0.036 (0.029)	0.010 (0.012)	0.019 (0.011)
Civilians	340 (804)	138 (82)	413 (938)	166 (88)	745 (1585)	358 (422)	123 (212)	148 (96)
Male	765 (1063)	815 (795)	639 (1017)	778 (513)	1361 (1976)	783 (623)	276 (562)	700 (453)
Aged 0-14	15 (24)	12 (11)	8 (13)	11 (16)	21 (28)	26 (34)	6 (13)	12 (12)
Aged 15-64	707 (969)	769 (772)	529 (820)	733 (463)	1243 (1805)	753 (612)	253 (533)	670 (443)
Aged 65+	44 (76)	27 (23)	47 (70)	31 (18)	63 (128)	59 (83)	31 (46)	23 (11)
Bosniak	565 (1009)	592 (637)	423 (932)	307 (295)	1138 (1966)	656 (608)	183 (388)	444 (326)
Serb	213 (219)	248 (253)	245 (195)	387 (334)	283 (232)	223 (194)	73 (131)	107 (134)
Croat	68 (103)	15 (33)	35 (53)	139 (83)	37 (78)	40 (56)	69 (127)	198 (146)
Other	3 (6)	1 (1)	4 (8)	3 (2)	4 (7)	4 (6)	2 (8)	3 (3)
Number of municipalities	109	7	17	9	19	26	19	12

Standard deviations in parentheses. War casualties refer to the number of dead or missing individuals by municipality. Casualty rates are constructed by using the number of war casualties divided by the population in 1991, for each municipality.

**Table 2 - Descriptive Statistics (Schooling Attainment)**

<u>Group of municipalities</u>	<u>Primary schooling completion</u>				<u>Secondary schooling completion</u>				Number of individuals
	<u>Aged 15-28</u>	<u>Aged 29-42</u>	<u>Aged 43-56</u>	<u>Aged 57+</u>	<u>Aged 15-28</u>	<u>Aged 29-42</u>	<u>Aged 43-56</u>	<u>Aged 57+</u>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
High casualty rate	0.953 (0.211)	0.907 (0.291)	0.680 (0.468)	0.613 (0.489)	0.526 (0.501)	0.619 (0.487)	0.406 (0.492)	0.347 (0.478)	740
Medium casualty rate	0.969 (0.174)	0.968 (0.176)	0.867 (0.340)	0.739 (0.440)	0.642 (0.480)	0.736 (0.441)	0.606 (0.489)	0.565 (0.496)	1741
Low casualty rate	0.975 (0.155)	0.958 (0.201)	0.834 (0.372)	0.644 (0.479)	0.595 (0.491)	0.688 (0.464)	0.550 (0.498)	0.364 (0.482)	2512
Number of individuals	1383	1323	1281	1006	1383	1323	1281	1006	4993

Standard deviations in parentheses. Casualty rates are constructed by using the number of war casualties divided by the population in 1991, for each municipality. Municipalities are categorized by casualty rate into three equal quantiles - High (casualty rate greater than 2.41 percent), Low (casualty rate less than 1.24 percent), and Medium (otherwise).

**Table 3 - Difference-in-Difference Regressions**

Dependent Variable:	<u>Primary schooling completion</u>			<u>Secondary schooling completion</u>		
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
Affected cohort:						
Aged 07-15 in 1992-95	0.117*** [0.023]	0.105* [0.062]	0.197** [0.075]			
Aged 16-19 in 1992-95				0.185*** [0.019]	-0.101 [0.063]	-0.084 [0.061]
Municipality war casualty rate	-0.478 [0.366]	-0.287 [0.258]		-0.192 [0.373]	0.242 [0.251]	
Cohort dummy x War casualty rate	0.339 [0.373]	0.385 [0.309]	0.274 [0.269]	-1.193* [0.624]	-1.639*** [0.532]	-1.534*** [0.426]
Individual controls	No	Yes	Yes	No	Yes	Yes
Cohort & municipality fixed effects	No	No	Yes	No	No	Yes
Mean of dependent variable	0.869	0.869	0.869	0.615	0.615	0.615
Number of observations	4993	4993	4993	4579	4579	4579
$R^2$	0.02	0.22	0.27	0.01	0.36	0.41

Clustered standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Individual controls include sex, ethnicity and parental secondary schooling completion. Schooling completion data is taken from the 2001 LSMS. The sample in columns (1)-(3) contains individuals aged 15 and above in 2001. The sample in columns (4)-(6) contains individuals aged 19 and above in 2001. The mean and standard deviation of the war casualty rate are 0.017 and 0.022 [columns (1)-(3)], and 0.017 and 0.021 [columns (4)-(6)].

**Table 4 - Robustness Checks**

Dependent Variable:	<u>Secondary schooling completion</u>						<u>Migration</u>	<u>Log (monthly</u>
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)	<u>dummy</u>	<u>earnings)</u>
							OLS (7)	OLS (8)
Affected cohort:								
Aged 16-19 in 1992-95	0.078 [0.095]	-0.037 [0.104]			-0.021 [0.069]	-0.097 [0.063]	-0.006 [0.014]	-0.646 [0.459]
Aged 16-18 in 1992-95			0.235*** [0.052]					
Aged 16-20 in 1992-95				-0.125 [0.117]				
Cohort dummy x War casualty rate	-2.034*** [0.557]	-0.815 [0.619]	-1.464*** [0.405]	-1.613*** [0.359]			0.137 [0.397]	-0.942 [4.451]
Cohort dummy x Percentage of damaged housing					-0.038 [0.035]			
Cohort dummy x Out-migrants per capita						-0.464 [0.580]		
Parental secondary schooling completion							0.005 [0.005]	
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort & municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of dependent variable	0.711	0.519	0.612	0.611	0.615	0.615	0.526	4.760
Number of observations	2291	2288	4701	4474	4579	4579	4579	1947
R <sup>2</sup>	0.62	0.35	0.39	0.41	0.41	0.41	0.95	0.39

Clustered standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Individual controls include sex, ethnicity and parental secondary schooling completion. Schooling completion data is taken from the 2001 LSMS. The sample in columns (1), (2), (5), (6) and (7) contains individuals aged 19 and above in 2001. The sample in column (3) contains individuals aged 18 and above in 2001. The sample in column (4) contains individuals aged 20 and above in 2001. Data on damaged housing units and number of out-migrants are taken from the UNHCR. Monthly earnings is denominated in the Bosnian Konvertible Marka (KM), where 1 KM is approximately 75 US cents. The mean and standard deviation of the war casualty rate are 0.016 and 0.018 [column (1)], 0.017 and 0.024 [column (2)], 0.017 and 0.021 [columns (3), (4) and (7)], and 0.015 and 0.014 [column (8)].

Columns (1)-(2): Diff-in-diff regression with male and female sample respectively.

Columns (3)-(4): Diff-in-diff regression with -1/+1 year of the affected cohorts respectively.

Columns (5)-(6): Diff-in-diff regression with measure of war intensity being percentage of damaged housing and out-migrants per capita respectively.

Columns (7)-(8): Diff-in-diff regression with migration dummy and log (monthly earnings) being the dependent variable respectively.

**Table 5 - Difference-in-Difference Regressions (Health Outcomes)**

Dependent Variable:	<u>Subjective health</u>	<u>War trauma</u>	<u>Depression</u>	<u>Physical disability</u>	<u>War disability</u>
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)
Affected cohort:					
Aged 16-19 in 1992-95	-0.038 [0.038]	0.122 [0.104]	-0.014 [0.039]	0.016 [0.028]	0.009 [0.013]
Cohort dummy x War casualty rate	-0.661 [0.418]	0.388 [1.122]	0.355* [0.188]	0.154 [0.145]	0.131 [0.112]
Individual controls	Yes	Yes	Yes	Yes	Yes
Cohort & municipality fixed effects	Yes	Yes	Yes	Yes	Yes
Mean of dependent variable	0.952	0.437	0.061	0.012	0.005
Number of observations	1383	1365	1084	1379	1379
$R^2$	0.1	0.25	0.22	0.09	0.05

Clustered standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Individual controls include sex, ethnicity and parental secondary schooling completion. Subjective health is a dummy = 1 if reported health is no less than "fair", based on health in the last 12 months, relative to people of the same age; the actual responses in the LSMS are: (1) very poor, (2) poor, (3) fair, (4) good, (5) excellent. War trauma is a dummy that refers to the recall of war trauma in the previous week. Depression is a dummy that takes the value 1 when an individual is Hopkins Symptom Checklist (HSCL) positive, with a depression score of 1.75 or higher (out of a possible 4), where a higher score corresponds to a greater likelihood of significant emotional illness; the HSCL is a symptom inventory which measures symptoms of depression. This sample contains individuals aged 28 and below in 2001. Physical disability (due to war or not) is a dummy that equals one when the individual reports disability. Some observations are lost due to unreported health measures. The mean and standard deviation of the war casualty rate in columns (1)-(5) are 0.018 and 0.027 respectively.

Figure 1 - Fitted Regression of Schooling Attainment by Cohort and War Casualty Rate

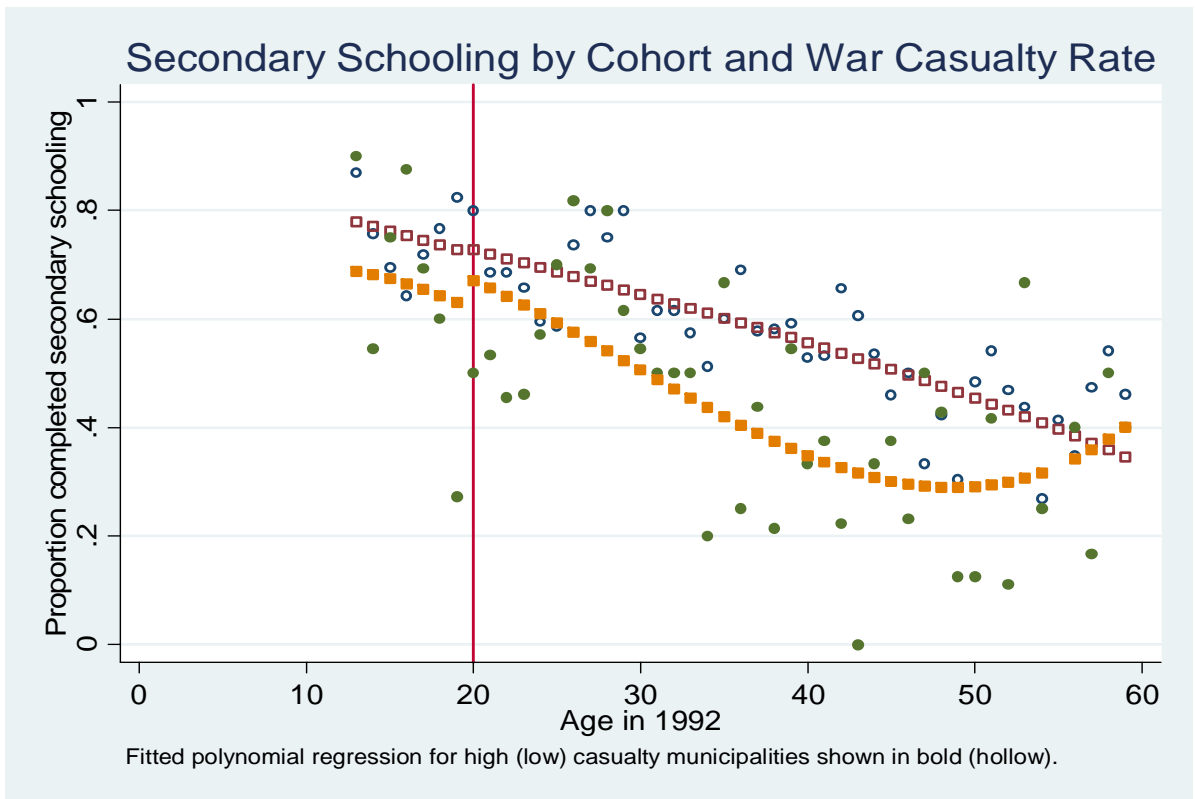
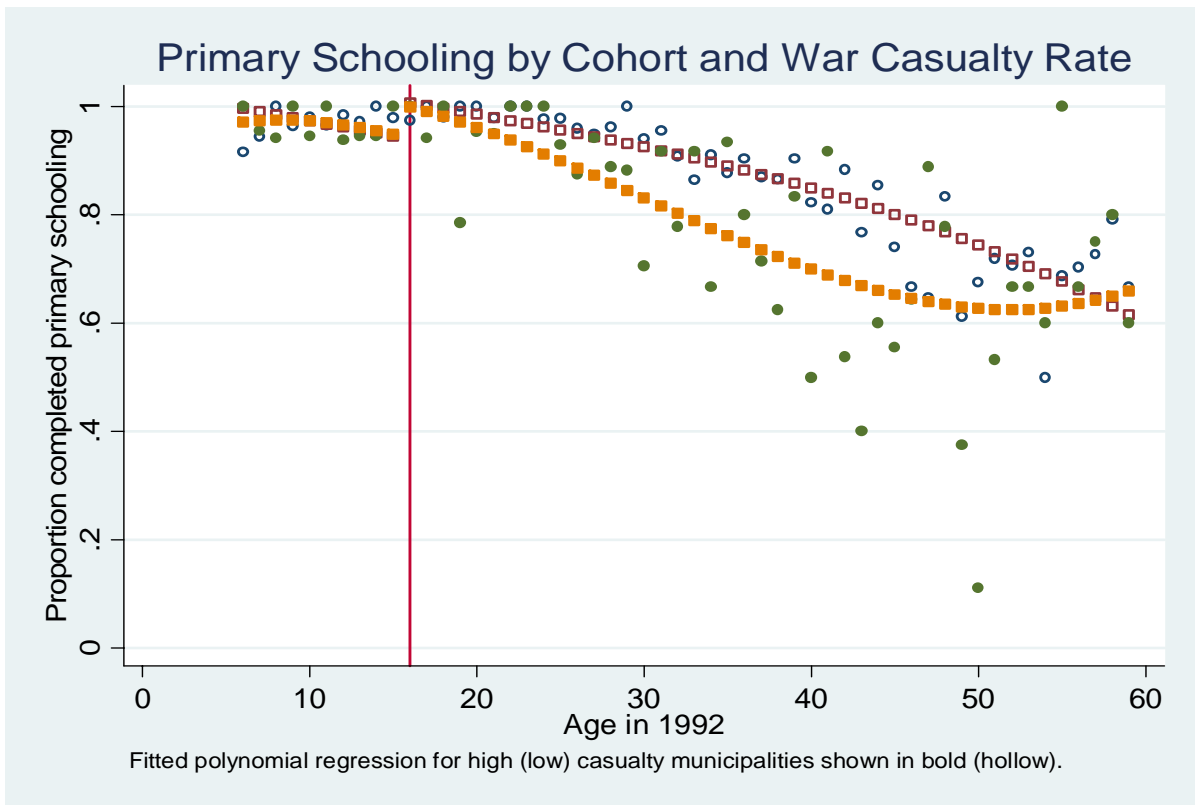


Figure 2 - Pre-war and Post-war Statistics on Schools and Teachers

