H i C N Households in Conflict Network

Displacement and Education of the Next Generation: Evidence from Bosnia and Herzegovina

Christoph Eder[1]

HiCN Working Paper 152

July 2013

Abstract: In this paper, I study how displacement of parents during a violent conflict affects investment in their children's' education years later. Using ethnic division during the Bosnian War as a natural experiment, I can identify exogenously displaced households and compare them to households who did not have to move because of the war. I find that displaced households spend significantly less on the education of their children in primary and secondary school (20 to 35 %), while their children are equally likely to be enrolled. The result also holds for expenditure positions like textbooks, school materials and annual tuition in secondary school. A decomposition of the causal effect shows that differences in income and the stock of durable goods can at most explain one third of the finding. Some evidence points towards increased uncertainty about the future of displaced parents. The finding implies that the disadvantage of displacement might be carried on to the next generation through the quality of education.

Keywords: Displacement, Conflict, Education
JEL Classification: I25, J15, O15

---

[1] Department of Economics, Simon Fraser University, 8888 University Drive, Burnaby, BC, V5A 1S6, Canada. (e-mail: cpe2@sfu.ca, phone: 01-604-518-4914 or 0043-676-814-23-505). I thank Gustavo Bobonis, Alex Karaivanov, Anke Kessler, Krishna Pendakur, and conference participants at the Atlantic Summer Conference on Public Policy Research, the Development Conference of the German Economic Association, the conference of the European Association of Labour Economists, and seminar participants at Johannes Kepler University for helpful comments. All remaining errors are mine.

1 Introduction

Violent conflict is a regular phenomenon in developing countries around the world. The long-term consequences of wars and conflicts can be substantial through the descruction of human and physical capital, infrastructure, and displacement. Many people have to leave their home to take refuge in a different region or a foreign country. The UNHCR counts 10.4 million refugees and 36 million people of concern in 2009 in their Global Report (UNHCR, 2009).

In the economics literature, the origins of violence and conflicts received prominent attention in recent years (eg. Besley & Persson, 2011; Blattman & Miguel, 2009). Especially the origin of state repression and civil war has been of interest to researchers. The long-term consequences of violent conflict have been studied less prominently, although recent studies show the effects of violence at the micro level on education (Justino, 2011; Leon, 2009; Shemyakina, 2011; Swee, 2009a), labor market outcomes (Ichino & Winter-Ebmer, 2004), and health (Fiala, 2009). We are, however, far from a full understanding of how these long-term consequences come about and how policy can mitigate these effects.

Displacement as a regular by-product of violent conflict puts individuals and families in a precarious situation. They loose their social network, physical assets and often family members. The consequences of displacement have been studied in a number of papers (Sarvimäki, Uusitalo & Jäntti, 2009; Fiala, 2009; Konylis, 2010; Bauer, Braun, Kvasnicka, 2012). Kondylis (2010) finds higher unemployment for men and lower labor force participation for females a few years after displacement in Bosnia and Herzegovina. Fiala (2009) finds a sizeable reduction in consumption quality for displaced households in Uganda. In contrast, Sarvimäki, Uusitalo & Jäntti (2009) find increased mobility among displaced Finns and higher income for displaced men over 25 years after displacement. Bauer, Braun & Kvasnicka (2012) uncover negative economic outcomes for the first and second generation of displaced after 25 years in Germany, but confirm the finding from Finland for displaced agricultural workers.

With the exception of Bauer, Braun & Kvasnicka (2012), the above mentioned contributions focus on the effect on the generation of the displaced, however the negative consequences of displacement do not need to end there. They potentially spill over to the next generation. From a policy perspective the effects on the second generation are of great interest, because intervention is a lot easier. Mitigating the consequences of conflict on the first generation would often require to end the conflict - a task of great difficulty. The effects on the second generation can be reduced through intervention in peacetime, when many aid workers are often readily available in the country.

In this paper, I use ethnic division during the Bosnian War between 1992 and 1995 as a natural experiement for displacement to uncover education as one channel through

which displacement has potential long-term consequences for the next generation. The identification strategy circumvents the problem of endogenously migrated households by using only households who moved accross the front line during the war. Data from the 2001 Living Standard Measurement Survey allows me to study the problem at a micro level.

The education system of Bosnia and Herzegovina requires parents to provide textbooks, uniforms, school materials etc. to their children, which gives me the chance to look at inputs in educational production. In particular, I am interested in education expenditure of displaced parents on their children. The short time span between the end of the war and the collection of the dataset does not allow me to evaluate educational outcomes of the children of displaced parents. Empirical evidence suggests that additional inputs in children's education do make a difference. The provision of textbooks in first and second grade of primary schools in the Philippines increased test scores by 0.2 to 0.5 standard deviations (Heyneman, Jamison & Montenegro, 1984). The increase in learning could be even larger in higher grades. For India and Zambia, Das et al. (2011) also find increases in test scores after an unanticipated increase in educational inputs directly used by students. Angrist et al. (2002) show that additinal funds through randomly allocated vouchers for privat schools in Columbia increased test scores by 0.2 standard deviations and the probablility of having finished 8th grade by 10 percentage points.

I find that displaced parents spend significantly less on the education of their children than comparable households that were not displaced, five years after the end of the war. The reduction in spending is estimated to be between 20 % and 35 %. Considering that the average household in Bosnia and Herzegovina spends more than half a monthly household income on the education of a child per year, this is quantitatively a large difference in spending on education. Displaced parents also spend significantly less on annual tuition in secondary school. If the quality of education is determined by the availablity of textbooks and school materials and the choice of secondary school, then this difference in education expenditure can bring children of displaced families into an adverse position in the labor market and influence them throughout their life.

Exploring the causal channels through which displacement influences education expenditure, I show that at most one third can be explained by differences in income and wealth levels. Increased exposure to violence, the employment status of the parents, enrollment differences, and post-war regional sorting also fail to explain a major part of the difference. Some evidence supports the hypothesis that increased uncertainty about the future is the main reason, why displaced parents spend less on the education of their children.

This paper is organized as follows: Section 2 discusses the situation in Bosnia and Herzegovina, describes the data and identification, while Section 3 discusses estimation

issues. Section 4 presents the results of the total causal effect and Section 5 looks at the mechanisms through which the identified effect could come about. Section 6 concludes.

2   Background, Data and Identification

Bosnia and Herzegovina became independent in the Fall of 1991 after the breakdown of former Yugoslavia. The three major etnic groups, Bosniaks, Serbs, and Croats, were struggling to gain power and eventually the conflict turned violent in April 1992. Initially all three ethnic groups were fighting each other, with the Serbs in control of the army of the former Yugoslavia (Silber & Little, 1996, p.222). In February 1994, Croats and Bosniaks reached a peace agreement and eventually joined forces against the Serbs. With air support from the NATO, Bosniaks and Croats were able to regain control of large areas and push the Serbs back. The Bosnian War ended in December 1995 with the Dayton Agreement, according to which Bosnia and Herzegovina was divided into two entities along the front line at the end of the war: the Federation of Bosnia and Herzegovina and the Republika Srpska. Most Bosniaks and Croats live in the Federation of Bosnia and Herzegovina and most Serbs in the Republika Srpska. Those two entities are like seperate states with their own administration and they currently cooperate only in a few areas. During the war about 100,000 - 110,000 people were killed and an estimated 1.3 - 1.8 mio. were displaced (the total population in 1991, the year of the last official census, was 4.38 mio.). The main reason for the violent conflict was the goal of the Serb forces to establish a connected Serb nation and not primarily economic reasons (Kondylis, 2010).

For this study I use household survey data from the "Living Standard Measurement Survey" (henceforth LSMS) (State Agency for Statistics of BiH et al.) of Bosnia and Herzegovina. The data collection started in 2001 in 25 municipalities with about 5,400 households. From 2002-2004 about half of the households were reinterviewed each year to form a 4-year panel dataset. The LSMS covers a wide range of topics. The different sections ask questions about housing, education, health, labor, credit, migration, and social assistance. There are also sections on consumption, household businesses, and agricultural activities. For most of this paper, I use the cross-sectional data from 2001. I do this for two reasons: Firstly, the sample size is reduced in the panel data to half the number of households, and secondly, the number of topics covered is limited in the 2002-2004 interviews. I will go into more detail about data issues in the respective sections.

2.1 The Education System in Bosnia and Herzegovina

The education system in Bosnia and Herzegovina faces many challanges and changes these days. As of 2001, primary education lasts for 8 years, where during the first 4 years the entire material is taught by one teacher and in grades 5-8 each subject has its own teacher. Secondary education is divided into vacational training and gymnasia (more academically oriented), where curricula are taught in 3-5 year programs (UNESCO, 1996; UNESCO, 1997). Primary schools have in general no annual tuition, but textbooks, school materials, etc. still need to be payed for by the parents. Only few municipalities ensure that textbooks for disadvantaged are provided (OECD, 2006). Low or non-existent incomes, migration, and difficult post-war conditions are common reasons why parents are unable to be active parents with schools and fail to provide school equipment, supplies, and textbooks (UNESCO, 1996).

The post-war financial situation for schools in Bosnia and Herzegovina was constrained, to say the least, as this paragraph from a report about the education system in the Republika Srpska illustrates (UNESCO, 1997, p.ii.):

> "Primary education is, in theory, free, and is financed from the government budget. In practice the government is often unable to pay salaries, and school repairs have often become the responsibility of the municipal authorities. At the secondary level the central government is expected to pay the salaries of personnel, and the municipality all other charges. It was reported that in December 1996 public sector employees, including teachers, had not been paid for 4 to 5 months. The education system today is largely dependent on financial sacrifices made by teachers and families. Textbooks, for example, are extremely expensive: an average primary school text costing DM 1-3.4 [DM = Convertible Mark] and a secondary one as much as DM 7."

It is reported that the curriculum for primary school is designed for a child that is equipped with 10 textbooks per grade. For most parents that seems to hardly be affordable, given that a qualified teacher earned in 1996 only 120 Convertible Mark per month (UNESCO, 1996) and unemployment is high. Detailed reports about conditions at schools during the academic year 2000-01 are not available. In the years following the publication of these reports, some reforms concerning the curriculum took place and in 2004 primary school was extended to 9 years (Swee, 2010). International aid has certainly improved some issues, but it is unclear if this reduced the parents' financial burden of children in school. A project report on the educational reform in Bosnia and Herzegovina by the European Union from 2008 observes (EU, 2008): "The education reform process evolves at an uneven and slow pace."

2.2 The Bosnian War as a Natural Experiment

At the time when Bosnia and Herzegovina was part of the former Yugoslavia, the population was a mix of Bosniaks, Serbs, and Croats in most municipalities. The ethnic conflict in Bosnia and Herzegovina between 1992 and 1995 caused many people to leave their home and take refuge on the other side of the frontline. During the war, Bosniaks and Croats in the Serb territory were at risk of being killed, what became to be known as "ethnic cleansing". A main goal of Serb forces was to create an ethnically homogenous territory within Bosnia and Herzegovina. Serbs beyond the frontline faced a similar fate and were abandoning whole villages withing a few days (Silber & Little, 1996, p.358). Even after the Dayton Agreement was signed, the displacement did not come to a halt. Several villages in the Federation of Bosnia and Herzegovina and suburbs of Sarajevo are reported to have been abandoned after the local Serbs realized they were trapped in Bosniak territory (Silber & Little, 1996, p.30). Thus displacement during and after the war produced for the most part ethnically homogenous regions. Table 1 describes this homogenization of the two entities in Bosnia and Herzegovina. The share of Serbs in the Federation of Bosnia and Herzegovina shrinks to 2.3 % from 17.6 %, while the share of Bosniaks (Croats) goes down to 2.2 % from 28.1 % (1 % from 9.2 %). Serbs were leaving from the Bosnian/Croats side to the Serb side and Bosniaks/Croats the other way round. Those households had the wrong ethnicity at the wrong place and the threat of being killed, robbed, and raped made those people move. Croats are hardly found as displaced people in the data, because households of Croats who found themself in Serb territory moved to the - then newly formed - Republic of Croatia (IDMC, 2009). I will therefore focus on Bosniaks and Serbs from now on.

The main empirical problem is that displacement and migration might look alike in a dataset. While the latter is by choice, the former is an exogenous shock to the household. The key assumption in this paper is that households, which I consider displaced, form a randomly selected treatment group. Several reasons why the displaced do not form a random sample come to mind. Firstly, displaced households could have lived in economically more (or less) successful regions, which were more contested during the war. Kondylis (2010) shows evidence that the war was not fought in a way to gain control over economically successful municipalities, but "was determined more by geo-strategic motives rather than economic motives." (Kondylis, 2010, p.242). This suggests that, ex ante, regions where households got displaced, did not have an economic advantage/disadvantage over other regions.

Second, households of a certain type could have moved into areas, where they were especially exposed to the risk of displacement. This includes, for instance, a Bosniak family moving to Banja Luka (now the capital of the Republika Srpska) before the war so the household head can take a good position there. The data do not suggest evidence of sorting before the war in Bosnia and Herzegovina. 70 % of the household heads in the

Table 1: Ethnic Groups in Bosnia and Herzegovina

Bosnia and Herzegovina

	Bosniaks	Serbs	Croats
1991	43.5 %	31.2 %	17.4 %
1996	46.1 %	37.9 %	14.6 %

Federation of Bosnia and Herzegovina

	Bosniaks	Serbs	Croats
1991	52.3 %	17.6 %	21.9 %
1996	72.5 %	2.3 %	22.8 %

Republika Srpska

	Bosniaks	Serbs	Croats
1991	28.1 %	55.4 %	9.2 %
1996	2.2 %	96.8 %	1.0 %

Source: Official census in 1991 and unofficial
census conducted by the UN in 1996.

data still lived in their municipality of birth just before the war. Considering the small size of the average municipality in Bosnia and Herzegovina of 373 km^2, this suggests that households generally do not exhibit high mobility.

Moreover, the results of the paper are not sensitive to restricting the sample to households who still lived in their birth municipality just before the war. If the results are purely driven by pre-war sorting, the findings would vanish in such a selected sample. In addition, household heads do not differ in their visible characteristics: the highest education level achieved and the age of the household head do not show any significant differences in the means (see Table 3) and distributions using a Kolmogorov-Smirnov equality of distributions test (available upon request).

The control group is formed by households that report to not have moved during the war. They did not feel the threat of violence to migrate because of their ethnicity. The households in this group might have directly been exposed to war, but their ethnicity and/or location of residence have allowed them to stay. For most of them (see Table 2 for displacement status by ethnicity of a subsample) moving to the other side of the frontline was not an option, because of ethnic violence. By comparing the treatment group of displaced households with a control group of households, who did not move because of the war, we can learn about the consequences of displacement.

Households who moved during the war within the later Federation of Bosnia and Herze-govina or the later Republika Srpska made an endogenous decision to do so. According to my identification strategy, they had the choice to stay at their home before the war or move to a new place within their entity. But they were not forced to change their location of residence. Similarly, households who moved because of the war and moved back to their hometown did this on purpose. They had the chance to return to their home town and did so. Those two groups have to be considered as endogenously migrated and do not enter the treatment or the control group.

One issue that should be mentioned is international migration/displacement. The Ministry for Human Rights and Refugees (MHHR, 2003) reports a the size of international refugees of 1.2 mio. between 1992 and the end of the war, which is more than a quarter of the total population in Bosnia and Herzegovina before the war. About half of this group returned to their home country until 2003. This is potentially a threat to the identification strategy because the displaced remaining in Bosnia and Herzegovina might be a selected sample of all displaced. It is a problem if the families who left Bosnia and Herzegovina during the war have a characteristic that is different to the people who stayed in the country and the treatment and control groups are unequally affected. Table 3 is of help here. It shows the observable characteristics of internally displaced and non-movers and only finds significant differences for the entity of residence and the grade of school of the child. The problem of international migration/displacement is common in the literature on conflicts, because micro dataset usually restrict the sample to a country. It should be kept in mind while evaluating the results.

2.3   Identifying Displaced Households in the Data

Determining the migration history of a person is done in two steps. First I split people into three groups according to the given answer on their migration status: did not move during the war, did move and returned, and did move for good. The first group is the control group since they were not treated by migration, neither by choice nor forced. The second group is considered to have migrated endogenously and will therefore not be used in the regressions. I cannot rule out the possibility that households that did get displaced according to my definition, are among the dropped households. However, the ethnic violence was still present in Bosnia and Herzegovina in 2001 and would hardly allow for households, that were displaced on ethnic grounds, to return. Also, the exclusion of returnees in the analysis is very unlikely to create a biased sample, because the safety to return is outside of a households sphere of control. In addition, the group of returnees is small compared to the treatment and control groups.

In the second step, the group "moved for good" is then split into two parts: moved within their entity and moved from one entity to the other. The ones that move within the entity could have moved endogenously (and probably did so because they could

have returned to their municipality of origin) and are dropped. The group that moved from one entity to the other is considered the displaced and constitute the treatment group. To identify the displaced, I match the reported municipalities of residence before the war with the entity after the war (Federation of Bosnia and Herzegovina or Republika Srpska) and compare this to the current entity of residence. The matching of municipalities of residence before the war to entities after the war is done with maps from Bennet Schulte (2009).[1]

The identification strategy implies the ethnicity of a person. If a person is observed to have lived in a municipality in the current Republika Srpska before the war and is now living in Federation of Bosnia and Herzegovina, the person is considered to be a displaced Bosniak. Conversely, a person, who has switched from the Federation of Bosnia and Herzegovina before the war to the Republika Srpska after the war, is considered to be a displaced Serb. Unfortunately, information about the ethnicity of a person is not available in the first wave of the dataset, which I use. The consequent waves do ask about the ethnicity, but the sample size is cut in half. I connect the ethnicity data from wave 2 of the dataset with the available corresponding individuals of my treatment and control groups to check if the identification is reasonable. Table 2 reports the ethnicities of the groups of non-movers and displaced people. Out of 1,040 displaced individuals, there is one Croat and no Serb in the Federation of Bosnia and Herzegovina and one Bosniak and one Croat in the Republika Srpska. The ethnicity mix in the sample of non-movers is not as clear-cut, which probably originates in the presence of enclaves in both, the Republika Srpska and the Federation of Bosnia and Herzegovina. However, these enclaves do not pose a threat to my identification, because these people did not got "treated" by forced displacement, neither did they endogenously decide to migrate. This evidence is a strong argument in support of my selection strategy.

Further evidence of random determination of displacement comes from Table 3, where almost all exogenous variables (ie. the ones not influenced by displacement) are not statistically different for the treatment and control group. The exception is the entity (Federation of Bosnia and Herzegovina or Republika Srpska) displaced families are living in and the grade of school the children are in. The first variable indicates that more Serbs were displaced than Bosniaks and is not of concern to the identification. The difference in the grade of school can be explained by displacement itself, since children of displaced households are more likely to have had a break in schooling during the war and are therefore still in school. Although this happened at all grades, six years after the war we only observe the children in the higher grades. Note that this table reports values from the selected sample of children in primary or secondary school, which is used in the following regressions.

---

[1]A complete list of municipalities matched with entities can be obtained from the author upon request.

Table 2: Displacement by Ethnic Groups

		Federation Bosnia and Herzegovina	Republika Srpska
Displaced	Bosniak	285	1
	Serb	0	747
	Croatian	1	1
	Other	5	0
Not Moved	Bosniak	2,847	59
	Serb	121	2,306
	Croatian	614	22
	Other	108	39

The number of observations is reported.

3   Estimation of the Causal Effect of Displacement

To find potential spill-overs of displacement during a violent conflict on the next generation, I take a look at education of children. Education has been identified as one of the most important determinants of future well-being and has a prominent role in the development literature (eg. Rosenzweig, 2010). However, measures of educational outcomes like highest education level achieved or test scores are not available, as the conflict ended only 6 years before the dataset was collected. A second-best way is to have a look at inputs in educational production like expenditure on education.

The research on the influence of additional educational inputs is limitted, but shows a clear direction. Heyneman, Jamison & Montenegro (1984) find increased test scores in the Phillipines through the provision of textbooks to first and second grade of primary school. For India and Zambia, Das et al. (2011) also find increases in test scores after an unanticipated increase in educational inputs directly used by students. Angrist et al. (2002) show that additional funds for education given to parents in the form of vouchers had large effects on educational attainment and test scores in Columbia. Expenditure on education seems to influence the quality of education children receive and their educational outcomes.

3.1   Estimation Strategy

The general difficulty in finding causal effects of a certain treatment on the treated is selection bias. A first step is to compare expected values of education expenditure

Table 3: Descriptive Statistics: Education Expenditure Sample

	All	Not Moved	Displaced	Difference
Displaced Family	0.189	0	1	
Republika Srpska	0.44	0.40	0.61	0.21***
				(0.028)
Number of Children in School	1.81	1.81	1.81	0.00
				(0.044)
Oldest Child	0.41	0.41	0.40	-0.01
				(0.028)
Female Child	0.47	0.47	0.48	0.01
				(0.029)
Grade of School	6.06	5.97	6.43	0.46***
				(0.171)
Education of HHH	10.30	10.34	10.10	-0.25
				(0.200)
Age of HHH	45.74	45.80	45.47	-0.33
				(0.588)
Observations	1,952	1,584	368	

Standard errors in paranthesis.
Significance: ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

conditional on displacement $E[y_i|d_i = 1] - E[y_i|d_i = 0]$. This observed difference in outcomes, can be broken up into two parts

$$\begin{aligned} E[y_i|d_i = 1] - E[y_i|d_i = 0] &= E[y_{1i}|d_i = 1] - E[y_{0i}|d_i = 1] \\ &\quad + E[y_{0i}|d_i = 1] - E[y_{0i}|d_i = 0]. \end{aligned}$$

The first line on the right hand side is the average treatment effect on the treated, whereas the second line shows a selection bias (Angrist & Pischke, 2009, p.14.). The selection bias comes from people sorting themselves into displacement, eg. households with more financial assets have the resources to move away from places of heavy fighting.

However, if the identification strategy in this paper is valid, displacement happened randomly, ie. people did not sort themself or get sorted systematically into displacement, and therefore the selection bias is zero. This assumption is supported by Table 3,

where exogenous characteristics of displaced households are not significantly different from the control group of non-movers.

Including exogenous covariates X into the regression helps to explain more variation in the data and produces a more precise estimate of the causal effect of displacement. It is important to use only variables that are not influenced by displacement themself, ie. variables that were determined before displacement happend. The causal effect of displacement is then consistently estimated by δ in the following regression:

$$y_{ij} \;\; = \;\; X_{ij}\beta + \delta d_{ij} + \eta_j + \varepsilon_{ij} \tag{1}$$

y_{ij} Education expenditure on child i in municipality j
X_{ij} Exogenous covariates
d_{ij} Indicator for displacement
η_j Municipality fixed effect
ε_{ij} Error term

The standard errors are clustered at the household level to account for intra-household correlations.

Indirect Effects of Displacement

There are some variables that would potentially explain a lot of variation in education expenditure, like income and the wealth level of the household. But those variables are influenced by displacement itself and therefore the total causal effect of displacement cannot be estimated consistently. In addition, a decomposition of the causal effect in direct and indirect effects might not be fully possible due to an endogeneity problem (as discussed below).

In the following I explain how I will decompose the direct and indirect effects of displacement by using income, but the discussion covers other variables as the stock of durable goods, housing etc. as well. Assume that income is affected by displacement and that income drives part of the variation in education expenditure. The following system of equations describes these relationships (municipality fixed effects are omitted for simplicity).

$$y_i \;\; = \;\; X_i\beta_1 + \delta_1 d_i + \rho_1 m_i + \theta_1 m_i d_i + \varepsilon_{1i} \tag{2}$$
$$m_i \;\; = \;\; X_i\beta_2 + \delta_2 d_i + \varepsilon_{2i} \tag{3}$$

m_i Income

In the language of the system of equations (2) and (3), estimating the model of equation (1) the effect of displacement is

$$
\begin{aligned}
E\left[y_i|d_i = 1\right] - E\left[y_i|d_i = 0\right] &= \delta_1 + \rho_1\delta_2 + \theta_1(\beta_2 E\left[X_i|d_i = 1\right] + \delta_2) \\
&= \delta_1 + \rho_1\delta_2 + \theta_1 E\left[m_i|d_i = 1\right].
\end{aligned}
$$

This is the average treatment effect of displacement, ie. the overall effect of displacement on education expenditure - direct and indirect effects combined. The model allows for different levels of income and a different spending pattern of that income for displaced households. Note that $\delta_2 = E\left[m_i|d_i = 1\right] - E\left[m_i|d_i = 0\right]$, which is consistently estimated, because displacement is randomly assigned and X_i are exogenous covariates.

However, estimating δ_1, ρ_1, and θ_1 faces another potential endogeneity problem from an omitted variable. If households have some unobserved characteristics that cause $Cov(\varepsilon_{1i}, \varepsilon_{2i}) \neq 0$, there will be a selection bias and the estimates in equation 2 are biased (Angrist & Pischke, 2009, p.64). It is most likely that $Cov(\varepsilon_{1i}, \varepsilon_{2i}) > 0$, as high income households are more likely to value education more. This causes the estimate of ρ_1 to be biased upwards, ie. the indirect channel of displacement-on-income-on-education expenditure captures too much of the total effect.

The covariances of the error terms for the estimated channels of income, stock of durable goods, and employment status of parents are likely to be small or zero. If the correlation between the error terms is greater than zero, my estimates of the indirect effects should be considered as an upper bound.

3.2   Data on Education Expenditure

To estimate equation 1, I use observations of children in primary or secondary school. Although decision making for education expenditure is made on the household level, there is more information about the children in school available if I use child level data. However, the results are not sensitive to the choice of household level or child level data. Households that report a "don't know" or "refused" in any of the used variables are dropped. Households are considered displaced if both parents (or the single parent) were displaced. Similarly, the control group consists of households, where both parents did not move during the war.

Table 4 reports descriptive statistics for the various expenditure groups per child in Convertible Mark, the local currency. Only a few groups shows a statistically significant

13

difference for children of displaced and not displaced households. In general, education is more expensive in the Republika Srpska, and also the share of children of displaced parents living in the Republika Srpska (61 %) is higher. The descriptive statistics in the column of simple differences are therefore suggesting a smaller difference in education expenditure than there really is. The last column of that table reports differences after controlling for the entity and more categories show a significant difference.

Table 4: Descriptive Statistics: Education Expenditure by Classes

	All	**Not Moved**	**Displaced**	**Diff.**	**Cond.**
Annual Tuition	12.1	12.6	9.8	-2.8	-4.2
				(3.41)	(3.46)
Special Tuition	2.1	2.0	2.4	0.5	0.7
				(1.46)	(1.48)
Membership Fee for Parent's Association	0.7	0.7	0.4	-0.3	-0.1
				(0.96)	(0.97)
School Uniforms and other School Clothing	36.5	38.7	26.7	-12.0**	-8.4
				(5.17)	(5.22)
Textbooks	35.3	33.8	42.1	8.3*	-0.9
				(3.10)	(2.89)
Other School Materials	31.5	31.4	32.0	0.6	0.9
				(2.00)	(2.02)
Food and Lodging	44.2	47.9	28.1	-19.8***	-15.0**
				(6.00)	(6.06)
Other Costs	19.9	20.8	15.8	-5.1	-11.6***
				(4.16)	(4.13)
Total Costs (not included in previous classes)	84.9	89.7	64.2	-25.5	-35.9**
				(15.94)	(16.11)
Expenditure on Education (Sum of the above groups)	267.1	277.7	221.5	-56.1***	-74.5***
				(18.3)	(18.37)
Observations	1,952	1,584	368		

Standard errors in paranthesis.

Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

The column "Cond." reports the difference after controlling for the entity.

Education expenditure is not a trivial part of total expenditure for households in Bosnia and Herzegovina. The average annual expenditure on education per child is 267.1 Covertible Mark, while the average total household income per month in the dataset

is 481 Convertible Mark. This relates to 4.6 % of an average total household income is spent on the education of each child. This a high price to pay for generally "free" education, which causes Mooney and French (2005) to suggest financial support for the education of children of displaced hosueholds.

In most specifications I use the sum of all expenditure classes, because of the group called "Total cost (not included in previous classes)". This expenditure class forms a pool for expenses, that parents cannot classify or do not bother to split up into the exact groups. The problem is that the group "Total cost (not included in previous classes)" is negativly correlated with all other groups, which suggests that some households do not take the effort to split up the expenditures into the various classes and put everything into this group. Since dropping such households would reduce the sample size considerably, I use the sum of all groups in the main specifications to avoid the loss of many observations. In additional specifications, I restrict myself to a number of selected groups and drop the households using the class "Total cost (not included in previous classes)".

Table 3 reports descriptive statistics of exogenous characteristics for children in primary or secondary school and the household head of their family. There are in total 1,952 children fulfilling the criteria for inclusion, out of which 368 are from displaced households. Only the entity of residence and the grade of school are significantly different for children of displaced and not displaced households.

4   Total Causal Effect

In this section, I present the estimation results for the total causal effect of displacement on education expenditure. The robustness checks show that the difference in spending on education is not an artifact of certain specifications but hold quite generally.

4.1   Results

The main results are reported in Table 5: they indicate a highly significant drop in education expenditure in all specifications. Quantitatively, the difference in education expenditure between children of displaced families and families that did not move during the war ranges between 24.2 % and 32.8 % depending on the set of control variables. Column (5) is the preferred specification with a full set of municipality fixed effects to control for regional differences. I will refer to the difference of 32.8 % as the baseline result. The standard errors are clustered at the household level and hardly change by including the various control variables. I try to explore the drop in education expenditure

further in different ways.

Table 5: Regression Output: Education Expenditure I

	Log. of Education Expenditure				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Displaced Family	-0.250***	-0.242***	-0.272***	-0.266***	-0.328***
	(0.070)	(0.070)	(0.069)	(0.068)	(0.066)
Republika Srpska	0.461***	0.477***	0.456***	0.452***	
	(0.054)	(0.054)	(0.052)	(0.053)	
Number in School		-0.163	-0.239**	-0.247**	-0.128
		(0.103)	(0.101)	(0.101)	(0.093)
Number in School^2		0.052**	0.063***	0.065***	0.029
		(0.021)	(0.021)	(0.021)	(0.019)
Oldest Child		0.178***	0.123***	0.134***	0.147***
		(0.040)	(0.041)	(0.043)	(0.041)
Female			0.061	0.060	0.065
			(0.043)	(0.043)	(0.040)
Grade of School			0.073***	0.071***	0.074***
			(0.008)	(0.008)	(0.007)
Education of HHH				0.011	0.017**
				(0.008)	(0.008)
Age of HHH				0.003	0.004
				(0.003)	(0.003)
Municipality FE					X
No. Observations	1,952	1,952	1,952	1,952	1,952
R-squared	0.054	0.067	0.115	0.116	0.245

Standard errors clustered at the household level in paranthesis.

Significance: $*:10\%$ $**:5\%$ $***:1\%$

To put the difference of 32.8 % into perspective, it is helpful to compare education expenditure with income numbers. The average household spends per child during one school year about 55.5 % of the monthly mean household income (56.5% for non-movers and 50.7 % for displaced). In terms of monthly median household income, the average household spends 66.8 % per schoolyear on the education of one child (69.4% for non-movers and 63.3 % for displaced). A difference in education expenditure of 32.8 % as estimated above, is therefore a significant drop in spending on education, not only in a statistical sense.

Regressions (1) and (2) in Table 6 run the main specification for each entity (Federation of Bosnia and Herzegovina and Republika Srpska, the two administrative units) separately. The difference is similar in both entities with 31.0 % in the Federation of Bosnia and Herzegovina and 33.8 % in the Repulika Srpska. Since the entities are in charge of the education system in Bosnia and Herzegovina, the way one system works, is not the source of the difference in education expenditure found in the baseline regression.

Table 6: Regression Output: Education Expenditure II

| | Log. of Education Expenditure | | | | |
	(1)	(2)	(3)	(4)	(5)
Displaced Family	-0.310***	-0.338***	-0.125	-0.407***	-0.877***
	(0.118)	(0.077)	(0.095)	(0.091)	(0.308)
Only Federation B&H	X				
Only Republic Srpska		X			
One Child in School			X		
Two Children in School				X	
Three Children in School					X
Controls	X	X	X	X	X
Municipality FE	X	X	X	X	X
No. Observations	1,101	851	691	1,003	218
R-squared	0.205	0.225	0.247	0.248	0.461

Standard errors clustered at the household level in paranthesis.

Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

Control variables include number of childen in HH enrolled and its square, grade of school, education of HHH, age of HHH and dummy variables for being the oldest child and females.

Columns (3) to (5) shed some light on the source of the education expenditure differences between displaced and not displaced families. In these regressions I only use families with one, two or three children in school, respectively. Displaced households with only one child in school spend 12.5 % less on education, while households with two (three) children in school spend 40.7 % (87.7 %) less. Only the latter two differences are significantly different from zero. This pattern suggests that in larger displaced families, some mechanism is at work, that generates the difference in education expenditure.

A closer look at some education expenditure groups is taken in Table 7. For this table, I restrict the sample to the 1,325 children, whose parents split up all their costs to the detailed expenditure groups and did not use the category Total Costs (not included in previous classes)". Including a child which zero reported expenditure on textbooks, for instance, and a single position in the group of unclassified expenditures would lead to unreasonable results in these regressions.

Table 7: Regression Output: Education Expenditure III

	Annual Tuition	Annual Tuition	Other School Materials	Textbooks	Important Groups
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Displaced Family	0.113	-0.822***	-0.167**	-0.200**	-0.152**
	(0.133)	(0.295)	(0.076)	(0.090)	(0.062)
Primary School Only	X				
Secondary School Only		X			
Controls	X	X	X	X	X
Municipality FE	X	X	X	X	X
No. Observations	984	341	1,325	1,101	1,325
R-squared	0.115	0.282	0.166	0.750	0.465

Standard errors clustered at the household level in paranthesis.

Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

Control variables include number of childen in HH enrolled and its square, grade of school, education of HHH, age of HHH and dummy variables for being the oldest child and females.
Only households with zero expenditure in the residual category "Total Costs (not included in previous columns)" are used in all regressions.
In the regression "Textbooks", only municipalities with some positive expenditures were used.
"Important Groups" is the sum of the previous three groups.
All independent variables are in measured in logs.

In primary school (grades 1-8) only few parents pay annual tuition and as regression (1) shows, there is no significant difference in spending. However, in secondary school, where areas of specialization are offered, there is a large and significant difference between children of displaced and non-mover parents. Regression (2) uses an OLS model and shows a reduction by about 82 %. In terms of other school material, which includes notebooks, pencils, etc., there is a difference of 16.7 %. The spending on textbooks in column (4) is conditional on positive spendings on textbooks by anyone in the municipality. In some municipaliteis, textbooks are provided by the municipality or the federal government, therefore this additional restriction. The difference is still a significant 20.0 %. Adding up these three groups, which seem to be especially important for the quality of education, a difference of 15.2 % is estimated.

These results suggest that displaced parents restrict expenditures on the education of their children whereever they can, that is even in matters like the choice of the secondary school and the provision of study materials.

4.2 Someone Outside the Household Paid for Education

The difference in education expenditure could easily be explained, if someone outside the household paid for some of the expenses. The government might have special subsidies for displaced households and pays the education for those children. Das et al. (2011) show that anticipated public supply of additional school inputs in India and Zambia is offset by an expenditure reduction of parents. Fortunately, the LSMS records the expenses paid from someone outside the household, however only as a total amount. Including these expenditures and running the baseline regressions with the new dependent variable in column (1) of Table 8 again, reduces the overall difference a bit, but leaves the general picture unchanged: a difference of 27.2 %.

Table 8: Regression Output: All Expenditures

	Log. of Education Expenditure		
	(1)	**(2)**	**(3)**
Displaced Family	-0.272***	-0.190	-0.323***
	(0.072)	(0.131)	(0.081)
Only Federation B&H		X	
Only Republic Srpska			X
Controls	X	X	X
Municipality FE	X	X	X
No. Observations	1,947	1,099	848
R-squared	0.216	0.176	0.212

Standard errors clustered at the household level in paranthesis.
Significance: ∗ : 10% ∗∗ : 5% ∗ ∗ ∗ : 1%
Control variables include number of childen in HH enrolled
and its square, grade of school, education of HHH, age of
HHH and dummy variables for being the oldest child and
females.

In column (2) and (3) the regressions are done separately for the two administrative units, the Federation Bosnia and Herzegovina and the Republika Srpska. The difference in education expenditure decreases for the former to 19.0 % and becomes insignificant while it remains almost unchanged at 32.3 % in the Republika Srpska. The difference in the Federation of Bosnia and Herzegovina decreases quite a bit and standard errors also increase. The difference is insignificant at traditional confidence levels, but is still sizeable.

It is true that chidlren of displaced households get more funding for education from outside, but only a few are so lucky. Only about 10 % of children of displaced parents

get support from outside the family, while about 5 % of the children of non-displaced households get support. Also if displaced households reduce their education expenditure because someone from outside the household is chipping in, there should be a negative correlation between spending from inside the household and from outside the household. The correlation between the spending groups is slightly positive for all households and quite positive with 0.3 by restricting to those households with positive expenditures from outside the household. In general, the hypothesis that displaced households reduce their spending on education because someone outside the household pays for the education of children can be rejected.

4.3   Displacement or Exposure to Violence

An interesting point is if really displacement creates this change in spending on education or if something highly correlated with displacement is the main reason. There is the possibility that the exposure to violence is the reason for the observed difference in education expenditure and not displacement, as assumed so far (see Voors et al, 2012). Displaced households were probably more exposed to violence during the Bosnian War than were the non-movers. In this set of regressions I distinguish between exposure to violence and displacement to answer this point. Data about exposure to violence is available from the Bosnian Book of Dead from the Research and Documentation Center in Sarajevo. The variable "Share of Dead and Missing" measures the number of dead and missing people by municipality relative to its population in the 1991 census in percent.[2] I match the municipality of residence just before the war with the violence data and include this variable in my baseline regressions. A number of observations is lost due to problems of matching municipality of residence before the war to the violence data. The data shows that on average displaced households were living in municipalities with 4.2 % dead or missing before the war and non-movers in municipalities with a mean of only 1.5 %.

Table 9 reports the results of these regressions, where column (1) reproduces the baseline result with this reduced sample for reference. In the next column, the share of dead and missing people by municipality of origin is included. The coefficient for displacement increases a little, while the coefficient for violence is basically zero and insignificant. Also the inclusion of an interaction term does not produce a significant coefficient(s) (neither individually nor jointly). These results are not sensitive to using the logarithm of the dead share or dropping the outliers from Srebrenica (with share of dead and missing of 23 %).

I conclude that displacement is the factor that is driving the difference in education expenditure found in previous regressions and not increased exposure to violence of

---

[2]Eik Swee generously provided the data.

Table 9: Regression Output: Exposure to Violence

	Log. of Education Expenditure		
	(1)	**(2)**	**(3)**
Displaced Family	-0.298***	-0.316***	-0.405***
	(0.089)	(0.091)	(0.150)
Share of Dead & Missing		0.010	-0.024
		(0.012)	(0.041)
Share of Dead & Missing * Displaced Family			0.038
			(0.044)
Controls	X	X	X
Municipality FE	X	X	X
No. Observations	1,732	1,732	1732
R-squared	0.244	0.244	0.244

Standard errors clustered at the household level in paranthesis.

Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

Control variables include number of childen in HH enrolled

and its square, grade of school, education of HHH, age of

HHH and dummy variables for being the oldest child and females.

displaced households.

5 Identifying the Mechanisms

Finding the mechanisms of how the difference in education expenditure comes about is of interest to researchers and policy makers alike. Therefore I try to decompose the total causal effect as far as possible. To identify the mechanism through which displacement causes reduced education expenditure, I include endogenous variables to control for their effect on education expenditure. In section 3.1, I noted that by including endogenous control variables, the results for the indirect effect should be considered as an upper bound.

5.1 Geography

One concern in the baseline regressions is that the difference in expenditure on education comes from some form of post-war regional sorting. That is, displaced households

either sort themself or get sorted into regions where education is cheaper. If displaced households end up in poorer communities where, for instance, education expenditure is generally low, the regressions in Table 5 would show a negative effect of displacement. This explanation seems unlikely, however, since the difference in education expenditure increases from 26.6 % to 32.8 % by controlling for municipality fixed effects. Regional differences within the municipality would still be a possibility, although municipalities in Bosnia and Herzegovina are a quite small geographical unit (on average 373 km^2). In the LSMS municipalities are classified into mostly rural, mixed or urban areas. The data shows that in rural municipalities 15.5 % of the observations are from displaced households, in mixed municipalities there are 23.4 % displaced, and in mostly urban municipalities the number is 18.2 %. At the municipality level, this does not look like sorting into specific areas. Therefore regional sorting does not seem to be the driving force behind the results.

A related issue is the freedom to make decisions over education expenditure. If there is only one school per town and a child can only be enrolled if certain equipment (like school materials and textbooks) is provided by the parents, then households cannot make a decision over how much to spend on their childrens' education. Either they provide the equipment or their children do not get educated at all. This point is related to the previous one, because in both arguments we need regional sorting to find the large effect on education expenditure from the baseline regression.

In mostly rural municipalities, it can be assumed that there is less choice for parents about the school they send their children to than in urban areas like Sarajevo or Banja Luka. If displaced households spend less on education by choice, we should see a larger difference in urban areas than in rural areas. Table 10 shows exactly this picture. Column (1) repeats the baseline result from Table 5 for reference. In regression (2) I add interaction terms of rural and mixed dummies with displacement to allow the differences in education expenditure to vary with the type of municipality. The result shows that in urban municipalities, displaced households spend 37.2 % less on the education of their children than not displaced households, in mixed areas 27.3 % (-0.372+0.099) less and in mostly rural areas 27.7 % less. Columns (3)-(5) shows separate regressions for the three municipality types and show an ordering of differences from rural with the smallest difference to urban areas with the highest. I conclude that more choice about education expenditure leads to a larger difference in spending on education for displaced households.

5.2   Enrollment

One of the first guesses of what could explain differences in education expenditure is enrollment, which is also of interest in its own right. If displaced households are less likely to be enrolled in secondary school and secondary school is more expensive, a

Table 10: Regression Output: Geography

	Log. of Education Expenditure				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Displaced Family	-0.328***	-0.372***	-0.229*	-0.284**	-0.381***
	(0.066)	(0.095)	(0.133)	(0.120)	(0.096)
Rural * Displaced Family		0.095			
		(0.164)			
Mixed * Displaced Family		0.099			
		(0.154)			
Rural Areas Only			X		
Mixed Areas Only				X	
Urban Areas Only					X
Controls	X	X	X	X	X
Municipality FE	X	X	X	X	X
No. Observations	1,952	1,952	453	482	1,017
R-squared	0.245	0.246	0.331	0.225	0.218

Standard errors clustered at the household level in paranthesis.

Significance: $*:10\%$ $**:5\%$ $***:1\%$

Control variables include number of childen in HH enrolled and its square, grade of school, education of HHH, age of HHH and dummy variables for being the oldest child and females.

large part of the difference in education expenditure could be explained. To investigate about enrollment I use data on children who are enrolled in primary or secondary school or could be enrolled, ie. kids who are too young or completed secondary school are dropped. This leaves me with 2,193 observations out of which 1,005 have already completed primary school. Average enrollment is high with over 97 % in primary school and over 91 % in secondary school.

The marginal effects of probit regressions are reported in Table 11. The regressions produce only one significant coefficientin the table. Also a test for joint significance in columns (2), (3) and (5) does not show a significant difference. Colums (1)-(3) look at enrollment in primary and secondary school together, where the second regression allows for a different slope of females from displaced households, and column (3) allows for a different slope for age in displaced households. In columns (4) and (5) the first two regressions are repeated with the restriction on children who have already graduated from primary school. The results show that girls of displaced parents are significantly more likely to be enrolled in secondary school at the 10 % level. However, this is based on only a few observations and can hardly explain the main results.

Table 11: Regression Output: Enrollment

	Enrollment				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Displaced Family	0.006	0.001	0.001	0.011	-0.012
	(0.0060)	(0.0075)	(0.0289)	(0.0156)	(0.0199)
Female *		0.014			0.054*
Displaced Family		(0.0088)			(0.0329)
Age *			0.000		
Displaced Family			(0.0016)		
Only Secondary Educ.				X	X
Controls	X	X	X	X	X
No. Observations	2,193	2,193	2,193	1,005	1,005
Pseudo R-squared	0.377	0.379	0.377	0.273	0.278

Standard errors clustered at the household level in paranthesis.

Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

Reported are marginal effects evaluated at the mean values from a probit model with standard errors clustered at the household level.

Control variables include age, age^2, education of HHH, age of HHH and dummy variables for females and the Republika Srpska.

Children from displaced parents are no less likely to be enrolled and so the difference in education expenditure cannot be explained with enrollment. Research on negative economic shocks to parents in Indonesia shows that education expenditure and enrollment in school was reduced (Duncan et al., 2004), that is the intensive and extensive margin changes. However, it is not surprising that enrollment did not change here, given the circumstances in Bosnia and Herzegovina in 2001 (eg. 66.7 % unemployment rate for the age group 15-24 years in 2006 (Labour Force Survey, 2008)). In addition, probably few displaced families had opportunities to use the additional labor of a child in agriculture.

5.3 Income and the Stock of Durable Goods

One of the most natural explanations for the difference in education expenditure would be reduced income and wealth levels of displaced households. It is not surprising that displaced households have lower labor income and wealth than households that did not have to move during the war. Table 12 documents that displaced households experience a significant reduction in income and the stock of durable goods. Also

the share reporting zero labor income is with 36.1 % a lot higher than that of non-movers with 19.1 %. Higher non-labor income (pensions and allowances) make up for this a bit. However, the largest difference is in the stock of durable goods, which can be considered as a proxy for wealth. Lower income and wealth is related to expenditure patterns and it would therefore be a prime explanation for the estimated difference in education expenditure. However, the difference in education expenditure is surprisingly robust to the inclusion of income and durable goods variables, as seen below. The difference decreases only slightly and rules out income and wealth differences as the main mechanism.

Income and wealth is controlled for with several different variables. Household labor income measures the sum of labor income reported for the last month by household members. Household non-labor income measures the sum of pensions and allowances per month received by household members, while total household income is composed of the sum of the two aforementioned variables. The variable durables is the sum of the values of reported durable goods in the household, but not financial assets or real estate. Dummy variables for a reported value of zero for any of those variables are included in the regressions to make the estimation more flexible.

Reconsider equations (2) and (3), where differences in income could influence education expenditure for displaced households in two ways: displaced households could have less income (ρ_1) and they could spend their income differently (θ_1). The main question to be answered is: "Would displaced parents still spend less on the education of their children, if they would not have had a reduction to their income due to displacement?". By substracting the mean of the income and durable goods variables of the non-movers from the respective variable, the dummy variable for displacement gives the answer to the counterfactual above.[3]

The results of the regressions are shown in Table 13, where column (1) replicates the baseline results for reference with the slightly smaller sample. Each variable is included in four ways: the main variable, a dummy variable for a value of zero, and both interacted with displacement. Only the variable durable goods is individually significant in all regressions, which is not surprising given the inclusion of the other interaction terms.

The dummy variable for displacement decreases surprisingly little by controlling for various forms of income and durable goods, and the indicator for displacement remains significant at the one-percent level in all specifications. The most flexible specification, (6), still shows a difference in education expenditure of 23.7 % after controlling for labor and non-labor income and the stock of durable goods. This is still two-thirds of the total causal effect. Note that the R^2 increases only slightly by including any of these variables.

---

[3]See Appendix A for details.

Table 12: Descriptive Statistics: Income and Durable Goods

	All	Not Moved	Displaced	Difference
Total HH Income	481	492	437	-54**
				(27.3)
Total HH Income (conditional on > 0)	527	539	473	-66**
				(28.2)
Zero Total HH Income	0.086	0.088	0.075	-0.013
				(0.016)
HH Labor Income	404	426	313	-113***
				(27.4)
HH Labor Income (conditional on > 0)	521	527	490	-37
				(33.9)
Zero HH Labor Income	0.224	0.191	0.361	0.170***
				(0.024)
HH Non-Labor Income	77	66	124	58***
				(8.9)
HH Non-Labor Income (conditional on > 0)	188	174	229	55***
				(15.7)
Zero HH Non-Labor Income	0.590	0.621	0.458	-0.163***
				(0.29)
Stock of Durable Goods	2,688	2,884	1,852	-1,032***
				(244.7)
Stock of Durable Goods (conditional on > 0)	2,795	3,002	1,915	-1,087***
				(251.8)
Zero Stock of Durable Goods	0.038	0.040	0.033	-0.006
				(0.011)
Observations	1,901	1,541	360	

Standard errors in paranthesis.

Significance: $* : 10\%$ $** : 5\%$ $*** : 1\%$

Income is relates to monthly income in Convertible Mark.

Table 13: Regression Output: Income and Durable Goods

	Log. of Education Expenditure					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Displaced Family	-0.329***	-0.321***	-0.261***	-0.269***	-0.276***	-0.237***
	(0.067)	(0.067)	(0.069)	(0.072)	(0.069)	(0.071)
Log. HH Total Income[1]		0.089**			0.060	
		(0.039)			(0.041)	
Displaced Family * Log. HH Total Income[1]		0.013			0.014	
		(0.080)			(0.081)	
Log. HH Labor Income[1]			0.055			0.016
			(0.049)			(0.053)
Displaced Family * Log. HH Labor Income[1]			0.074			0.077
			(0.102)			(0.108)
Log. HH Non-Labor Inc.[1]			0.028			0.026
			(0.041)			(0.040)
Displaced Family * Log. HH Non-Labor Inc.[1]			-0.001			-0.008
			(0.082)			(0.081)
Log. Durable Goods[1]				0.077***	0.062**	0.071**
				(0.026)	(0.028)	(0.028)
Displaced Family * Log. Durable Goods[1]				0.040	0.033	-0.000
				(0.053)	(0.054)	(0.057)
Zero Indicator[1]		X	X	X	X	X
Displaced Family * Zero Indicator[1]		X	X	X	X	X
F-test		9.51***	5.29***	7.08***	5.19***	3.66***
Controls	X	X	X	X	X	X
Municipality FE	X	X	X	X	X	X
No. Observations	1,901	1,901	1,901	1,901	1,901	1,901
R-squared	0.243	0.250	0.253	0.251	0.255	0.258

Standard errors clustered at the household level in paranthesis.

Significance: $* : 10\%$ $** : 5\%$ $*** : 1\%$

Control variables include number of childen in HH enrolled and its square, grade of school, education of HHH, age of HHH and dummy variables for being the oldest child and females.

"F-test" results from a test of joint significance of displacement and all its interactions.

[1] Measured as the difference to the mean of non-movers.

To conclude, differences in income and the stock of durable goods do explain some part of the difference, but it does not seem to be the main mechanism. There still seems something else to be going on that was induced by displacement of the parents.

5.4 Employment Status of Parents

Another mechanism I want to explore is that differences in the employment status of the parents cause the education expenditure difference. The idea is that if both parents are working, parents may not have the time to help their children learn and therefore spend more on books and school materials to make up for less personal support. Kondylis (2010) shows that males from displaced households are more likely to be unemployed and displaced females are more likely to be out of the labor force. The descriptive statistics in Table 14 show the same picture, where displaced families are less likely to be employed. This mechanism could therefore very well explain the difference in education expenditure.

Table 14: Descriptive Statistics: Parent's Employment Status

	All	Not Moved	Displaced	Difference
Both Parents Employed	0.29	0.30	0.23	-0.07***
				(0.026)
Spouse of HHH Employed	0.28	0.29	0.23	-0.06**
				(0.026)
No Parent Employed	0.34	0.30	0.48	0.17***
				(0.027)
Observations	1,901	1,541	360	

Standard errors in paranthesis.
Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

I test this hypothesis by including indicator variables for employment of both parents or a single parent, one for whether the spouse of the household head is employed and one if no parent is employed. Interaction terms of the employment indicators with displacement are included as well. As with income in section 5.3, I substract the mean of the non-movers of each employment variable from the indicator to interpret the displacement dummy as a counterfactual. Column (1) of Table 15 replicates the baseline result for comparison. In the three following columns I add one dummy variable and the interaction term at a time. None of these coefficients is significant at a traditional level individually and only in column (2) are the two coefficients together significant at the 10 % level.

Table 15: Regression Output: Parent's Employment Status

	Log. of Education Expenditure				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Displaced Family	-0.329***	-0.308***	-0.317***	-0.306***	-0.302***
	(0.067)	(0.068)	(0.067)	(0.069)	(0.106)
Both Parents Employed[1]		0.095			0.071
		(0.066)			(0.071)
Displaced Family * Both Parents Employed[1]		0.146			0.162
		(0.154)			(0.170)
Spouse Employed[1]			0.079		
			(0.67)		
Displaced Family * Spouse Employed[1]			0.082		
			(0.146)		
No Parent Employed[1]				-0.102	-0.078
				(0.069)	(0.074)
Displaced Family * No Parent Employed[1]				-0.017	0.046
				(0.131)	(0.144)
F-test		11.88***	11.61***	10.40***	7.49***
Controls	X	X	X	X	X
Municipality FE	X	X	X	X	X
No. Observations	1,901	1,901	1,901	1,901	1,901
R-squared	0.243	0.245	0.244	0.244	0.246

Standard errors clustered at the household level in paranthesis.

Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$

Control variables include number of childen in HH enrolled and its square, grade of school, education of HHH, age of HHH and dummy variables for being the oldest child and females.

"F-test" results from a test of joint significance of displacement and all its interactions.

[1] Measured as the difference to the mean of non-movers.

As with income, the coefficients show that only a small portion of the difference in education expenditure can be explained by the employment status of the parents, at most about one tenth in the last regression. The main mechanism through which displacement affects education expenditure is still undetected.

5.5   Preferences, Uncertainty and Financial Constraints

In summary, neither regional sorting, variation in enrollment, income and durable goods levels nor the employment status of the parents are able to account for the majority of the difference in education expenditure. The natural question is then: How does the effect come about? Unfortunately, I am not able to fully answer this question. This section discusses some other, not testable, explanations and further crude evidence.

A possible explanation could be that displaced households are able to buy cheaper school materials and textbooks or share the supplies with other families. Displaced households in an area may build networks to help each other. However, it is hard to imagine that displaced households find a way to save on education expenditure that households who did not move during the war do not find, especially with their social network in place. The non-movers in Bosnia and Herzegovina are not exactly rich to pass up a possibility to save.

Voors et al. (2012) present evidence from field experiments in Burundi that exposure to violence affects preferences. In detail they report more altruistic behavior towards their neighbors, more risk taking, and a higher discount rate. For my purpose the higher discount rate is of special interest. If displaced parents have a higher discount rate than parents who were not displaced because the exposure to the war was more intense for them, they would invest less in projects that generate a payoff in the future - such as education. With the consumption data available, such a hypothesis cannot tested rigorously. However, some preliminary tests can be done and those results point not into the direction of a higher discount rate. With the available consumption data, I construct a rough variable of annual consumption. Some of the consumption groups were asked only for one week, some for a month and some for the last year. By using the income data available, I also calculate the annual income by using the labor income from the last month and non-labor income of the last year. This allows me to get an idea about the savings pattern of households.

Table 16 presents the results of some regressions with these variables. All these regressions show that conditional on income and the stock of durable goods, displaced households save more and consume less than their non-mover counterparts. An increased discount rate would, ceteris paribus, imply lower savings and higher consumption. Of course these variables contain a lot of measurement error and there are other econometric problems present, but the general pattern does not support the hypothesis that an

increase in the discount rate of displaced persons is the reason for decreased spending on education.

Table 16: Regression Output: Consumption and Savings

	Log. of Annual Consumption	Annual Consumption	Savings	Savings Share
	(1)	(2)	(3)	(4)
Displaced Family	-0.083***	-992.2***	1,432***	0.368***
	(0.027)	(309.6)	(349.3)	(0.1433)
Log. Ann. HH Income	0.140***			3.287***
	(0.017)			(0.337)
Ann. HH Income		0.272***	0.694***	
		(0.035)	(0.045)	
Log. Durable Goods	0.155***	1,692***	-1,987***	-0.679***
	(0.011)	(137.5)	(162.6)	(0.154)
Zero Income Indicator	X	X	X	
Zero Durables Indicator	X	X	X	X
Controls	X	X	X	X
Municipality FE	X	X	X	X
No. Observations	1,157	1,157	1,157	1,072
R-squared	0.507	0.450	0.390	0.523

Heteroskedasticity robust standard errors are reported in paranthesis.
Significance: $*: 10\%$ $**: 5\%$ $***: 1\%$
Control variables include number of adults in HH, the number of childen in HH, education of HHH, age of HHH.
Outliers with an annual household income of less than 360 Convertible Mark were dropped in regression (4) because of unreasonably small saving shares. The estimate is only sensitive to the chosen income cutoff if a cutoff of 60 Convertible Mark or smaller is used. Other income cutoffs do not produce quantitatively different results.

The regression results in Table 16 show clearly that displaced households consume about 8 % less than comparable non-mover households. This is a lot less than the 33 % I find for education expenditures. My interpretation of this pattern is twofold. First, displaced households face a lot of uncertainty about the future and try to prepare themselfs by cutting down spending on every non-vital position, which includes education expenditure. In a simple two period model, an agent with convex marginal utility reduces consumption in the first period if the risk of period 2 income increases. Kimball (1990) calls this phenomenon prudence and defines it as "the propensity to prepare and forearm oneself in the face of uncertainty". In 2001 the restitution of property to internally displaced households and the possibility to return to their homes from before the

war was still an issue in Bosnia and Herzegovina. Many displaced households probably faced a highly uncertain future.

The second interpretation of these results are financial constraints. For many households in the data savings are negative, which might have to do with underreporting income figures. Displaced households could face stricter financial constraints due to the loss of their social network for credit or the lack of property they could use as collateral. This interpretation is also supported by results shown in Table 6, where difference in education expenditure increases with the number of children in school. More children result in a greater financial burden. Since financial assets are not included in the survey, I cannot check how tight the budgets of these households are. Even if financial constraints are not binding now, expectating that they will be binding in the future would already make households cut back on expenditures today (eg. Deaton, 1991).

However, I am not able to give a full explanation how the difference in education expenditure comes about. Increased risk and financial constraints are consistent with the pattern above, but changes in preferences and values of the parents cannot be ruled out in general.

6   Conclusion

This paper contributes to the literature on the long-term consequences of conflict by identifying education as a mechanism through which displacement has a potential negative spill-over on the next generation. I find a robust statistical relationship that displaced parents spend a sizeable amount less on the education of their children, that is between -20 % and -35 %, than parents who did not move during the war. In an environment like Bosnia and Herzegovina, where parents have to pay for textbooks and school materials etc., this difference in spending on education has the potential to negatively affect the quality of education children receive. The estimated difference in the annual tuition payed for children in secondary school, indicates that children of displaced parents attend secondary schools of lower quality. The difference in education expenditure is robust to many specifications and a series of tests indicate that a selection bias is not the source of the result.

A number of channels how displacement can affect education expenditure is tested. Differences in income and durable goods levels can explain at most one third of the baseline result. The employment of parents, enrollment and support from outside the household can be ruled out as the main mechanisms. Further evidence is consistent with the hypothesis that the displaced households face more uncertainty about the future or more rigid financial constraints than non-movers. That would lead them to cut back spending on every non-vital position, including the education of their children.

More work needs to be done to fully understand how violent conflict influences peoples lives. Research has shown negative consequences of exposure to violence and displacement, but how exactly these changes in economic outcomes come about is not fully understood yet.

References

Agency for Statistics of Bosnia and Herzegovina. (2008.) *"Labour Force Survey."* Available at: www.bhas.ba

Angrist, Joshua, Eric Bettinger, Erik Bloom, Elizabeth King & Michael Kremer. (2002.) "Vouchers for Private Schooling in Columbia: Evidence from a Randomized Natural Experiment." *American Economic Review,* Vol. 92(5).

Angrist, Joshua & Jörn-Steffen Pischke. (2009.) *"Mostly Harmless Econometrics."* Princton University Press. Princton, New Jersey.

Bauer, Thomas, Sebastian Braun & Michael Kvasnicka. (2012.) "The Economic Integration of Forced Migrants: Evidence from Post-War Germany." *Working Paper.*

Besley, Timothy & Thorsten Persson. (2011.) "The Logic of Political Violence." *Quarterly Journal of Economics,* Vol. 126(3).

Bozic, Gordana. (2006.) "Reeducation the Hearts of Bosnian Students: An Essay on Some Aspects of Education in Bosnia and Herzegovina." *East European Politics and Societies,* Vol. 20(2).

Das, Jishnu, Stefan Dercon, James Habyarimana, Pramila Krishnan, Karthik Muralidharan & Venkatesh Sundararaman. (2011.) "School Inputs, Household Substitution, and Test Scores." *NBER Working Paper No. 16830.*

Deaton, Angus. (1991.) "Savings and Liquidity Constraints." *Econometrica,* Vol. 59(5).

Duncan, Thomas, Kathleen Beegle, Elizabeth Frankenberg, Bondan Sikoki, John Strauss & Graciela Teruel. (2004.) "Education in a crisis." *Journal of Development Economics,* Vol 74.

EU. (2008.) "Institutional and Capacity Building of Bosnia and Herzegovina Education System." Available at: www.erisee.org

Fiala, Nathan. (2009.) "The Consequences of Forced Displacement in Northern Uganda." *HiCN Working Paper 65.*

Heyneman, Stephen, Dean Jamison & Xenia Montenegro. (1984.) "Textbooks in the Philippines: Evaluation of the Pedagogical Impact of Nationwide Investment." *Educational Evaluation and Policy Analysis,* Vol. 6(2).

Ichino, Andrea & Rudolf Winter-Ebmer. (2004.) "The Long-Run Educational Cost of World War II." *Journal of Labor Economics,* Vol. 22(1).

IDMC. (2009.) *"A profile of the internal displacement situation: Croatia."* Available at: www.internal-displacement.org

Justino, Patricia. (2011.) "Violent Conflict and Human Capital Accumulation." *HiCN Working Paper 99.*

Kimball, Miles. (1990.) "Precautionary Savings in the Small and in the Large." *Econometrica,* Vol. 58(1).

Kondylis, Florence. (2010.) "Conflict Displacement and Labour Market Outcomes in Post-War Bosnia and Herzegovina." *Journal of Development Economics,* Vol. 93.

Krstić, Gorana & Peter Sanfey. (2007.) "Mobility, poverty and well-being among the informally employed in Bosnia and Herzegovina." *Economic Systems,* Vol. 31.

Leon, Gianmarco. (2009.) "Civil conflict and Human Capital Accumulation: Long Term Consequences of Political Violence in Perú". *BREAD Working Paper No. 245.*

MHHR (Ministry for Human Rights and Refugees). (2003.) *"Comparative Indicators on Refugees, Displaced Persons and Returnees, Property Law Implementation, and Reconstruction in BiH from 1991 to 30 June 2003"*

Mooney, Erin & Colleen French. (2005.) "Barriers and Bridges: Access to Education for Internally Displaced Children." The Brookings Institution-University of Bern.

OECD, Mission to Bosnia and Herzegovina. (2006.) *"Action Plan on School Enrolment and Completion in Bosnia and Herzegovina."*

Pitkanen, Kari. (2008.) *"Institutional Capacity Building on Bosnia and Herzegovina Education System."* EU-ICBE Project.

Rosenzweig, Mark. (2010.) "Microeconomic Approaches to Development: Schooling, Learning, and Growth." *Journal of Economic Perspectives,* Vol. 24(3).

Sarvimäki, Matti, Roope Uusitalo & Markus Jäntti. (2009.) "Long-Term Effects of Forced Migration." *IZA Discussion Paper No. 4003.*

Schulte, Bennet. (2009.) Map "Bosnia and Herzegovina. Administrative structure 1992-1995."

Silber, Laura & Allan Little. (1996.) *"The Death of Yugoslavia."* Penguin Books. London, England.

State Agency for Statistics of BiH, Statistical Institute of the Federation of BiH, Republika Srpska Statistical Institute & The World Bank. *Living Standard Measurement Survey - Bosnia and Herzegovina.* Available at: tinyurl.com/bdetznv

Swee, Eik. (2009.) "On War and Schooling Attainment: The Case of Bosnia and Herzegovina." *Working Paper,* University of Toronto.

Swee, Eik. (2010.) "Post-conflict Partition, Ethnic Homogenization, and the Provision of Public Schooling." *Working Paper,* University of Toronto.

UNESCO. (1996.) "Review of the education system in the Federation of Bosnia and Herzegovina." Available at: www.unesco.org

UNESCO. (1997.) "Review of the education system in the Republika Srpska - Bosnia and Herzegovina." Available at: www.unesco.org

UNHCR. (2009.) *"Global Report 2009."* Available at: www.unhcr.org/gr09

Voors, Maarten, Eleonora Nillesen, Philip Verwimp, Erwin Bulte, Robert Lensink & Daan van Soest. (2012.) "Violent Conflict and Behavior: A Field Experiment in Burundi." *American Economic Review,* Vol. 102(2).

A Evaluating the Indirect Effect

Let the conditional expectation function be

$$E\left[y_i|m_i, m_i^0\right] = \alpha + \delta d_i + \rho m_i + \theta m_i d_i + \phi m_i^0 + \psi m_i^0 d_i$$

where m_i is income and m_i^0 is a dummy variable for a value of zero.

Then the expected difference in education expenditure between displaced and non-movers is

$$E\left[y_i|d_i = 1\right] - E\left[y_i|d_i = 0\right] = \delta + (\rho + \theta)E\left[m_i|d_i = 1\right] + (\phi + \psi)E\left[m_i^0|d_i = 1\right] \\ -\rho E\left[m_i|d_i = 0\right] - \phi E\left[m_i^0|d_i = 0\right]$$

The difference in education expenditure if the displaced would not have experienced a change in income, can be estimated with just one coefficient by substracting the expected income of non-movers from the income variables of both displaced and non-movers:

$$\hat{m}_i = m_i - E\left[m_i|d_i = 0\right]$$
$$\hat{m}_i^0 = m_i^0 - E\left[m_i^0|d_i = 0\right]$$

$$E\left[y_i|d_i = 1, \hat{m}_i = 0, \hat{m}_i^0 = 0\right] \\ -E\left[y_i|d_i = 0, \hat{m}_i = 0, \hat{m}_i^0 = 0\right] = \delta + (\rho + \theta)\hat{m}_i + (\phi + \psi)\hat{m}_i^0 - \rho\hat{m}_i - \phi\hat{m}_i^0 \\ = \delta$$

Therefore the transformation of the income variables allows me to estimate the difference in education expenditure at the expected income of the non-movers with δ, while ρ, θ, ϕ, and ψ remain unchanged because variances and covariances are unchanged by substracting a constant.