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The Effect of Armed Conflict on Accumulation of Schooling: Results from Tajikistan

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HiCN Working Paper 12
Updated: November 2006

Abstract: From 1992 to 1998 Tajikistan was embroiled in one of the most devastating civil conflicts in the Former Soviet Union region. To identify regional exposure to the conflict I use data on the past damage to household dwelling from the 1999 Tajik Living Standards Survey and data on exposure to conflict from Tajik newspapers for the 1991-1999. I use two empirical approaches in this paper. First, I evaluate the impact of the conflict on school enrollment by children in the mandatory age group, ages 7-15. Second, I use a difference in differences approach to determine whether the exposure to conflict affected the probability of completion of mandatory schooling by adults. The results imply that exposure to the conflict, as measured by past damage to household dwelling, had a large significant negative effect on the enrollment of girls, and little, or no, effect on enrollment of boys. Furthermore, I find that girls who were of school age during the conflict and lived in conflict affected regions were i) 12.3 percent less likely to complete mandatory schooling as compared to girls who had the opportunity to complete their schooling before the conflict started, and ii) 7% less likely to complete school than girls of the same age who lived in regions relatively unaffected by conflict. Thus, the armed conflict in Tajikistan may have created significant regional and generational disparities in the education attained by women. Interestingly, these disparities were not completely explained by unavailability or destruction of schools and other education related infrastructure in the regions affected by conflict.

Acknowledgements: For comments and advice I thank Esther Duflo, Lynne Casper, Richard A. Easterlin, Harikumar V. Iyer, Jeffrey B. Nugent, Geert Ridder, John Strauss and Anke Zimmermann. I would like to thank seminar participants at the University of Southern California, the Northeastern Universities Development Consortium Conference at Cornell, the 1st Households in Conflict Network Workshop, the 2006 Population Association of America Annual Meeting and the Bureau for Research and Economic Analysis of Development 2005 summer school for comments and suggestions. I would like to thank the State Statistical Committee and the Ministry of Education of Tajikistan for the permission to use the data. I am grateful to Ms. Elena Vasil'evna Budnikova of the State Statistical Committee of Tajikistan for many useful discussions and Mr. Saidmomim Kamolov for his help in Tajikistan. I am especially indebted to John Strauss for his numerous helpful comments and his encouragement. Financial support was provided by the University of Southern California (USC), the USC Urban Initiative and the Institute for Social Research/William Davidson Institute at the University of Michigan. The views expressed in this paper are those of the author alone and do not necessarily reflect those of granting and funding agencies. The usual caveat applies.

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1. Introduction

The purpose of this paper is to discuss the micro-economic impacts of civil conflicts, and in particular, to understand a link between armed conflict and accumulation of education. This paper shows that while strong institutions matter for countries affected by a civil strive, exposure to conflict may create or intensify regional and generational inequalities in educational attainment.

Civil wars and armed conflicts are common in less developed countries, and their detrimental effects are widely recognized. Most research on civil wars has been focused on the onset, development and end of armed conflicts.[1] Also, existing research focuses primarily on African countries that experienced violent turmoil after their decolonization in the post World War II period (Collier et al. 2003.) However, very few researchers have addressed the impact of civil wars on welfare of households and individuals. One possible reason is that large-scale, high quality household level data for developing countries affected by civil war are generally not available. Second, even when such data are available, it is difficult to identify whether the household coping behavior is induced by war or by economic conditions. For example, Miguel, Satyanath and Sergenti (2004), who study armed conflicts in 1981-1999 in 41 African countries, find that the likelihood of the conflict increases by 50 percent in the year that follows a five percentage point negative growth shock. Third, detailed measures of conflict and associated with it destruction are often not available. Such information may be difficult to collect in countries that are emerged or emerging from an armed conflict. This paper examines the effect of the armed conflict in Tajikistan, a transition economy, on individuals' school attainment and enrollment by combining differences across regions and cohorts in exposure to the conflict.

The data on the 1992-1998 Tajik armed conflict and the 1999 and 2003 Tajik Living Standards Measurement Surveys can be used to identify groups of individuals who were significantly exposed to the conflict. The educational attainment of such individuals is then compared to the attainment by individuals

[1] Humphreys (2003) provides a recent review of the literature on this subject.

who did not suffer as much.[2] Two empirical strategies are used for this comparison. The first strategy analyzes determinants of school enrollment and assumes random placement of individuals in affected and non-affected regions while controlling for observable characteristics. The second strategy employs a difference in differences approach to determine the impact of regional and year of birth exposure to the conflict on the educational attainment of adults.

To analyze the impact of this conflict on schooling, I use the 1999 and 2003 Tajikistan Living Standards Surveys (TLSS)[3] collected by the State Statistical Agency of Tajikistan (Goskomstat RT) in collaboration with several international agencies. The 1999 survey contains data on the past damage to household's home during the civil war as reported in the answers to household questionnaire. While only 6.8 percent of the 2000 households in TLSS 1999 data reported damage to their dwelling during the war, almost 40 percent of households surveyed in 1999 lived in a community where one or more dwellings were damaged (Appendix Tables 1 and 2).[4] These data, the household damage dwelling reports from the 1999 survey and household geographical location in high and low conflict intensity zones (as described in Appendix A), are used to identify individuals who lived in the conflict affected region. I assume that the past damage to the household's dwelling, other dwellings in a community or residence in a high conflict intensity area reflect the household's exposure to economic and social hardships as a result of war.

My first estimation strategy is to evaluate the effect of exposure to conflict on school enrollment of children in the mandatory school age group, ages 7 to 15 in 1999 and ages 8 to 16 in 2003. The dependent variable is child's enrollment status in the academic year corresponding to the year of survey.[5] I use a rich set of observable characteristics to control for the potential selection effects. The findings suggest that there is a strong negative association between current school enrollment by girls and past

[2] The human costs of the conflict were substantial for the 6.4 million inhabitants of Tajikistan. Approximately 40 percent of population was affected directly during the conflict. The conflict displaced at least 600,000 people internally. In addition, about 60,000 found temporal refuge in the neighboring states and 500,000 left the country for good. The conflict claimed the lives of at least 50,000 men, orphaned 55,000 children and widowed 20,000 women (Falkingham 2000).
[3] The TLSS 1999 and 2003 data are publicly available for download at www.worldbank.org/lsms.
[4] The IMF (1998) reports that at least 36,000 homes were destroyed in the Tajik conflict.
[5] See Appendix B for more detail.

damage to the household dwelling (Tables 1.1 and 1.2). This effect is particularly large for older girls, ages 12-15, who are 13 percent less likely to be enrolled if their household reported damage dwelling, but is not observed for boys. This finding implies that households affected by conflict played "safe" and invested more in schooling of boys. It is also possible that older girls were viewed by their families as more vulnerable to risks associated with conflict activity (such as rape and harassment), and therefore kept at home. High enrollment rates among younger children, ages 8-12 (Tables 2.1-2.3), suggest that during the conflict households attempted to protect the education of younger children by allowing them to complete at least primary school. Among the household characteristics, educational attainments by parents, household per capita expenditure and mother's widow status interacted with household damage dwelling have the greatest impact on child enrollment (Tables 4 and 5).

Since the datasets used in this paper are two separate cross-sections, I can not observe the same individuals or households in those years. Nor do the data allow me to study the dynamics of drop-outs and re-enrollments by the same individuals and their progress towards completion of mandatory education during and after the conflict. My second estimation strategy is to investigate the impact of Tajik war on the completion of mandatory nine years of schooling. I focus on the educational attainment by adults who reached age 17 by June-July 2003 and thus should have completed nine years of schooling by the time of the 2003 survey. This second estimation strategy allows me to use a difference in differences approach, observe the medium to long-term impact of the war on schooling and extend my analysis to individuals of younger ages who would have just completed their mandatory schooling by the time of the 2003 survey. All information on adults is linked to the district (*raion*) level data on the regional exposure to the conflict during their schooling years.

The findings suggest that individuals who were of school age during the war were significantly less likely to complete their mandatory education by age 17 than individuals who had an opportunity to complete this education level before the start of the conflict in 1992. The probability of completing 9 grades is 4 and 7 percent lower for boys and girls respectively. Further, the probability decreases by another 5% for girls, born in 1978-1986, who also lived in regions affected by the conflict during their

schooling years. Potential migration during the war should not affect my estimates as 99.5 percent of individuals in the analytical dataset report that they lived in the region of survey continuously since birth.[6]

The rest of the paper is organized as follows. Section 2 presents background information on Tajikistan and section 3 discusses relevant literature. Section 4 describes general trends in enrollment rates in Tajikistan. Section 5 focuses on data and descriptive statistics on school enrollment and grade attainment by conflict exposure. Section 6 discuses empirical approaches used in this paper. The results are presented in Section 7 and conclusion in Section 8.

2. Background

One can draw a parallel between the civil conflicts in the 1990s in the Former Soviet Union (FSU) region and the eruption of civil wars in some of African countries (Collier 2003). Both the collapse of the Soviet Union and decolonization in Africa created many small low-income economies that had difficulty in sustaining themselves. In contrast to the African post-colonial countries, the transitional economies inherited a well-developed infrastructure and highly trained human capital (Collier). Those factors may have influenced the nature and length[7] of the post-independence conflicts in the FSU region as many of the low level conflicts in the transitional economies did not last as long as African conflicts.

2.1 The 1992-1998 armed conflict in Tajikistan

In Tajikistan, old grievances and new challenges to the existing power led to a violent civil war that started in early 1992 and was followed by a prolonged armed conflict ending in 1998. The conflict was reportedly caused by a dispute over political and economic power after Tajikistan's independence in 1991. In June of 1997, the United Nations facilitated a peace accord between the Tajikistan's government and the United Tajik Opposition (UTO). However, this ceasefire agreement was often broken in various parts of the country, with some districts serving as centers of insurgency. The reconciliation was complicated by a lack of a coherent national identity in Tajikistan, where warring sides were often

[6] There is no significant difference in the migration rates of individuals from regions affected and non-affected by the conflict (TLSS 2003).
[7] See Gleditsch et al (2002) on the length and intensity of civil wars in Africa and the FSU region.

associated with particular regions and ethnic groups.[8] The conflict ended in November, 1998 when the government forces forced the remnants of opposition groups out of Tajikistan into Afghanistan.[9]

The main parties to the conflict were the post-Communist Tajik government and several opposition groups, represented by the United Tajik Opposition (UTO).[10] Those political affiliations in Tajikistan were based on regional sub-divisions and kinship groups, or clans. Thereby, the conflict divided the country into geographical regions with opposing political interests.[11]

The Tajik post-Communist party was comprised of members of Kulob and Khodjent clans, who traditionally held power in the republic[12], and residents of the Uzbek-dominated Hissar region west of Dushanbe.[13] Similarly, opposition found regional support in the southern (Khatlon) and eastern (GBAO) districts and was supported by the members of Gharmi (Garmi) and Pamiri clans. The opposition represented interests of regionally based clans that lacked access to power during the Soviet times and intelligentsia that was not regionally based (Capisani 2000). Thus the conflict could have been driven by the inequalities among ethnic groups or horizontal inequalities as outlined by Stewart (2002).

As it frequently happens, civilians also got involved in the conflict. Some civilians organized into small military units (Narodnii Front or People's Front) to protect them and their communities from intruders. Many people were forced to leave their communities and houses. They found refuge in Dushanbe, Leninobod (Sugd) and GBAO or moved on to Uzbekistan and even Afghanistan. Others, in particular those of non-Tajik origin, left the country for good.

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[8] Tajikistan is inhabited by approximately 79.9% Tajiks and 15.3% Uzbeks (The World Factboook, CIA 2006 (Accessed: August 8, 2006).). The Tajik group also includes Pamiri people who speak a different language and belong to a different branch of Islam than the majority of the population (Roy 2000).

[9] University of Uppsala Conflict Database. (http://www.pcr.uu.se/database/conflictSummary.php?bcID=205 (Accessed: August 8, 2006).)

[10] For detailed accounts of this conflict see Atkin (1997a) and Nourzhanov (2005).

[11] Allegiance to clans, also defined as patron-client networks (Atkin 1997b) or elite groups (Fridman 1994) is traditional in Central Asia, where the regional or kinship affiliations often overrule the sense of national identity (Roy 2000, Collins 2004).

[12] Since the 1930s, members of those clans had occupied many important government positions and had managed state enterprises (Capisani 2000).

[13] http://www.globalsecurity.org/military/world/war/tajikistan.htm. (Accessed: May 10th, 2005) and Capisani (2000: 168).

The war led to a significant destruction of the state and people's property. The disorder led to formation of bands and military groups who were interested in protracting the conflict. Crime level escalated across the country. The capital of Tajikistan, Dushanbe, and southern regions such as Khatlon and Regions of Republican Subordination (RRS) were severely affected by the terror. Assassinations, hostage-taking, rapes, murders and robberies during the daylight became common.[14] The government was not able to contain the conflict situation independently and negotiated for an outside political and military assistance, which was provided by Russia and Uzbekistan from 1992 to 1999. While the opposition did not receive any express financial or political support from any country in the region, it obtained arms from and used for its' bases the bordering territories of Afghanistan and Iran (Panarin 1994).

2.2 Overview of Tajikistan

Tajikistan is a landlocked, mostly mountainous country in Central Asia. It borders Uzbekistan to the west and north, Kyrgyzstan to the north, China to the east and Afghanistan to the south. The country has a total land area of 143,000 square kilometers (slightly less than Wisconsin) and only 6.52 percent of this land is arable. Tajikistan is populated by approximately 7.3 million people as of 2006 (Central Intelligence Agency, 2006) and almost 2.85 million of it's inhabitants are under age 14 (World Bank, 2006).

Prior to it's independence in 1991, Tajikistan was the poorest of the FSU republics. The republic was largely supported by subsidies from the central Moscow based Soviet government. Unfortunately, the legacy of poverty continues, and, 15 years past independence, Tajikistan still occupies the bottom poverty spot in the FSU region. Almost 66 percent of Tajik population lives on less than USD2.15 a day (WFP 2006).

The Republic of Tajikistan is administratively divided in 4 regions: Sogdian oblast (Sugd, former Leninobod), Khatlon oblast, Gorno-Badagakshan (GBAO) Autonomous Oblast, *Raions* of Republican Subordination (RRS) also known as the Direct Rule Districts, and capital city Dushanbe. Raions (districts) significantly exposed to war are primarily located in Dushanbe, Khatlon and RRS regions.

[14] Based on the "Vechernii Dushanbe" and "Narodnaya Gazeta" news material for 1991-1999.

2.3 Economic situation in Tajikistan after its independence

The 1992-1998 armed conflict took a significant toll on the country's physical infrastructure[15] and destroyed much of its human and social capital. It exacerbated problems that Tajikistan had experienced immediately after the dissolution of the FSU in 1991.

Two of such post-transition difficulties were the deterioration of economic ties with business partners located in other FSU countries and the loss of subsides from the center. The Soviet Union economic space was devised as a close-knit system, with some regions and republics specializing in particular products or industries. Tajikistan specialized in aluminum refining and growing of cotton. The country's independence in 1991 undermined both industries. Tajikistan's ties with its aluminum suppliers in Azerbaijan and Russia were severed. As a result, the Tajik aluminum smelter, the largest in Central Asia, was working below its operating capacity due to a decrease in the supply of its major raw material. Also, production and distribution of cotton were severely disrupted after the war. Two factors contributed to the temporary decline of the cotton industry during that period. First, similarly to aluminum industry, the dissipation of industrial ties has left the cotton industry without a sufficient demand for its product as during the Soviet times almost 90 percent of cotton production was shipped outside of Tajikistan (McLean and Greene 1998). Second, shortage of laborers and war damage in the southern cotton-growing regions led to the sharp decline in production of this major cash-crop.

Over the course of the conflict, various military warlords and the government fought over control of the important agricultural and industrial centers, many of which are located in the southern part of Tajikistan. This fighting led to destruction of infrastructure, disruption of communication and transportation. For example, the railroad operated with severe disruptions. Bridges and rails were bombed and damaged. Fuel and labor were in short supply.

[15] "According to A. Abdullojonev, Prime Minister of Tajikistan, by the end of December 1992 80 percent of the country's industry was destroyed and in the south of the republic 100 percent. In spite of the good yield, there were harvested only 100,000 tons of cotton instead of 700,000." Nezavisimaja Gazeta, December 23, 1992 (as quoted in Fridman (1994)).

The mass displacement of people during the first years of the war affected agricultural and industrial production in the south of Tajikistan and later led to insufficient labor supply in these areas. People who stayed at home in those regions were too scared to leave their houses and show up for work. As a result of labor shortage, fighting, fuel shortages and other disruptions, only 32.3 percent of the planned 820,261 tons cotton collection in Tajikistan was completed by the end of 1992. The war affected areas in the south, such as Kurgan-Tube, Bohtar, Tursunzade, Hissar, Gozimalik, Kumsangir raions, fulfilled even smaller percentage of the plan. Only 10 percent of the planned 360 thousand tons were collected in those raions (Narodnaya Gazeta Nov. 14, 1992.)

Although labor was temporarily in short supply in some areas of Tajikistan, in other regions many employment opportunities disappeared as a result of war and the accompanying economic crisis. The situation was particularly harsh for some groups of the population. For example, many members of Gharmi and Pamiri clans after the war allegedly experienced employment discrimination when members of the Kulobi and Khodjenti clans, who were the "winners" in the conflict, made the jobs available (often for money) mainly to the members of their own clans (McLean and Greene).

When the job market does not look good, in many developed countries and some transition economies (for example, Kyrgyzstan) many students return to school or stay in school for longer. For example, the recent economic downturns in the U.S. in 2002 and in 1990s coincided with high increases in enrollments in higher education (Callan 2002). However, in Tajikistan the enrollment rates at all levels of education were below their 1991 level over the course of the war and declined below the levels observed in most of the neighboring countries in Central Asia (see Figures 1 and 2). This decrease in enrollment by Tajik students could be attributed to both, political instability and economic concerns. The trends in enrollment are discussed in Section 3. The next section discusses channels through which exposure to armed conflict can affected accumulation of schooling.

3. Evidence from other countries

There are very few academic studies that document the effect of armed conflict on education. Most of them use cross-country data and analyze trends in aggregate enrollment rates as a part of larger projects on social impacts of conflicts. However, the country-level data is not suitable for estimating an impact of armed conflicts on particular regions and population groups within the country.

This study uses individual and household level data to explore the effect of armed conflict on individual human capital accumulation, as measured by school enrollment and completion of mandatory nine grades of education. The study aims to answer three questions. First, is there a strong (presumably negative) association between armed conflict and individual's school attainment? Second, if there is such a relationship, then does conflict have a long-lasting or a temporary impact on schooling? Third, what are the characteristics of the individuals who were affected the most? To give answers to those questions, we need to understand the channels through which armed conflicts can affect accumulation of human capital.

In theory, armed conflicts can affect schooling of individuals through the following four channels. First, civil wars and conflicts may reduce expected returns to schooling. In particular, returns may fall significantly for some elements of the population. Lower returns to schooling may motivate decisions to stop attending school either temporarily or permanently. Second, armed conflicts reduce resources available to many households. An unexpected decrease in income may induce households to withdraw their children from school in an attempt to maintain current level of consumption. Third, infrastructure is often destroyed in the course of internal wars, and schools and educational facilities are often targeted by militants. Some communities may be affected significantly. Children from such communities would have to travel to schools elsewhere or stop attending school altogether. If schools are not rebuilt within a reasonable period of time, we may observe some communities falling behind the rest of the country in their educational attainments. Fourth, civilians are often terrorized by armed forces and militias. Violence and feelings of insecurity may induce households to keep children away from public places, go into hiding or relocate.

Let me explore each of these channels in more detail.

First, conflict-induced societal and economic changes may alter the lifestyle of various populations. Due to destruction of industries, job opportunities for skilled labor may become scarce. If a conflict were based on religious grounds, winners may establish a regime that prevents women from working (example, Taliban). Assuming that households are rational and forward looking, they would redistribute their resources away from investments with lower returns.

Second, exposure to conflict often unexpectedly reduces the financial resources available to many households. Jacoby and Skoufias (1997) and Thomas et al (2004) examined the impact of income shocks on household decisions with respect to schooling in peaceful environments. In India, agricultural households use seasonal school non-attendance by children and child labor as a form of self-insurance in the lean times (Jacoby and Skoufias). Similarly, in Indonesia, many households had to decrease their spending on education after the 1998 financial crisis (Thomas et al.). While the overall decrease in spending was small, it was large for the poor households with a high proportion of young children. Poor households, as authors conjecture, favored education of older children who were close to graduation. These older kids were able to finish their education at the expense of the younger ones. These studies assume that households would like to invest in the education of their children, but, when facing an unexpected income shock have to trade-off future for present consumption. When the shock hits, households withdraw children from school and send them to work to maintain current consumption levels. Once the crisis is over, households may expect to return to their previous state and re-enroll children in school. Thus, income uncertainty may adversely affect the quality and quantity of children's education. In some situations, households may have difficulty in reallocating resources because they have so little already. Such families may have to reduce consumption of foodstuffs for all and children who were very young during the conflict may suffer from cognition problems as adults. Thus, the conflict may have a long legacy.

The social legacy of the conflict becomes even more profound when we remember that data often allows us to observe information on only those individuals who survive the conflict. Armed conflicts are commonly accompanied by an increase in mortality and morbidity. For example, Hoeffler and Reynal-

Querol (2003) find that infant mortality increases by 13 percent above baseline during a typical five year war and remains 11 percent higher in the first five years after the conflict. Ghobarah, Huth and Russett (2003) observe from cross-country data that the incidence of some infectious diseases and conditions increases as well. The authors attribute this increase to two factors. First, civilians find it more difficult to maintain health in the poor after-war conditions. Second, governments often have less money to spend on the public health and infrastructure, such as safe water supply. Poor individual health or loss of family may create serious restraints on access to schooling. There is a growing body of literature studying the impacts of losing parents on child well-being. In one such study, Evans and Miguel (2004) find that young children in rural Kenya are more likely to drop out of school after the parent's death and that effect is particularly strong for children who lost their mothers.

Third, during civil wars households and communities have to deal with physical destruction of property and infrastructure. Internal wars force people to flee for safety. Refugees or internally displaced persons may find themselves in remote areas without any educational facilities. In more developed areas, massive influxes of refugees usually overcrowd local health and schooling facilities. Schools often serve as temporary shelters for refugees and internally displaced persons thus preventing students from accessing those facilities. Access to schooling may also be cumbersome for refugee and internally displaced children if they lack the documents and residency permits required for enrollment.[16] Even if people do not relocate, schools are often specifically targeted for destruction or used as living quarters by parties in armed conflicts and refugees. The availability and quality of school facilities has been linked to student attendance and achievement (Glewwe 1994).

Fourth, internal wars can have an impact by increasing fears of violence and insecurity. Violence against civilians[17] has become a modern tool of warfare. "Ethnic cleansing", torture, kidnappings and

[16] See Mooney and French (2005) for the discussion of barriers of education for internally displaced persons (IDP) children and country examples.

[17] Azam and Hoeffler (2002) theorize that civilians in internal wars are terrorized for two reasons. First, soldiers may terrorize civilians because they need to loot to augment their resources. Second, violence against civilians may play a direct military role. Large fractions of civilians fleeing for safety will leave local fighting forces without support. Thus militants would have difficulty in securing shelter in de-populated areas and would be easier to spot.

targeted killings are very common in conflict-affected countries. In the atmosphere of terror, households may attempt to protect their most vulnerable members, by keeping them at home or sending away to relatives in more secure places. Children exposed to conflict may experience severe psychological effects that continue long after the war is over. They may become depressed and socially withdrawn.[18] Their school performance may be adversely affected and they may have to leave their studies prematurely. However, the effect of exposure to the conflict on children may be felt stronger in areas other than psychological health. Blattman (2006), who studies former child soldiers in Northern Uganda, finds that the labor market productivity and educational outcomes of children-abductees suffered as they missed on acquiring labor market skills and education during the years they spent with the rebel forces.

Further, the conflict may have specific gender impacts. Girls may be withdrawn from school much earlier and married off to lift the burden from their families. Also girls may stay at home to avoid sexual assaults and harassment on their way to school (Machel 1996). Even if girls complete education, they may not be able to work outside their households, either because fewer opportunities are available in general or because society starts to frown at families who let their women engage in outside employment. For those reasons, we should expect a certain redistribution of household resources towards their more mobile and employable members.

The arguments above support the hypothesis that internal armed conflicts can lead to decrease in school enrollment and school attainment, and in particularly affect education of vulnerable groups. So, can something be done to prevent or control the damage to education caused by internal wars? Recent research by Miguel and Roland (2004) and Stewart, Huang and Wang (2001) suggests that countries with favorable institutions are able to maintain their enrollment rates during a conflict or recover to their pre-conflict enrollments once the conflict is over. A study by Stewart et al (2001) of African countries affected by internal armed conflicts finds that primary school enrollments decreased only in three out of

[18] Many children affected by conflicts report levels of distress, which associated with serious disorders such as post-traumatic stress disorder (PTSD), depression or anxiety. The level of distress is directly linked to the severity of trauma or event children experienced during the war. While the levels of distress decline over the time, many children remain severely affected for a long period of time (Yule et al. 2003). See Turner, Yuksel and Silove (2003) for a more general discussion of psychological responses to violence and torture in wars and conflicts.

eighteen countries, but improved in five during civil conflicts. On average, girls fared better than boys, which is not surprising given that boys often serve in the army. Lopez and Wodon (2005) report that school enrollment rates in Rwanda that decreased during the conflict returned to their pre-conflict levels within five years after the end of the conflict. A similar effect is found by Miguel and Roland who study the long-term impact of US bombing on the economic development in Vietnam and by Thomas et al. (2004) during crisis in Indonesia. Despite of such recoveries, conflicts and crises may still have an effect on children who were pulled out of school during calamities and did not have an opportunity to resume their studies.

However, it remains difficult to judge whether a conflict would have long-term or short term impact on education. If the effect of conflict on education is transient, we should observe enrollment rates rebounding to their pre-conflict levels and people catching up on years of education lost during the war. Conversely, if the effect of conflict is long-lived, we should expect a continuing downward trend or stagnation in average enrollment rates, in particular, in regions significantly affected by the conflict. In the next two sections, I will explore the relationship between armed conflict and school enrollments in Tajikistan.

4. General education and enrollment rates in Tajikistan

I begin with the description of the trends in enrollment rates since the independence of Tajikistan in 1991 and proceed with a discussion of trends in school enrollments and number of years of schooling completed using the 1999 and 2003 TLSS data.[19] I focus on the distribution of enrollment rates across ages, gender and exposure to conflict for children of age 7 to 15.

After the dissolution of the Soviet Union in 1991, Tajikistan inherited a strong school system. Like other FSU countries, Tajikistan mandates nine required grades of schooling for children of ages 7 to 15 and provides schooling up to grade eleven free of charge. Strong support for education is reflected in high secondary and primary enrollment rates that are comparable to enrollments in other Central Asian

[19] The data used in this analysis are discussed in Appendix C.

countries (Figure 1). Despite of the strong educational system and the popular support for education, enrollment rates in Tajikistan started to decline soon after it's independence in 1991.

From Figure 1 we can observe that the non-enrollment rate of children ages 7-15 increased by 10 percentage points between 1991 and 1993.[20] Over the same period, enrollment by young adults, ages 15-18, in the general secondary education levels dropped by 30 percentage points and continued to decline until 1998 (Figure 2). The initial decline in enrollments coincided with the first and most brutal years of the Tajik civil war. The enrollment rates at all levels of education began to recover in 1997-1998. This recovery may be partially explained by the Peace Agreement between the Tajik government and the United Tajik Opposition (UTO) that was signed in June 1997.

The decrease in the enrollment rates over the 1991-1998 years can be further decomposed into regional and gender differences.

First, during the war, some regions of Tajikistan, such as Khatlon and Regions of Republican Subordination (RRS) and the country capital Dushanbe were significantly affected by the conflict, while other regions, such as Leninobod and GBAO enjoyed relative stability because they were geographically isolated from the conflict affected areas.[21] The war, fighting and surge in criminal activity disrupted schooling and affected children's experiences. Here are three examples. One, in the city of Kurgan-Tube and Kurgan-Tube raion in Khatlon region the official start of the academic year 1992-1993 was delayed by as much as 2 months. Even when the schools were officially open in November of 1993, parents did not send their children for education as they were concerned about their safety (Narodnaya Gazeta, Oct. 26, 1992.) Two, in Dushanbe, the government sent students of professional technical institutions for early winter holidays from November 13, 1992 to January 4, 1993. The holidays were further extended to February 1st, 1993. This forced school holiday was motivated by the low attendance of students and teachers due to unstable situation in the republic capital (Narodnaya Gazeta, Nov. 13, 1992 and Jan. 23. 1993). Three, schools and professional technical institutions were repeatedly targeted by military

[20] The enrollment rates are for September 1st of the respective year.
[21] Leninobod region is connected to the rest of Tajikistan by a narrow road of that is easy to block. The pass was blocked during the war. Gorno-Badakshon region is located in a mountainous area which is difficult to access.

formations for hostage taking. Two separate incidents of such attempts occurred in Dushanbe in October of 1992 (Narodnaya Gazeta, Oct. 15, 1992 and Oct. 16, 1992). In other regions, with less media coverage, many such events may have gone unreported.

Second, within the affected regions there was a variation in the exposure to conflict across communities. Some people lived on the front lines while others enjoyed relative stability. Out of 136 households that reported damage dwelling in the TLSS 1999 data (6.8 percent of the sample of 2,000 households), 63 were located in Khatlon, 54 in RRS, 11 in Dushanbe and 8 in Leninobod (Sugd) regions. This amounts to 8.95, 12.5, 6.25 and 1.32 percent of households surveyed in each of these regions respectively. Correspondingly, the enrollment rates for children ages 7-15 are lower for areas with the most damage dwelling reports and stand at 88.27, 86.61, 83.78, 91.85 and 95.56 percent for Khatlon, RRS, Dushanbe, Leninobod and GBAO respectively.

Third, the lower enrollment in the conflict affected areas can be partially explained by the school quality and damage to school facilities. It is possible that students were likely to drop out if their classes were overcrowded and their quality expectations were not met by the schools. The IMF (1998) estimates that approximately 20 percent of schools in Tajikistan were destroyed beyond repair in the conflict and that many teachers fled war affected areas. From Figure 3 we can observe that student per teacher ratio is increasing over the 1991-2002 academic years across Tajikistan. Decomposing this ratio, we find that, in the conflict affected areas, the mean (average by raion) number of students increased by 22 percent from 23.93 to 30.85 thousands over the 1991-2003 period, while the average number of teachers declined by almost 23 percent from 1.85 to 1.44 thousands over the 1991-1996 period. The number of teachers never reached its pre-war level during that time. In the contrast to that, in the lesser affected regions, both, the number of students and teachers, did not change as much over the 1991-2002 academic years.

Further, these differences in enrollment rates across regions can be explained by a greater danger in the conflict areas to the children. For example, parents from Gharm (RRS region) community were concerned that older girls would be harassed or abused by soldiers at checkpoints on their way to school.

Similarly, in Western Khatlon children of Gharmi and Pamiri origins reported fears of physical violence and of being beaten by other children as the main reason for skipping school (Falkingham 2000).[22]

Forth, the impact of war varied across households living in the same communities and by region. In the south, where the war was ravaging communities, it was common for Tajiks who belong to different clans to live in the same town or village. When the war started, residents of such communities commonly took different sides in the conflict. Often members of Gharmi and Pamiri clans supported the opposition, while Kuliabi and Khodzhenti (or Leninobodi) people backed up the Tajik government forces. There are numerous reports of houses owned by Gharmi and Pamiri people burned and destroyed and houses of Kuliabi left standing in the Kuliabi communities and the other way around. Such targeted destruction of property of non-majority community members was very common during the Tajik civil war (McLean and Green 2003; Human Rights Watch 1993).

Thus, decreased family incomes, low school quality and surrounding violence may have induced many children to leave school. To further our understanding of the impact of armed conflict in Tajikistan on schooling, we should compare enrollment rates and number of grades completed among children across and within regions, by age and gender. I explore these differences in the following section.

5. Data and descriptive statistics on school enrollment and grade attainment

5. 1 Data

This study is based on the 1999 and 2003 Tajik Living Standards Surveys (TLSS). Both surveys are a part of the Living Standards Measurement Survey Data Collection Project.

The 1999 survey is the first nationally representative household survey conducted in Tajikistan after its independence in 1991. The survey was carried out only six months after the end of the armed

[22] Pamiri and Gharmi ethnic groups or clans were strongly associated with supporting opposition forces. During the war, adults, whose passports indicated that they were born in Pamir or Garm regions, were killed or taken away by Narodnii Front or government associated militias and disappeared. Human Rights Watch (1994) reports that in the late December of 1992 in Dushanbe, Narodnii Front militias killed 300 and taken away hundreds of people (unfortunately the data used in this paper does not allow for identification of various ethnic groups and clans in Tajikistan).

conflict in November 1998 and, therefore, allows us to examine the short-term impact of exposure to conflict on school enrollment. From the 2003 data, I can make inferences about a longer term, cumulative impact of exposure to conflict on schooling of young adults who were exposed to the conflict during their schooling years.

5.2 Exposure to conflict, school enrollment and grade attainment

This section explores the effect of differential exposure to conflict on school enrollment of and number of grades completed by individuals using the 1999 and 2003 Tajik Living Standards surveys.

Prior to examining the schooling attainments by individuals by region, gender, age and exposure to the conflict, I outline the measures of conflict exposure used in this paper. For the detailed description of the construction of conflict variables and the wording of the related survey questions refer to Appendix Part A.

5.2.1 Measures of exposure to armed conflict

Three variables are used to compare the extent of conflict exposure on school enrollment and school grades completed by individuals.

The first variable indicates direct effect of the conflict on an individual household. This measure is based on households' reports of damage to their own dwellings (henceforth, household damage dwelling or HDD) in the 1999 TLSS.[23] As I mentioned above, 136 households or 6.8 percent of households interviewed for the 1999 TLSS reported that their dwelling was damaged during the recent civil unrest.

The second variable is recorded at the primary sampling unit level for the 1999 and at the *raion* level for the 2003 data. It is an indicator variable that is assigned a value of one for all households in a primary sampling unit in the 1999 TLSS if one or more households from this unit reported that their dwelling was damaged during the war (henceforth, community damage dwelling or CDD). In the

[23] Using the 1999 TLSS household data, I found no apparent relationship between the type of construction material used in dwelling construction and reports of damage to household dwelling.

construction of this variable, I assume that households who lived in the same locality as households that reported damage dwelling were affected by the conflict in the similar way.

The third conflict variable is available only at the *raion* level for both 1999 and 2003 datasets. This variable indicates that a *raion* (district) was severely affected by a various conflict events. Such incidents include high level of conflict and insurgent activities, episodes of violence and atrocities against the civilian population in Tajikistan between 1991 and 1998 years that are recorded at the *raion* level (henceforth, reports of conflict activity or RCA). The variable is based on the news reports in local Tajik newspapers, reports of the UN agencies, the U.S. Department of State, human rights organizations and other literature on the Tajik civil war. This measure identifies *raions* within Tajikistan that sustained significant damage during the war and timing of such damage.[24]

The above three measures of exposure to conflict are used to compare school enrollment rates and number of grades completed by individuals across communities that were impacted by the conflict to a different extent.

5.2.2 School enrollment and grade attainment by conflict exposure

Tables 1.1-1.2 present enrollment rates[25] by gender and degree of conflict exposure for children in the mandatory age groups using the 1999 and 2003 TLSS data. Three observations emerge from Table 1.1. First, on average boys were 8 percent more likely to be enrolled than girls.[26] Second, only 71 percent of girls from households that reported household damage dwelling were enrolled as compared to 84 percent of girls from households that did not report such damage. Third, boys from households that reported damage dwelling were almost as likely to be enrolled as boys from households that did not reports such damage.

A similar effect is observed when community damage dwelling dummy is used to compare enrollment rates across sub-groups of children. From Table 1.2 we can observe that girls from

[24] A possible limitation of this variable is that it may not include all communities that were affected during the war because the accounts of conflict activity may not discuss smaller incidents or less known communities. For example, the correlation coefficient between CDD and RCA variables is equal to 0.46.
[25] Refer to Appendix B for the detailed definition of enrollment status.
[26] t-statistic= - 6.856, p (2, 3621)=0.000.

communities exposed to conflict were 7 and 6 percent (significant at 1 percent level) less likely to be enrolled in 1999 and 2003 as compared to girls from communities where residents did not report damage dwelling during the conflict.

Further exploring enrollment rates across different age groups, gender and degree of conflict exposure in Tables 2.1-2.3 we can make another four observations. First, younger children are more likely to be enrolled than older ones. Second, at all ages boys have higher enrollment rates than girls. Third, children from households and communities significantly affected by the conflict are less likely to attend school. The impact of an individual conflict shock as measured by damage dwelling variable is particularly high for older girls, ages 12-15, who were 20 to 31 percent less likely (significant at 5 percent level) to be enrolled than girls from households that did not experience damage dwelling (Table 2.1). Fourth, we can also observe an increase in the enrollment rates by all children, and a large recovery in enrollment rate by girls in 2003 as compared to 1999.

Thus, the data suggest a negative association between conflict exposure and school enrollment, in particular for girls, ages 12-15. The impact of conflict on enrollment is decreasing with time as shown by higher enrollment rates for 2003. This could be explained by more stable situation in the regions and reconstruction of schools by the government, international and non-governmental organizations (Rashidov c.2000).

As enrollment rates are measured at a point in time, or the time of the survey, they do not provide us with information of whether children, who were not in school at the time of the survey, are also behind in school as measured by their grade attainment.

Patterns in grade attainment by children ages 7-15 are very similar to those found in the enrollment data (Tables 3.1-3.2). First, in 1999 children from war-affected households and communities completed fewer grades of schooling than the rest of the sample and this gap increased with age. By 2003 (Table 3.3), on boys of age 15 from conflict affected areas completed 0.23 (significant at 5% level) fewer grades of schooling than boys of the same age from regions not affected by the conflict. Similarly, girls from conflict affected regions completed 0.26 fewer grades of schooling than girls from non-affected

areas (significant at 5% level). Third, in each age group boys consistently complete more years of education than girls, which should not be surprising as we observed that boys are more likely to be enrolled than girls.

Looking at the longer-term impact of the conflict measured by the mean grade attainment by adults (grades 0 to 9) born in 1966-1986 (Figures 4 and 5), we observe a downward trend in the grades attained by the cohort of women who were of school age during the conflict (born in 1976-1986). While the largest drop in grade attainment as compared to older cohorts is observed for those born in 1974-1975, there is an increasing gap in grade attainment between those who live in conflict affected regions and those who live in lesser affected areas. However, we do not find the same effect for men.

Robustness

In this section the reports of conflict activity (RCA) is used to compare child school enrollment rates and number of school years completed for children across communities. This measure allows us to keep all observations for 1999 and 2003, as compared to community damage dwelling variable where we loose about 8 percent of the 2003 sample because it is not possible to match all raions surveyed in 1999 to raions surveyed in 2003.

This third measure of conflict exposure provides results comparable to those found for the household and community damage dwelling variables (Appendix Tables 5, 6 and 7). Again, the differences in enrollment rates between affected and non-affected regions are large and statistically significant at 5 percent level for girls ages 14-15. Enrollment rates for both, boys and girls, noticeably improved in four years that passed between the surveys. For example, 85 percent of 14 year old girls from conflict affected regions were enrolled in 2003 as compared to only 77 percent of girls age 14 in 1999. Girls from less affected regions were more likely to be enrolled in 2003 as compared to 1999. As expected the improvement in enrollment rates is higher for the conflict affected areas because the lesser affected regions already had rather high enrollment rates in 1999.

The next section describes identification and regression framework used to determine if a negative relationship between the exposure to conflict and enrollment rates holds when we control for individual, household and community characteristics.

6. Identification and empirical specification

My study extends the previous research on the determinants of school enrollment in low-income countries and contributes to the literature on household and individual behavior in countries affected by internal armed conflicts. For the purposes of this paper, I rely primarily on detailed information on household and individual demographic characteristics, expenditure, school enrollment and community characteristics.

In order to identify the effect of the Tajik armed conflict on school enrollment and completion of the mandatory 9 grades of schooling, this paper takes on two empirical approaches. In both approaches my identification strategy exploits variation in the conflict intensity over the regions and time.

6.1 Empirical strategy 1: school enrollment

My first empirical strategy involves the estimation of the impact of exposure to conflict on school enrollment of children in the mandatory school age group.[27] My analytical datasets contain information on 3,284 children of ages 7-15 living in 1,435 households from the 1999 TLSS and on 6,055 children ages 8 to 16 living in 2,838 households from the 2003 TLSS. All variables used in this analysis are based on the information from the interview of the reporting adult in the household. Coding of variables and summary statistics for the 1999 and 2003 samples are shown in Appendix Tables 1 and 2. Comparison of sample means of the schooling outcome variables and schooling covariates by conflict exposure is provided in Appendix Tables 3.1-3.2.

To measure the impact of exposure to conflict in a regression framework, I estimate equation (1) below. The estimation framework controls for individual and household characteristics as well as year of birth effects.

[27] Ages 7 to 15 as of May 1999. See Appendix C for the details on the construction of the analytical samples.

The decision on whether to enroll in a particular year has been modeled as a dummy variable that is equal to one if a child is enrolled in school and zero otherwise. In the model, I assume that households maximize their utility subject to a budget constraint and that the maximized utility value could be observed from household choices (Becker 1975).[28] Results are reported separately for boys and girls. As parents may have a differential preference for their sons' and daughters' education and market return to education may be different for boys and girls, education of boys and girls can be determined by different production functions (Rosenzweig and Schultz 1982; Strauss and Thomas 1995).[29]

$$E_{ijk} = c_1 + \beta_{1k} + \mathbf{M_i}*\eta_1 + Di*\eta_2 + \mathbf{Cj}*\eta_3 + u_{ijk} \qquad (1)$$

Where

E_{ijk} is a binary variable indicating whether an individual *i* born in region *j* in year *k* was enrolled in school during the respective academic year at the time of the survey; D_i is a dummy indicating whether the individual's dwelling was damaged during the war (I also use community damage dwelling variable to estimate the impact of exposure to the conflict at the community level); $\boldsymbol{\beta_{1k}}$ - age fixed effects; $\mathbf{M_i}$ is a vector of individual and household specific socioeconomic characteristics (such as education of parents, household monthly expenditure per capita, value of household assets); $\mathbf{C_i}$ is a vector of community of residence specific characteristics (such as availability of employment and access to education).

To control for unobserved correlation of observations within localities, I estimate equation (1) with fixed effects at two community levels. First, I specify fixed effects at the primary sampling unit. Second, I compare these results with specification of fixed effects at the *raion* (district) level of the child's current residence. In both specifications, I estimate regressions with robust standard errors to control for the effect of unobserved heterogeneity on variance. The fixed-effects model purges all observed and unobserved community characteristics that are constant across individuals from the same community, thus removing the bias in the estimation of enrollment that is caused by child-invariant community

[28] Refer to Becker (1975) for the full details of this model.

[29] This assumption is tested by estimating a regression equation on the pooled data for boys and girls. In this specification, all control and explanatory variables are interacted with an indicator for child's gender. The hypothesis that estimated parameters are identical for boys and girls is rejected ($F(16, 124) = 3.66$, p-value = 0.000).

characteristics. It is also possible that local characteristics are correlated with the war damage variable, and the fixed effects specification helps us to control for this correlation. Since the enrollment variable is a binary measure, it would be appropriate to estimate a probit or logit specification of the model (1). To compare the estimates from the reduced form OLS model, I re-estimate the model (1) above using probit specification with clustering at the *raion* and population point levels and robust standard errors. The results are qualitatively similar to the results received from the OLS specifications (results not reported).

The regression specification (1) allows us to examine determinants of schooling and the impact of war damage variable. However, the results may not capture the long-term impact of exposure to conflict on final school attainment by children as we study the determinants of the enrollment rates at the particular point in time or May 1999 or June 2003, when the surveys were conducted. Some children may have left the school for good, while others returned to school after the conflict was over. The second empirical approach allows us to examine the long-term impact of the conflict on education by studying the completion of mandatory nine grades of schooling by adults.

6.2 Empirical strategy 2: completion of mandatory schooling

Focusing on the completion of mandatory schooling by adults allows me to use a difference in difference estimation strategy and evaluate the impact of war on education of the group of adults who was significantly exposed to the conflict.

To identify an individual's exposure to conflict I use a sample of men and women born between 1966 and 1986 and link an adult's education with the district (*raion*) data on the exposure to the conflict in the region where individual went to school. Exposure to the conflict is examined at the regional and cohort levels, and is determined by the date of birth and the region of residence during schooling.

A difference in differences approach is used to compare educational attainment by adults who should have completed their mandatory schooling before the war to the educational attainments by adults who were of school age during the war. Following Duflo (2001), equation 2 is specified as follows:

$$S_{ijk} = c_1 + \alpha_{1j} + \beta_{1k} + (P_j * T_i)*\Upsilon_2 + \varepsilon_{ijk} \quad (2)$$

where S_{ijk} is a binary variable, =1 if individual completed nine grades of schooling, and zero otherwise.[30] Subscripts on the dependent variable denote individual *i* residing in the region *j* and born in year *k*. T_i is a dummy indicating whether the individual *i* belongs to a young "exposed" cohort in the sub-sample. α_{1j} is a fixed effect for the individual's region of residence during schooling. β_{1k} is a cohort of birth fixed effect. P_j is the intensity of the conflict in the district of residence during schooling (measured by community damage dwelling or reports of conflict activity.)[31] I did not include controls for the household characteristics in my regression specification as characteristics of the household of origin for each individual are not available from the TLSSs. The surveys include data only for the current household of residence. However, the information on current living environment may not accurately reflect the conditions experienced by adults in their childhood since many individuals by the time of the survey had formed their own families.

To estimate parameters in equation (2), I use the sample of adults, born between 1966 and 1986 or ages 17 and above from the 2003 TLSS. In this difference-in-differences framework, I focus on two groups of individuals, the treatment and control groups as defined below.

The treatment group is a subset of individuals from the young or "exposed" group who were of school age during the conflict. This subset consists of individuals who were of school age during the war and who also lived in the regions affected by the conflict. Based on the age criteria alone, this group of individuals should have had an opportunity to complete the mandatory nine grades of schooling by June 2002. Those individuals faced the decision to enroll or continue attending school in the academic years during the period of war, starting with the academic year 1991-1992, and ending with the academic year 1998-1999. Respectively, this group was born between 1978 and 1986. Further, based on the residence

[30] Most of the variation in the number of grades completed (0-9) is between 8 and 9 grades. Therefore, using a binary variable is appropriate.

[31] Only 0.5 percent in the sample reported that they did not live continuously in the current region of residence, so migration should not have an effect on our estimates. I tested this assumption by including a dummy for "migrant" in specification (2). I also estimated equation with interactions of this dummy with the exposed cohort and war damage dummies. Both, the migrant dummy itself and the interaction terms were not significant.

criteria, the individuals should have lived in the conflict affected regions from February 1992 until January 1999.

The control group should not have been affected by the conflict during their schooling years. It includes two subgroups. The first subgroup contains individuals born between 1978 and 1986 who lived in the lesser conflict affected regions. The second subgroup includes individuals who were born between 1966 and 1972. This older cohort, born in 1966 to 1972, had an opportunity to complete their mandatory education of 9 grades (usually completed by age 16) by the start of the conflict in 1991. The cohort born is older cohort was not exposed to the conflict at all during its mandatory schooling years. Also this cohort is relatively young and should have been exposed to a similar grade school system[32] as the cohort born after 1973. Coding of variables and summary statistics for the sample are shown in Appendix Table 4.

7. Results

In this section I discuss the results from the reduced form regressions that examine the impact of conflict exposure on enrollment by school age children and completion of mandatory schooling by adults. For all regressions reported in this paper, I use the linear probability (LP) model with fixed effects specified at *raion*[33] level with robust standard errors to control for heteroscedasticity. The advantage of the LP[34] model is that coefficients are easy to interpret in terms of probability of enrollment by children or completion of mandatory schooling by adults.

7.1 School enrollment

First, I run several LP regressions for the sub-samples of boys and girls ages 7-15 as of May 1999 and ages 8-16 as of June-July 2003. Then, I divide samples of boys and girls further into primary and general

[32] This assumption needs further investigation.
[33] I also run regressions with fixed effects specified at the primary sampling unit level and the results were consistent with fixed effects at the raion level. I specified fixed effects at the raion level to maintain consistency between regressions of child enrollment and completion of mandatory schooling by adults.
[34] As a robustness check, I also completed all analysis using the probit model. The results do not differ qualitatively (not reported).

education age groups, respectively ages 7-11 and 12-15, and re-estimate my initial regression specifications.

Table 4 presents the first set of regressions where I sequentially introduce various controls for household and community characteristics. Observed household characteristics include number of male and female adults (ages 17-65) in a household, parental level of education, household monthly expenditure per capita and land ownership. Regressions results separately for primary and general education age groups are presented in Table 5.

Further, I compare the impact on enrollment of two measures of exposure to the conflict: the household damage dwelling and community damage dwelling (Table 4 and Appendix Table 8). This comparison allows me to examine whether different populations suffered differently. I hypothesize that the impact of the conflict was felt stronger by families who reported damage dwelling as compared to those who "just" lived in the conflict affected communities.

The first set of specifications in columns 1-3 in panels A and B of Table 4 includes child and household characteristics and the household damage dwelling variable. Results across regressions in Table 4 indicate that the household damage dwelling is strongly and negatively associated with the enrollment of girls. Girls are 11 to 12 percent (significant at 1% level) less likely to be enrolled if their household reported damage to the dwelling. The point estimates are relatively stable and significant when I introduce various controls. This result relies on the assumption that there are no omitted time-varying and region specific effects correlated with the damage dwelling variable. Since some community attributes could be correlated with the community damage dwelling variable, using fixed effects allows me to exclude all time-invariant community characteristics.

With respect to socioeconomic status, the levels of education received by child's parents are positively and significantly associated with enrollment. For each additional year of educational attainment by a girl's mother, the probability of enrollment increases by approximately 2 percent. The effect of parental education is almost two times lower for boys. Coefficients on land ownership (owning above 0.1 hectare of land) have opposite signs for boys and girls. It appears that boys' enrollment is negatively

related to land ownership while girls benefit from it. Distance to school has an expected negative sign, but the coefficient on the distance to school is significant only for boys (significant at 10 percent level). For each additional kilometer walked to school, the probability of school enrollment declines by 1.0 percent for boys and by 1.3 percent for girls.

At the community level, residence in urban areas, which are usually better equipped, is negatively related to school enrollment in post-war Tajikistan. Lower attendance may reflect higher risk or fear of being accosted or harassed by the militants congregating in urban areas, in particular for girls. Alternatively, families in rural areas may have better access to financial and other resources for consumption smoothing. Such families may engage in subsistence agriculture, and rely less on outside income in comparison to urban families.

With respect to age groups, Table 5 illustrates that the household damage dwelling variable is negatively associated with enrollment by girls in both primary and general education age groups. The damage dwelling variable is still negative and significant at 5 percent level. It is larger for older girls (0.142 vs. 0.093). This finding is expected because during the Tajik war, parents were reluctant to allow girls to attend school because of the concern that girls might be harassed by soldiers or militants on their way to school (Gomart 2003; Falkingham 2000). Also, older girls, ages 12-15, reached school age during the first and most violent years of the armed conflict. Therefore, they may have experienced a greater disruption to their education than younger children (ages 7-11) who reached school age by 1995-1998, when the conflict intensity decreased.

The coefficient on the natural logarithm of the spline of the per capita household expenditure (spline at median of 12,846 rubles) suggests that older girls from families with income higher than median are 1.2 percent more likely to be enrolled. Distance to school variable has an expected negative sign, and each kilometer walked to school decreases attendance by 2.3 and 1.6 percent for boys and girls, respectively, ages 7-11 (significant at 10% level). Surprisingly, distance to school has a negligible effect on school attendance by older girls. Coefficients on parental education are almost two times larger for older children. Each year of education completed by mother increases probability of enrollment of

younger girls by 1.6 percent as compared to 2.6 percent for girls ages 12-15. Thus, teenage daughters of a woman who completed 10 grades of education are 26 percent more likely to be enrolled than daughters of a woman without schooling. There are no significant changes in the sign or size of other regression coefficients.[35]

Adding community schooling characteristics interacted with age dummies (Table 6) does not have a significant impact on sign and size of other regression coefficients as well. I use two types of community schooling characteristics. Since all regressions control for fixed effects at the raion level, instead of using level schooling variables I use interactions between age dummies and the schooling variables In the first set of regressions, age dummies are interacted with number of students per teacher in the 1997-1998 academic year. In the second set of regressions, age dummies are interacted with number of students per teacher in the academic year when a child was supposed to enter school if this child were to start attending school at age 7. For example, children who were age 9 in 1999 should have started attending a primary school in the academic year 1997-1998. The analysis of the joint F-tests of the interactions of age dummies with schooling characteristics suggests that an increase in number of students per teacher in the academic year 1997-1998 was associated with a decrease in attendance by girls and an increase in attendance by boys, both effects are significant at 10% level. The enrollment of girls were also positively associated with the number of students per teacher in the year when were supposed to start their schooling. However, this effect is only significant for girls ages 7-15 (at 10% level) and 7-11 (at 5% level) and boys, ages 7-11 (at 5% level). This may indicate that the decision to start schooling is strongly associated with the schooling quality for younger children, ages 7-11, while the decision to continue schooling by teenagers age 12 and above is primarily explained by family characteristics.

[35] I have also completed analysis in Tables 4 and 5 using the 2003 data for the sample of children ages 8-16. The results suggest that community damage dwelling and reports of conflict activity were significantly negatively associated with enrollment of girls ages 12-15 in the 2002-2003 academic year. However, the relationship between enrollment and conflict exposure variables becomes insignificant when I add community variables such as distance to school in each primary sampling unit and number of students per school in each raion in the 2002-2003 academic year.

Analyzing the impact of interactions of selected household variables with damage dwelling variable[36] (Table 7.1, Panel B, column 3), we observe that girls, ages 7-15, were 22.8 (significant at 5% level) percent less to be enrolled in school if their mother was a widow and their household dwelling was damaged during the war.

The individual impact of the damage dwelling variable decreased to 8% from 13% after adding to the regression a variable constructed by interacting the widow status of a child's mother and damage dwelling. The interaction between damage dwelling and mother's education is positive (0.022) and significant at 5% level. This suggests that mothers with higher education can make a better use of available resources even under difficult circumstances. Testing for the impact of mother's migration during the war, we find that probability of enrollment of girls ages 12-15 (Table 7.2, Panel B, column 7) decreases by 30.9 percent (significant at 10% level) if a mother did migrate during the war and if the household dwelling was damaged during the same period. This effect may be explained by the disruption of schooling of older children as most of the war-related displacement occurred between 1992 and 1994.

Robustness:

The community damage dwelling variable is significantly and positively associated with enrollment of boys, who are 5.5 percent more likely to be enrolled if they live in the conflict affected region (Appendix Table 8). The coefficients on interactions of school quality (number of students per teacher in 1998-1999 academic year) and age dummies are positive for boys. However, the joint F-test of interaction coefficients cannot reject the hypothesis that the school quality has a significant impact on enrollment (significant at 10 percent level.) I repeat the analysis in Appendix Table 8 for students in the primary and general education age groups (not reported). Again, the results suggest that school quality as measured by the number of students per teacher in the raion of residence (overcrowding) has a significant positive impact on enrollment of boys ages 7-11 (1% level) and negative although not significant impact on enrollment of girls.

[36] In addition to the interactions given in Tables 7.1 and 7.2 I also run regressions with interactions of damage dwelling variable with household expenditure per capita, number of adults in a household, distance to school and residence in the rural area. These interactions did not have a significant relationship to child's school enrollment.

Overall, the regression results reported in Tables 4 and 5 confirm that there is indeed significant negative relationship between individual household damage dwelling and school enrollment of girls. This effect is strong and non-trivial. There is also a negative relationship between the enrollment of girls ages 12-15 and i) widow status of girl's mother interacted with household damage dwelling and ii) interaction of mother's migration in the past 8 years (during the war) and household damage dwelling. These results suggest that households who were individually affected during the conflict were also more likely to pull older girls out of school as a form of income insurance or to ensure their safety.[37] It is also possible that in a situation of uncertainty caused by conflict, families view boys as more likely to be future income providers than girls.

7.2 Completion of mandatory schooling

The second part of my analysis examines whether the conflict had a long-lasting impact on education. In this analysis I use a subset of data on education of adults from the 2003 TLSS. The 2003 TLSS provides a relatively complete set of individuals who were in the school age group during the conflict and who were old enough to finish their general education of nine grades. I estimate equation (2) with *raion* level fixed effects using data on adults age 17 to 37 from the 2003 TLSS and present my results in Tables 8 and 9.

Three observations emerge from the analysis of Table 8. First, coefficients on the cohort term (born in 1976-1986 or of school age during the conflict) are negative and significant for both boys and girls. Clearly, individuals who were of school age during the conflict were less likely to complete 9 grades of schooling. The effect is greater for girls. The probability of completing nine grades of schooling is approximately 4.5 and 6.9 percent lower for boys and girls born in 1976-1986 as compared to the older cohorts. Second, coefficients on the interaction terms in the probit regressions (year of birth 1976-1986 * Reports of Conflict Activity) are negative and significant for girls. Thus, a girl who was of school age during the war and who attended school in a high conflict region was approximately 12% less likely to

[37] There is anecdotal evidence that the bride price in Tajikistan is determined by her skills in cooking and housekeeping. So, it is possible that households that were affected by the conflict are more likely to keep older girls at home and "train" them in skills valued in the marriage market to secure a higher return on their "education".

complete the mandatory nine grades of schooling than a girl who completed her schooling before the conflict started.

In Table 9 the analysis is repeated with the year of birth dummies. The point estimates for the interaction terms (regional exposure to conflict*of school age during the war) remain significant and are rather stable.

The above results can be interpreted as a casual effect of the exposure to war, under an assumption that in the absence of the conflict activity in the exposed regions, the probability of completion of nine grades would not have been systematically different between the regions with high and low exposure to the conflict. This result depends on the assumption that there are no omitted time-varying and region specific effects correlated with the regional conflict measures.

The cross-sectional TLSS 2003 does not contain individual background variables such as parental education, household of origin expenditure and assets. Time-series information on regional characteristics for the pre-independence period is also not available. Otherwise, it would have been informative to study the effects of interaction of the conflict variables with parental education, and stratify the sample by education of mother and/or household's of origin assets and income.

8. Discussion

My study takes a step toward understanding the impact of internal civil wars on school enrollment and completion of mandatory schooling by individuals. Two empirical approaches are employed to investigate this question using two separate cross-sectional datasets from Tajikistan. My first empirical strategy evaluates the impact of the conflict on school enrollment by children of ages 7-15. The second empirical strategy employs a difference in differences approach to determine whether the exposure to conflict affected the probability of completion of mandatory schooling by adults.

The results suggest that there is a strong negative relationship between the exposure to conflict and school enrollment of girls. The point estimates for damage dwelling variable remain stable and significant when controlling for community fixed effects, community variables and important household

and individual characteristics. However, the enrollment rates among boys are not significantly negatively associated with community measures of exposure to the conflict. There are several potential explanations for those findings. First, households facing uncertainty were more inclined to invest in the education of boys. It is possible that the expected return on investment in education of girls was lower in areas affected by conflict. Second, families aimed to provide all children with at least primary education. High enrollment rates among younger children support this argument (World Bank 2005). Third, some children were exposed to the conflict for a longer period of time. For example, girls who were in age group 12-15 in 1999 reached school age (usually age 7) before the peak of fighting in 1992-1993 or soon after the conflict started. Thus, their schooling years significantly overlapped with the most intense period of the war.

The results from difference in differences regressions reveal that while exposure to conflict reduced the probability of completion of mandatory schooling for all individuals in the cohort that was exposed to war during their schooling years, the effect was greater for girls from conflict affected regions. Since we do not observe the same result for boys, unavailability or destruction of schools and other education related infrastructure in the regions affected by conflict may not explain this result entirely. Also, the regression analysis does not allow us to determine with certainty whether this difference in educational attainment by girls from regions affected and not affected by the conflict has always been present, or if it has emerged in response to economic and social shocks associated with conflict because time-series data on schooling availability and quality are not available for the pre-independence years.

Let me repeat the questions I raised earlier. Who is affected by the conflict? Is it a long-term effect? What can be done? The results indicate that the exposure to conflict had a large, negative and lasting effect on the education of girls who were of school age during the conflict and lived in the conflict affected areas. Such girls were less likely to be enrolled and had a lower probability of completing mandatory schooling. The results indicate that while the enrollment rates in Tajikistan started to rise soon after the end of the war, the rates in the conflict affected areas were still below those in areas not affected by the conflict.

Further, the anecdotal evidence indicates that older girls are less likely to attend school if classes are taught by male teachers and if there are few other girls of their age in school.[38] Thus it may be advisable to create girls' only classes at the higher levels of education, thus making school attendance by older girls more acceptable in some conservative communities.

To increase school enrollment and keep children in school until graduation, the Tajik government should strive to restore stability as quickly as possible, thereby addressing the war-induced instability and distress that society may still have as a result of the conflict. Given that this instability was possibly instrumental in restricting access to education, particularly for girls, such an approach may bring girls back to school. It is also advisable to provide specific incentives for girls to attend schools. Such incentives could include improving school facilities[39], quality, safety and providing secure transportation to schools.

[38] As indicated by the UNDP Tajikistan education specialists.
[39] Many schools in Tajikistan do not have separate bathrooms for boys and girls. School bathrooms are often of very poor quality as well.

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APPENDIX

Appendix A

Measures of conflict exposure

From 1992 to 1998, Tajikistan was embroiled in one of the most violent and long armed conflicts on the territory of the former Soviet Union. The most violent bout of war ravaged the southern regions of the country in 1992-1993. Conflict facilitated access to prominence and power to some of local warlords who supported the government forces. This created militia groups who benefited from the war tremendously and were determined to keep the conflict going. Some regions of Tajikistan were affected significantly as the conflict had an ethnic character where regionally based clans supported either government forces or opposition (McLean and Greene 1998, Capisani 2000, Nourzhanov 2005).

In order to identify regions and communities that suffered the most during the war, I use three variables. Those variables allow me to compare the extent of conflict exposure across households and communities.

The first measure is based on the households' reports of damage to their dwellings (henceforth, household damage dwelling or HDD) in the 1999 TLSS. Approximately 6.8 percent of the 2000 households surveyed in 1999 reported that their dwelling suffered damage during the armed conflict. The person interviewed was the head of household or a person who could give information on all household members. This damage dwelling measure is available only for the 1999 TLSS data. The question is worded in the following way:

- "WAS YOUR DWELLING DAMAGED DURING THE RECENT CIVIL UNREST?"
  (Question 12 from section 2 "Dwelling", Household Questionnaire, Tajikistan Survey of Living Standards 1999).

My second conflict variable reflects damage in a community (henceforth, community damage dwelling or CDD). It is a dummy variable that is assigned a value of one for all households in a primary sampling unit if one or more households from this unit reported that their dwelling was damaged during the war. For example, if 16 households were selected in a primary sampling unit and one of them reported damage dwelling during the war, then I assign a value of one to each household in this primary sampling unit in the 1999 TLSS data. The 2003 TLSS data does not have a similar question on the damage household dwelling. So, in order to compare communities from the 1999 TLSS data to the 2003 TLSS, I match *raions* surveyed in 1999 to those in 2003 data. For that, I calculate the CDD measure for each *raion,* which is a collection of several primary sampling units, in the 1999 survey. Then I match *raion* names between the 1999 and 2003 surveys and assign to each raion in the 2003 dataset a corresponding value of CDD from the 1999 data.[40]

The above two measures of the conflict have several drawbacks. First, there is a chance that households migrated during and after the war and their current community of residence is different from the one where their dwelling was damaged. Second, households or communities that suffered the most during the war may not have been selected for the TLSS interviews. Households could have relocated during the war and communities could have been destroyed to the ground, or still occupied by militants. For example, the 1999 TLSS research team was not able to secure permission from the United Tajik Opposition to survey households in some parts of the Gharm area in the RRS region. Third, the community damage dwelling data is available for all primary sampling units in the 1999 TLSS data, as compared to only 92 percent of observations with community damage dwelling data available for 2003. Also the community damage

[40] It was not possible to match individual primary sampling units between 1999 and 2003 datasets, as the 2003 survey data does not contain the names of the primary sampling units selected for the survey.

dwelling data is available only at the *raion* (district) level for the 2003 data and at the *primary sampling unit* level data for the 1999 sample.

Thus, I use a third, also dummy, variable that is based on the reports of conflict activity (henceforth, RCA) and/or atrocities against the civilian population in Tajikistan during the civil war. I used multiple data sources to cross-check the type and degree of damage to villages and towns. The report of conflict activity (RCA) variable is used to identify residents of communities that sustained a significant damage during the war. Often, residents were terrorized and their houses looted by armed forces stationed in or passing through those communities.[41] Two good detailed chronological sources on the events of the Tajik civil war are Brzezinski and Sullivan (1997) and Djalili, Grare and Akiner (1997).

Communities included in the RCA measure

I constructed a geographic mapping of the civil conflict using references to fighting in literature. I collected names raions, villages, towns and cities where fighting or other conflict related event occurred from two central newspapers published in Dushanbe, Tajikistan between 1991 and 1999. I also added to this list names of the communities mentioned as associated with conflict from the reports by human rights organizations, international not-for profit organizations that involved in the monitoring of armed conflicts around the world and publications on the Tajik civil war.[42]

To match villages, towns and cities to raion data I used the detailed map of the deployment of the United Nations Mission of Observers in Tajikistan (UNMOT).[43] Further, I matched the list of community names that were identified to be highly exposed to the conflict to the list of primary sampling units (PSU) that were surveyed for the TLSS 1999 and *raions* in the 2003 TLSSs.

The list of communities is available on request.

[41] The possible disadvantage of using the RCA measure of conflict activity as a primary conflict variable is that it allows us to use only *raion*/district level data in 2003.

[42] I did not include in the RCA measure the attack by Colonel Makhmud Khudoberdiyev in Leninabad region in November of 1998. This attack was an individual conflict event reported for Leninabad (Sugd) region over the 1991-1998 period. The attack lasted for less than a month as compared to the minimum of several months of conflict exposure in the RRS, Dushanbe and Khatlon regions.

[43] Available at http://www.un.org/Depts/DPKO/Missions/unmot/Unmot.htm. (Accessed 03/30/2005.)

Appendix B

Questions and response categories for enrollment variables and number of grades completed

1. ENROLLED - There is a difference in the wording of this question between the 1999 and 2003 surveys.
In the 1999 TLSS (collected in May of 1999) the question is worded as:
- "*Is [NAME] currently studying?"*
In the 2003 TLSS (collected in June-July 2003) the question is worded as
- *"Did you enroll in school last academic year (2002-2003)?"*
In this paper, both questions are coded as 1 for "yes" and as 0 for "no" response. The questions are comparable because both are used as a filter. Questions regarding school quality, school related expenses and frequency of attendance are asked only of those individuals who indicated that they are currently enrolled or studying, while questions regarding school non-attendance are asked only to those who responded that they are not enrolled/attending school.

2. COMPLETION OF 9 GRADES - coded as 1 if a person responds that he or she completed 9 grades and above, and zero otherwise.

3. GRADES COMPLETED - number of school grades completed.

Appendix C

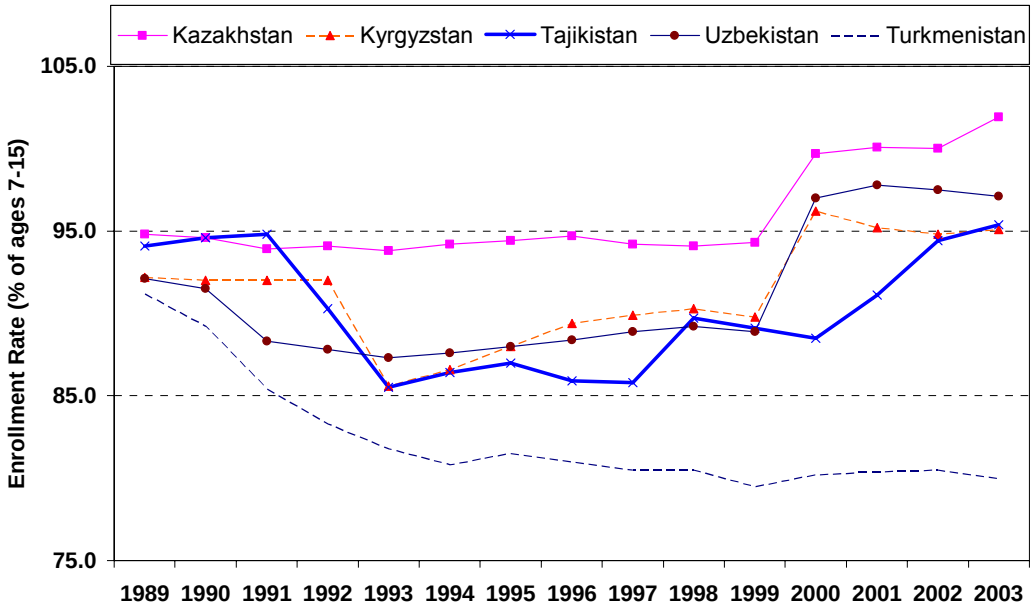
Data and sample construction

Description and Comparison of the 1999 and 2003 Tajik Living Standards Surveys
The 1999 and 2003 surveys include 3 modules: a household questionnaire, a community level questionnaire and a female questionnaire. Both, 1999 and 2003, samples were stratified by oblast (region) and rural and urban areas. While the sample designs were very similar, there are several differences between the two surveys (World Bank 2005)[44]. First, the sample size in the 2003 survey is much larger than the sample surveyed in 1999. The 1999 sample size is 2,000 households (14,142 individuals) as compared to 4,160 households (26,141 individuals) surveyed in 2003. Second, the 2003 survey over sampled households from Dushanbe by 40%, rural GBAO by 300% and by 600% in urban areas of GBAO, while the 1999 TLSS sample was designed to be nationally representative. The 2003 survey is representative at regional and urban/rural levels. Third, the 2003 TLSS sample was based on the 2000 Census shares of each strata, while the 1999 TLSS stratification was based on the "best estimates" from community registers as the survey was conducted prior to the Census. More information on the surveys and the sample design can be obtained from the 1999 TLSS survey documents available online at www.worldbank.org/lsms/ and "Republic of Tajikistan: Poverty Assessment Update" (World Bank 2005).

Strategy 1: enrollment sample construction
To analyze the impact of the conflict on school enrollment, I identify individuals who were in age groups eligible for enrollment in the academic years corresponding to the information in the 1999 and 2003 surveys. For this, I use a rule established by the Tajik law on education. First, I identify the youngest children who were eligible to be enrolled in school during the academic year under consideration.[45] Since by law only children age seven and above are eligible to be enrolled in school, I include in my analytical samples children who reached age 7 by the end of September 1998 (for 1999 data) or 2002 (for 2003 data).[46] Thus, I avoid i) erroneously overstating non-enrollment rates among six- and seven- year olds; and ii) mitigate the selection bias problem as young children who enroll in school before reaching the official enrollment age may have a particularly high ability or very motivated parents. On the upper age bound I limit my regression analysis to 15 year olds in the 1999 data and to 16 year olds in the 2003 dataset.

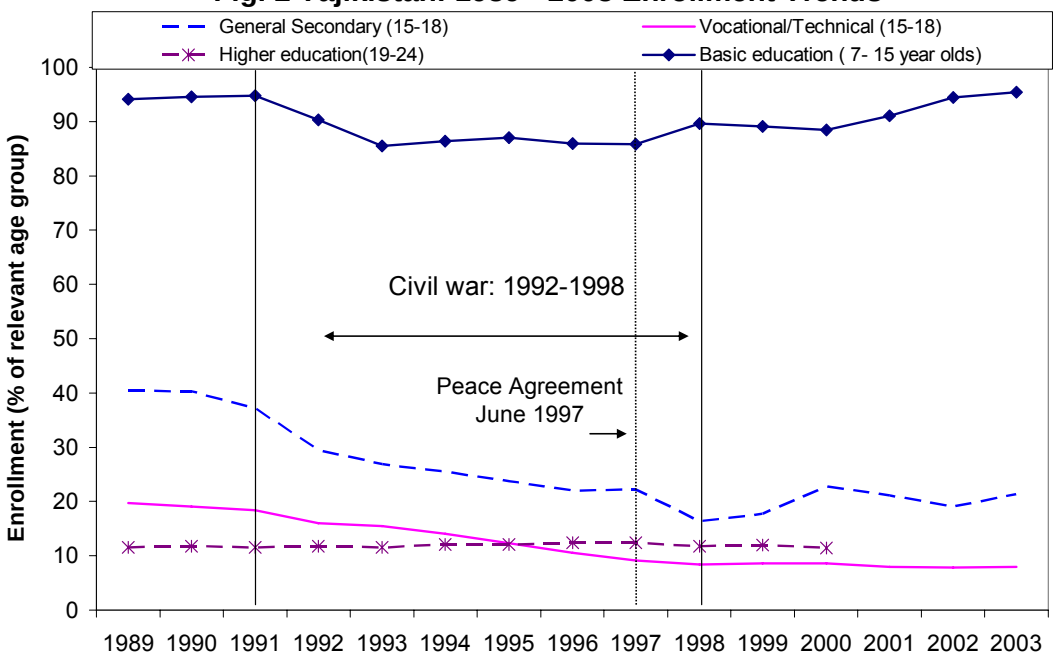
[44] Those differences will not affect the results presented in this paper.
[45] Since the 1999 TLSS was collected in May, all questions regarding student enrollment in grade school refer to the 1998-1999 academic year. In the 2003 survey, all questions refer to the 2002-2003 academic year.
[46] September 1st is the official start of a school year in Tajikistan and other former Soviet Union countries. School year ends around May 25-27.

Fig. 1 Central Asia: Basic Education Enrollment Rates, 1989-2003



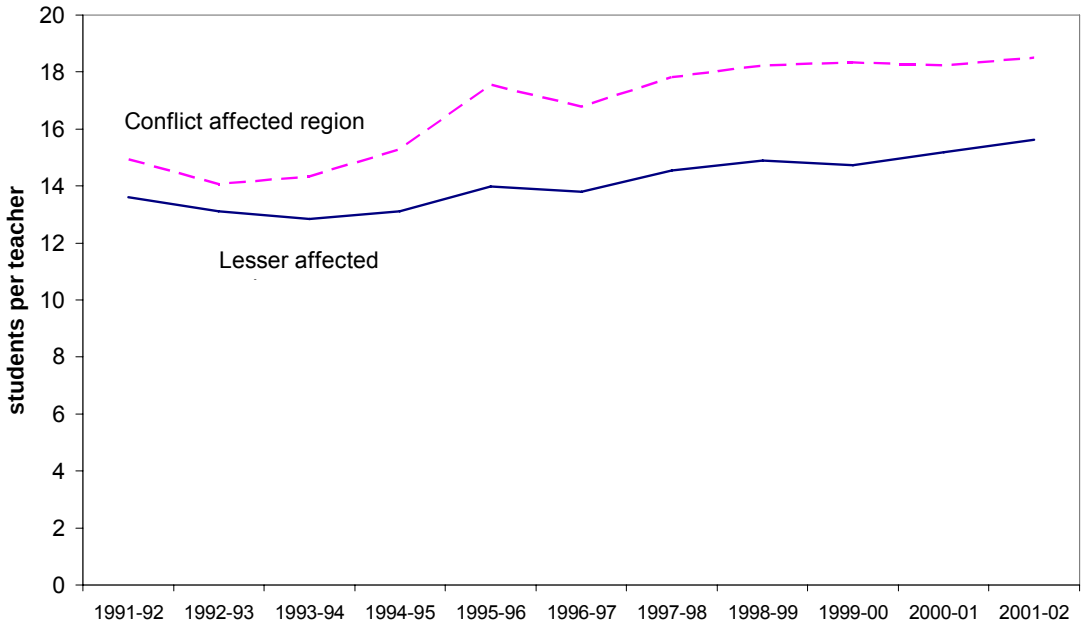
Source: UNICEF 2005.

Fig. 2 Tajikistan: 1989 - 2003 Enrollment Trends



Source: UNICEF 2005.

Fig.3 - Number of Students of General Education Schools per Teacher, by Academic Year (1991-2002) and Reports of Conflict Activity (RCA)



Source: State Statistical Committee of the Republic of Tajikistan (2001, 2004)

Fig. 4 - Mean school grades completed (up to 9) by year of birth (1966-1986) and community damage dwelling, males

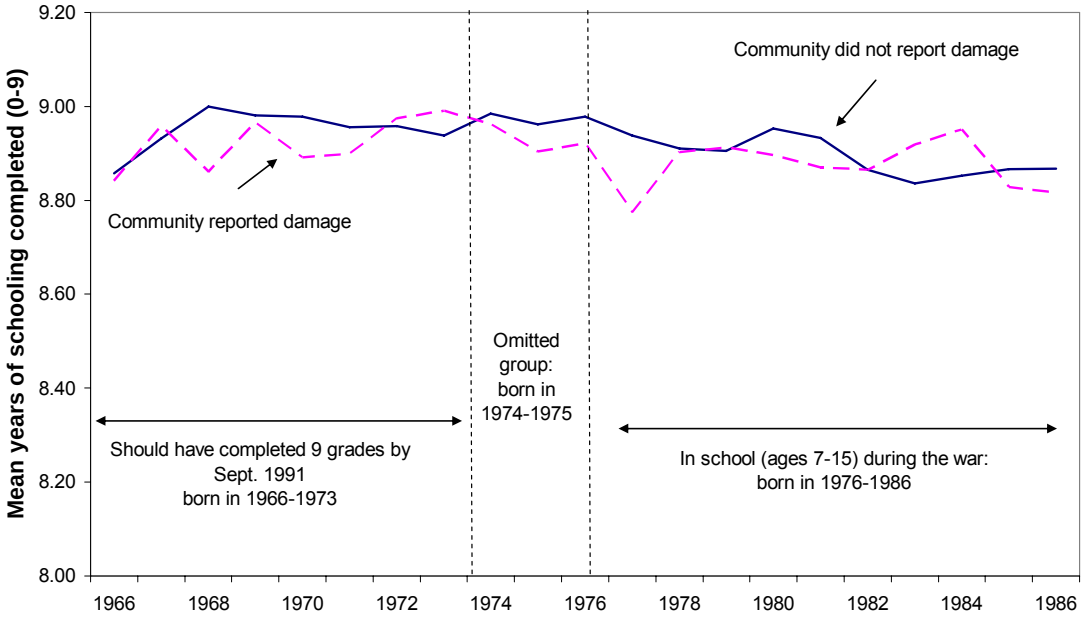
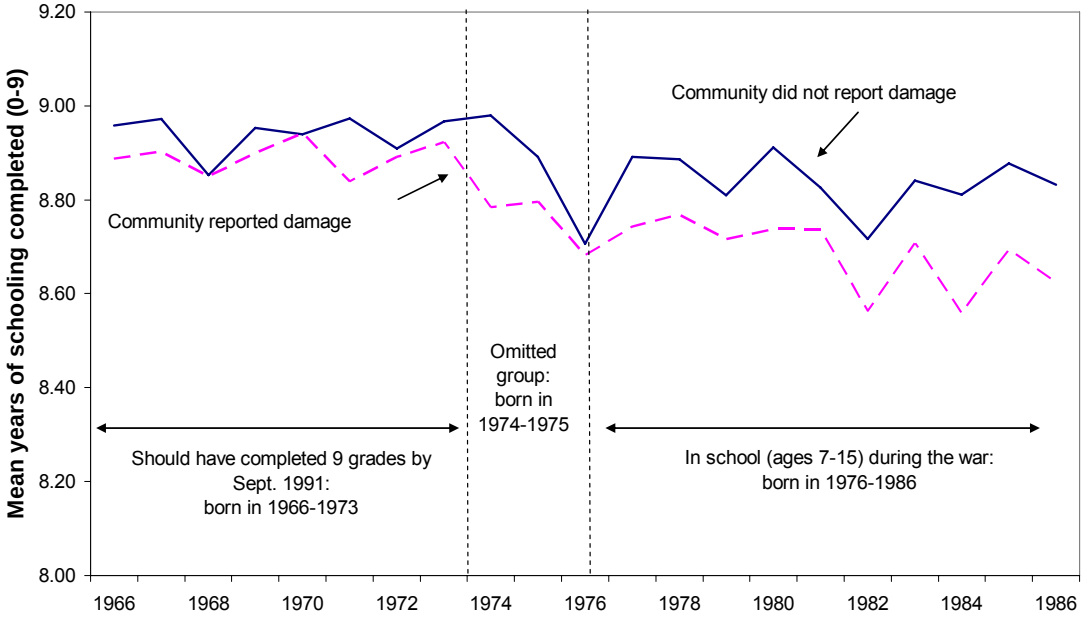


Fig. 5 - Mean school grades completed (up to 9) by year of birth (1966-1986) and community damage dwelling, females



Source: author's calculations, TLSS 2003.

Table 1.1 - Enrollment by gender and damage to household dwelling (HDD), ages 7 - 16, TLSS 1999

Household Damage Dwelling (HDD)		Boys	Girls	Total
Yes: enrollment rate		0.90	0.71	0.80
	s.e.	(0.03)	(0.04)	(0.02)
	% of sub-sample	7	8	8
No: enrollment rate		0.91	0.84	0.87
	s.e.	(0.01)	(0.01)	(0.01)
	% of sub-sample	93	92	92
Enrollment rate by gender		0.91	0.83	0.87
	s.e.	(0.01)	(0.01)	(0.01)
N observations		1,806	1,815	3,621

Source: TLSS 1999. Author's calculations.

Table 1.2 - Enrollment by gender and reports of damage to household dwellings in a community of residence (CDD). TLSS 1999 vs TLSS 2003 data

		TLSS 1999 sample (age 7-16)			TLSS 2003 sample (age 8-16)		
Community damage dwelling (CDD)		Boys	Girls	Total	Boys	Girls	Total
Yes: enrollment rate		0.90	0.79	0.84	0.90	0.85	0.88
	s.e.	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	% of sub-sample	43	43	43	58	57	57
No: enrollment rate		0.92	0.86	0.89	0.92	0.89	0.91
	s.e.	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	% of sub-sample	57	57	57	34	35	35
Missing CDD information:enrollment rate		-	-	-	0.95	0.91	0.93
	s.e.	-	-	-	(0.01)	(0.01)	(0.01)
	% of sub-sample	-	-	-	8	8	8
N observations		1,806	1,815	3,621	3,403	3,263	6,666

Source: TLSS 1999 and 2003. Author's calculations.

Table 2.1 - Enrollment by age, gender and damage to household dwelling (HDD), ages 7 - 16, TLSS 1999

	Girls			Boys		
	Damage dwelling			Damage dwelling		
age	Reported	Not	p-value	Reported	Not	p-value
7	0.80	0.78	0.90	0.80	0.77	0.87
8	0.79	0.90	0.16	1.00	0.93	0.32
9	0.77	0.92	0.06	0.90	0.95	0.48
10	0.94	0.92	0.78	0.89	0.94	0.45
11	0.82	0.91	0.23	1.00	0.93	0.40
12	0.70	0.90	0.01	1.00	0.94	0.33
13	0.62	0.85	0.03	0.93	0.91	0.79
14	0.60	0.85	0.02	0.80	0.91	0.25
15	0.42	0.73	0.01	0.81	0.89	0.33
16	0.73	0.55	0.27	0.84	0.79	0.59
N	149	1666		131	1675	

Table 2.2 - Enrollment by age, gender and community damage dwelling reports in a primary sampling unit of residence (CDD), ages 7 - 16, TLSS 1999

	Girls			Boys		
	CDD			CDD		
age	Reported	Not	p-value	Reported	Not	p-value
7	0.79	0.77	0.83	0.66	0.88	0.04
8	0.86	0.91	0.31	0.94	0.94	0.90
9	0.93	0.90	0.44	0.93	0.96	0.31
10	0.94	0.91	0.50	0.91	0.95	0.28
11	0.89	0.92	0.49	0.93	0.93	1.00
12	0.80	0.93	0.00	0.98	0.93	0.10
13	0.79	0.86	0.16	0.89	0.92	0.45
14	0.74	0.91	0.00	0.88	0.92	0.42
15	0.58	0.77	0.00	0.86	0.90	0.35
16	0.51	0.61	0.20	0.77	0.81	0.52
N	777	1038		770	1036	

Table 2.3 - Enrollment rates by age, gender and community damage dwelling reports in a raion (district) of residence (CDD), ages 8-16. TLSS 2003

	Girls			Boys		
	CDD			CDD		
age	Reported	Not	p-value	Reported	Not	p-value
8	0.93	0.94	0.66	0.93	0.96	0.32
9	0.96	0.96	0.90	0.97	0.96	0.75
10	0.95	0.99	0.09	0.94	0.99	0.03
11	0.94	0.95	0.75	0.96	0.98	0.27
12	0.94	0.98	0.06	0.96	1.00	0.02
13	0.84	0.92	0.03	0.95	0.93	0.51
14	0.86	0.93	0.06	0.95	0.97	0.39
15	0.80	0.91	0.01	0.90	0.93	0.36
16	0.67	0.81	0.01	0.85	0.91	0.15
N	1856	1150		1964	1165	

Table 3.1 - Average grades completed by age, gender and damage to household dwelling (HDD), ages 7 - 16, TLSS 1999

	Girls			Boys		
	Damage dwelling			Damage dwelling		
age	Reported	Not	p-value	Reported	Not	p-value
7	0.60	0.82	0.47	0.60	0.71	0.63
8	1.32	1.27	0.84	1.21	1.35	0.65
9	1.54	2.08	0.07	1.60	2.17	0.06
10	3.24	3.11	0.64	2.72	3.06	0.20
11	3.71	3.84	0.67	3.78	4.00	0.59
12	4.50	4.96	0.13	5.13	5.02	0.73
13	4.31	6.10	0.00	5.21	6.05	0.04
14	5.53	7.13	0.00	6.90	7.08	0.73
15	7.06	8.12	0.00	7.06	8.12	0.00
16	8.64	8.57	0.90	8.95	8.88	0.83
N	149	1666		131	1675	

Table 3.2 - Average grades completed by age, gender and community damage dwelling reports in a primary sampling unit of residence (CDD), ages 7-16, TLSS 1999

	Girls			Boys		
	CDD			CDD		
age	Yes	No	p-value	Yes	No	p-value
7	0.75	0.83	0.63	0.55	0.84	0.02
8	1.24	1.30	0.72	1.31	1.36	0.72
9	2.00	2.08	0.60	2.03	2.23	0.14
10	3.16	3.10	0.68	2.91	3.14	0.13
11	3.71	3.92	0.23	3.83	4.09	0.16
12	4.85	4.96	0.55	4.98	5.07	0.58
13	5.76	6.15	0.08	5.81	6.10	0.17
14	6.76	7.23	0.05	6.76	7.32	0.02
15	7.28	7.86	0.04	7.78	8.21	0.04
16	8.52	8.61	0.75	8.70	9.04	0.06
N	777	1038		770	1036	

Table 3.3 - Average grades completed by age, gender and community damage dwelling dwellings in a raion (district) of residence (CDD), ages 8-16. TLSS 2003

	Girls			Boys		
age	Reported	Not	p-value	Reported	Not	p-value
8	1.58	1.58	0.25	1.59	1.53	0.63
9	2.37	2.42	0.67	2.38	2.60	0.11
10	3.30	3.36	0.56	3.45	3.41	0.86
11	4.15	4.23	0.58	4.31	4.28	0.84
12	5.30	5.26	0.75	5.44	5.28	0.14
13	5.80	6.10	0.10	6.22	6.24	0.87
14	6.75	7.05	0.16	7.11	7.22	0.53
15	7.58	8.02	0.03	7.80	8.21	0.04
16	8.30	8.67	0.14	8.72	9.87	0.06
N	1855	1150		1964	1165	

Table 4 - Household damage dwelling (HDD) and determinants of school enrollment, by sex, ages 7-15. TLSS 1999

Variables and Controls	Panel A: Boys			Panel B: Girls		
	(1)	(2)	(3)	(1)	(2)	(3)
Household damage dwelling (=1)	0.028	0.030	0.028	-0.117***	-0.122***	-0.123***
	[0.028]	[0.029]	[0.029]	[0.040]	[0.041]	[0.041]
HH owns > 0.1 hectare of land (=1)		-0.055**	-0.052*		0.062*	0.063*
		[0.028]	[0.028]		[0.036]	[0.037]
Distance to school			-0.010*			-0.013
			[0.005]			[0.008]
Parent's education (years)						
Mother	0.008**	0.008**	0.009**	0.020***	0.020***	0.020***
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
Father	0.009***	0.009***	0.010***	0.020***	0.020***	0.020***
	[0.003]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]
N adults (ages 17-65)						
Females	0.007	0.008	0.008	0.013	0.013	0.014
	[0.008]	[0.008]	[0.008]	[0.010]	[0.010]	[0.010]
Males	-0.016**	-0.016**	-0.016**	-0.016	-0.016	-0.016
	[0.008]	[0.008]	[0.008]	[0.010]	[0.010]	[0.010]
Ln spline of household expenditure per capita (pce) (at median)						
≤12,842 rubles	0.127***	0.127***	0.127***	0.023	0.021	0.022
	[0.029]	[0.029]	[0.029]	[0.029]	[0.029]	[0.029]
>12, 842 tubles	-0.002	-0.002	-0.002	0.007***	0.007***	0.007***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Rural	0.044	0.069**	0.067**	0.042	0.017	0.016
	[0.031]	[0.033]	[0.033]	[0.030]	[0.033]	[0.033]
Child's age						
8	0.148***	0.144***	0.145***	0.129**	0.128**	0.126**
	[0.055]	[0.055]	[0.055]	[0.061]	[0.061]	[0.060]
9	0.173***	0.169***	0.170***	0.167***	0.167***	0.168***
	[0.053]	[0.054]	[0.054]	[0.060]	[0.060]	[0.060]
10	0.151***	0.146***	0.147***	0.171***	0.172***	0.171***
	[0.053]	[0.054]	[0.053]	[0.060]	[0.060]	[0.060]
11	0.160***	0.156***	0.157***	0.143**	0.143**	0.144**
	[0.055]	[0.055]	[0.055]	[0.060]	[0.060]	[0.060]
12	0.174***	0.171***	0.172***	0.133**	0.133**	0.133**
	[0.054]	[0.054]	[0.054]	[0.061]	[0.060]	[0.060]
13	0.147***	0.144***	0.149***	0.075	0.076	0.076
	[0.055]	[0.055]	[0.055]	[0.062]	[0.062]	[0.062]
14	0.132**	0.128**	0.129**	0.074	0.075	0.074
	[0.056]	[0.056]	[0.056]	[0.062]	[0.062]	[0.062]
15	0.114**	0.112**	0.114**	-0.044	-0.042	-0.041
	[0.055]	[0.055]	[0.055]	[0.065]	[0.065]	[0.065]
Missing information for						
Mother	-0.044	-0.043	-0.044	0.088**	0.084**	0.084**
	[0.034]	[0.034]	[0.034]	[0.039]	[0.039]	[0.039]
Father	-0.003	-0.004	-0.004	-0.108***	-0.104***	-0.104***
	[0.027]	[0.026]	[0.027]	[0.031]	[0.031]	[0.031]
Constant	-0.596**	-0.559**	-0.559**	0.089	0.068	0.064
	[0.268]	[0.267]	[0.266]	[0.270]	[0.270]	[0.270]
Observations	1580	1580	1580	1626	1626	1626
Number of raions (fe)	56	56	56	56	56	56
R-squared	0.08	0.08	0.08	0.11	0.11	0.11

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets. Reference group is "age 7".

Table 5 - Household damage dwelling and determinants of school enrollment, by sex, and age group. Primary education - ages 7-11; General Education - ages 12-15. TLSS 1999

Variables and Controls	Panel A: Boys		Panel B: Girls	
	age 7-11	age 12-15	age 7-11	age 12-15
	(1)	(2)	(1)	(2)
Household damage dwelling (=1)	0.06	0.01	-0.093**	-0.142**
	[0.040]	[0.047]	[0.046]	[0.068]
HH owns > 0.1 hectare of land (=1)	-0.049	-0.05	0.042	0.072
	[0.039]	[0.044]	[0.044]	[0.062]
Distance to school	-0.023**	-0.004	-0.016*	-0.010
	[0.011]	[0.004]	[0.009]	[0.014]
Parent's education (years)				
Mother	0.012**	0.003	0.012**	0.026***
	[0.006]	[0.006]	[0.006]	[0.006]
Father	0.007	0.014***	0.016***	0.022***
	[0.004]	[0.005]	[0.005]	[0.006]
N adults ages 17-65				
Females	0.006	0.010	0.013	0.014
	[0.012]	[0.011]	[0.013]	[0.017]
Males	-0.024*	-0.006	-0.019	-0.017
	[0.014]	[0.009]	[0.015]	[0.015]
Ln spline of household expenditure per capita (pce) (at median)				
≤12,842 rubles	0.106***	0.138***	0.036	0.005
	[0.041]	[0.042]	[0.037]	[0.045]
>12, 842 tubles	0.000	-0.003	0.003	0.012***
	[0.003]	[0.003]	[0.003]	[0.004]
Rural	0.034	0.109**	-0.007	0.037
	[0.051]	[0.043]	[0.041]	[0.052]
Child's age				
7	reference		reference	
8	0.145***		0.114*	
	[0.056]		[0.059]	
9	0.162***		0.174***	
	[0.053]		[0.059]	
10	0.140***		0.170***	
	[0.053]		[0.059]	
11	0.155***		0.149**	
	[0.055]		[0.059]	
12		reference		reference
13		-0.031		-0.063*
		[0.026]		[0.035]
14		-0.048*		-0.066*
		[0.028]		[0.034]
15		-0.059**		-0.185***
		[0.027]		[0.038]
Missing information for				
Mother	-0.057	-0.06	0.002	0.154**
	[0.054]	[0.047]	[0.049]	[0.063]
Father	-0.015	0.023	-0.072*	-0.150***
	[0.040]	[0.039]	[0.038]	[0.052]
Constant	-0.323	-0.556	0.124	0.222
	[0.376]	[0.374]	[0.339]	[0.408]
Observations	834	746	840	786
Number of raions (fe)	56	56	56	56
R-squared	0.09	0.07	0.07	0.14

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets.

Table 6 - Interaction of schooling variables with age dummies, by age and gender. TLSS 1999

	Dependent variable: Child's Enrollment in the 1998-1999 academic year											
	Panel A: Ages 7-15				Panel B: Ages 7-11				Panel C: Age 12-15			
Covariates	Boys		Girls		Boys		Girls		Boys		Girls	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Household damage dwelling	0.024	0.015	-0.129***	-0.115***	0.057	0.052	-0.099**	-0.104**	0.001	-0.003	-0.148**	-0.132*
	[0.029]	[0.031]	[0.041]	[0.043]	[0.039]	[0.042]	[0.047]	[0.049]	[0.049]	[0.050]	[0.070]	[0.074]
Interactions of age dummies with number of students per teacher in the academic year of entry in school												
age 8 X spt98		-0.006		0.014**		-0.014*		-0.002				
		[0.005]		[0.007]		[0.007]		[0.009]				
age 9 X spt97		-0.003		0.019***		-0.009		0.000				
		[0.006]		[0.006]		[0.007]		[0.009]				
age 10 X spt96		0.003		0.013*		-0.003		-0.004				
		[0.006]		[0.007]		[0.007]		[0.010]				
age 11 X spt95		0.007		0.003		0.003		-0.008				
		[0.005]		[0.006]		[0.006]		[0.008]				
age 12 X spt94		0.004		0.013**								
		[0.005]		[0.006]								
age 13 X spt93		-0.005		0.002						-0.009		-0.005
		[0.007]		[0.007]						[0.007]		[0.009]
age 14 X spt92		-0.003		0.006						-0.008		-0.003
		[0.006]		[0.008]						[0.007]		[0.008]
age 15 X spt91		0.001		-0.003						-0.003		-0.01
		[0.005]		[0.008]						[0.007]		[0.008]
Interactions of age dummies with number of students per teacher in the 1997-1998 academic year												
age 8 X spt97	0.008		-0.011		0.007		-0.005					
	[0.015]		[0.016]		[0.015]		[0.016]					
age 9 X spt97	0.009		-0.007		0.012		0.000					
	[0.015]		[0.015]		[0.015]		[0.015]					
age 10 X spt97	0.019		-0.011		0.020		-0.003					
	[0.015]		[0.016]		[0.015]		[0.016]					
age 11 X spt97	0.021		-0.019		0.023		-0.009					
	[0.016]		[0.016]		[0.016]		[0.016]					
age 12 X spt97	0.018		-0.011									
	[0.015]		[0.016]									
age 13 X spt97	0.008		-0.020						-0.013*		-0.008	
	[0.016]		[0.017]						[0.008]		[0.009]	
age 14 X spt97	0.003		-0.027						-0.017**		-0.015	
	[0.016]		[0.017]						[0.008]		[0.009]	
age 15 X spt97	0.018		-0.033*						-0.002		-0.020**	
	[0.016]		[0.017]						[0.007]		[0.010]	
Constant	-0.559**	-0.529*	0.009	0.107	-0.356	-0.483	0.105	0.126	-0.534	-0.504	0.091	0.124
	[0.270]	[0.287]	[0.273]	[0.287]	[0.375]	[0.398]	[0.344]	[0.373]	[0.380]	[0.401]	[0.415]	[0.420]
Observations	1562	1442	1604	1463	824	782	829	776	738	685	775	708
Number of raions (fe)	55	51	55	51	55	52	55	52	55	51	55	51
R-squared	0.09	0.07	0.12	0.12	0.1	0.11	0.07	0.08	0.08	0.06	0.14	0.14
Joint F test: interactions=0												
Prob > F	0.053	0.252	0.094	0.069	0.026	0.042	0.838	0.716	0.089	0.513	0.161	0.658

Note:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets. Reference group is "age 7" for ages "7-15" and "ages 7-11". "Age 12" is the reference group for "ages 12-15". All regressions include age dummies and controals for education of parents, missing information on parents, log spline household expenditire per capita, a dummy for owing more land the median of 0.1 hectare, number of male and female adults ages 17-65 in a household; rural location and distance to school.

Table 7.1 - Interaction of damage dwelling variable with selected covariates. Ages 7-15, by gender. TLSS 1999

Covariates	Dependent Variable: Child's school enrollment in the 1998-1999 academic year													
	Panel A: Boys, ages 7-15							*Panel B: Girls, ages 7-15*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Household damage dwelling (HDD)	0.027	0.028	0.021	-0.179	-0.176	0.054	0.044	-0.122***	-0.120***	-0.080*	-0.328***	-0.235**	-0.158***	-0.097**
	[0.029]	[0.029]	[0.031]	[0.163]	[0.163]	[0.042]	[0.032]	[0.041]	[0.040]	[0.044]	[0.114]	[0.120]	[0.057]	[0.044]
Mother moved from different region/community						0.004							-0.042*	
						[0.017]							[0.022]	
Mother moved from different region/community * HDD						-0.047							0.068	
						[0.060]							[0.078]	
Mother migrated during war (last 8 years)							0.010							0.008
							[0.034]							[0.035]
Mother migrated during war (last 8 years) * HDD							-0.088							-0.146
							[0.127]							[0.131]
Education of mother * HDD				0.022	0.021						0.022**	0.016		
				[0.016]	[0.016]						[0.011]	[0.011]		
Mother is a widow		0.025	0.017		0.016				-0.070	-0.028		-0.027		
		[0.054]	[0.056]		[0.056]				[0.062]	[0.063]		[0.063]		
Mother is a widow * HDD			0.070		0.051					-0.228**		-0.207**		
			[0.056]		[0.059]					[0.103]		[0.104]		
Controls for proportion of community residents working in an industry	yes							yes						
Constant	-0.549*	-0.555**	-0.556**	-0.553**	-0.550**	-0.565**	-0.563**	0.013	0.053	0.017	0.054	0.013	0.127	0.051
	[0.284]	[0.267]	[0.267]	[0.266]	[0.267]	[0.267]	[0.267]	[0.298]	[0.270]	[0.271]	[0.270]	[0.271]	[0.268]	[0.270]
Observations	1580	1580	1580	1580	1580	1580	1580	1626	1626	1626	1626	1626	1626	1626
Number of raions (fe)	56	56	56	56	56	56	56	56	56	56	56	56	56	56
R-squared	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.12	0.11	0.12	0.11	0.12	0.11	0.11
F test: interaction with HH =0														
Prob > F		0.642	0.209	0.162	0.279	0.740	0.768		0.259	0.026	0.048	0.011	0.142	0.536

Note:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets. Reference group is "age 7" for ages "7-15" and "ages 7-11". "Age 12" is the reference group for "ages 12-15". All regressions include age dummies and controals for education of parents, missing information on parents, log spline household expenditire per capita, a dummy for owing more land the median of 0.1 hectare, number of male and female adults ages 17-65 in a household; rural location and distance to school.

Table 7.2 - Interaction of damage dwelling variable with selected covariates. Girls: Ages 7-11 and 12-15. TLSS 1999

Covariates	Dependent Variable: Child's school enrollment in the 1998-1999 academic year													
	Panel A: Girls, ages 7-11							*Panel B: Girls, ages 12-15*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Household damage dwelling (HDD)	-0.094**	-0.090**	-0.056	-0.278	-0.224	-0.139*	-0.118**	-0.141**	-0.139**	-0.100	-0.172	-0.048	-0.183*	-0.078
	[0.047]	[0.046]	[0.050]	[0.194]	[0.178]	[0.072]	[0.052]	[0.069]	[0.068]	[0.075]	[0.151]	[0.177]	[0.094]	[0.077]
Mother moved from different region/community						-0.027							-0.067*	
						[0.027]							[0.038]	
Mother moved from different region/community * HDD						0.096							0.071	
						[0.097]							[0.131]	
Mother migrated during war (last 8 years)							-0.016							0.054
							[0.042]							[0.065]
Mother migrated during war (last 8 years) * HDD							0.181							-0.309*
							[0.137]							[0.186]
Education of mother * HDD				0.019	0.017						0.003	-0.006		
				[0.019]	[0.017]						[0.016]	[0.017]		
Mother is a widow		-0.058	-0.023		-0.020				-0.060	-0.021		-0.021		
		[0.075]	[0.077]		[0.076]				[0.108]	[0.111]		[0.111]		
Mother is a widow * HDD			-0.198		-0.193					-0.221		-0.234		
			[0.137]		[0.134]					[0.156]		[0.170]		
Controls for proportion of community residents working in an industry	yes							yes						
Constant	0.098	0.105	0.065	0.129	0.072	0.177	0.141	0.034	0.219	0.176	0.218	0.180	0.340	0.191
	[0.357]	[0.343]	[0.343]	[0.338]	[0.343]	[0.336]	[0.339]	[0.473]	[0.408]	[0.412]	[0.410]	[0.412]	[0.408]	[0.406]
Observations	840	840	840	840	840	840	840	786	786	786	786	786	786	786
Number of raions (fe)	56	56	56	56	56	56	56	56	56	56	56	56	56	56
R-squared	0.09	0.07	0.08	0.07	0.08	0.07	0.07	0.14	0.14	0.14	0.14	0.14	0.14	0.14
F test: interaction with HH =0														
Prob > F		0.438	0.148	0.301	0.217	0.452	0.416		0.580	0.157	0.827	0.368	0.588	0.097

Note:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets. "Age 7" is the reference group for age group "7-11". "Age 12" is the reference group for "ages 12-15". All regressions include age dummies and controals for education of parents, missing information on parents, log spline household expenditire per capita, a dummy for owing more land the median of 0.1 hectare, number of male and female adults ages 17-65 in a household; rural location and distance to school.

Table 8 - Effect of exposure to the armed conflict on the probability of completing nine grades of schooling: coefficients of the interactions between cohort dummies and individual's exposure to the conflict in the region of schooling, by gender. TLSS 2003

	Men: Panel A		Women: Panel B	
	(1)	(2)	(1)	(2)
CDD *(Born in 1976-1986)	-0.017		-0.034	
	[0.018]		[0.021]	
RMA *(Born in 1976-1986)		0.018		-0.054**
		[0.017]		[0.022]
Born in 1976-1986	-0.040***	-0.052***	-0.075***	-0.069***
	[0.013]	[0.012]	[0.014]	[0.012]
Constant	0.953***	0.954***	0.920***	0.925***
	[0.007]	[0.007]	[0.008]	[0.008]
Observations	3211	3533	3522	3868
Number of raions (fe)	55	63	55	63
R-squared	0.01	0.01	0.02	0.02
F test: interaction term=0				
Prob > F	0.345	0.299	0.114	0.012

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets. Reference group is "born in 1966-1973" Born in 1974-1975 is omitted from the regression sample.

Table 9 - Effect of exposure to the armed conflict on the probability of completing nine grades of schooling. Interactions between individual's cohort of birth and regional exposure to the conflict. TLSS 2003

	Men: Panel A		Women: Panel B	
	(1)	(2)	(1)	(2)
CDD *(Born in 1976-1986)	-0.016		-0.034	
	[0.019]		[0.021]	
RMA *(Born in 1976-1986)		0.017		-0.054**
		[0.017]		[0.022]
Year of birth				
1967	-0.008	-0.013	0.006	0.001
	[0.033]	[0.031]	[0.035]	[0.033]
1968	0.034	0.033	-0.007	-0.003
	[0.031]	[0.027]	[0.037]	[0.035]
1969	0.015	0.015	-0.011	-0.014
	[0.032]	[0.029]	[0.035]	[0.034]
1970	0.014	0.008	-0.003	0.005
	[0.031]	[0.029]	[0.031]	[0.030]
1971	-0.009	-0.018	-0.021	-0.008
	[0.031]	[0.030]	[0.036]	[0.033]
1972	0.03	0.023	0.016	0.024
	[0.027]	[0.026]	[0.032]	[0.031]
1973	0.024	0.019	0.004	0.006
	[0.027]	[0.024]	[0.031]	[0.029]
1976	0.007	-0.011	-0.03	-0.05
	[0.030]	[0.028]	[0.035]	[0.034]
1977	-0.043	-0.059*	-0.083**	-0.069*
	[0.034]	[0.031]	[0.039]	[0.036]
1978	-0.046	-0.061**	-0.075**	-0.062*
	[0.034]	[0.031]	[0.036]	[0.034]
1979	-0.014	-0.028	-0.099***	-0.086**
	[0.034]	[0.031]	[0.038]	[0.036]
1980	-0.019	-0.032	-0.063*	-0.048
	[0.031]	[0.028]	[0.034]	[0.032]
1981	-0.05	-0.067**	-0.075**	-0.065*
	[0.033]	[0.031]	[0.036]	[0.034]
1982	-0.04	-0.054*	-0.136***	-0.123***
	[0.034]	[0.030]	[0.037]	[0.035]
1983	-0.012	-0.03	-0.073**	-0.064**
	[0.030]	[0.027]	[0.033]	[0.031]
1984	-0.055	-0.068**	-0.094***	-0.078**
	[0.033]	[0.030]	[0.034]	[0.032]
1985	-0.02	-0.033	-0.033	-0.023
	[0.029]	[0.026]	[0.032]	[0.030]
1986	-0.022	-0.041	-0.085**	-0.084***
	[0.029]	[0.027]	[0.033]	[0.031]
Constant	0.940***	0.945***	0.922***	0.923***
	[0.023]	[0.021]	[0.024]	[0.023]
Observations	3211	3533	3522	3868
Number of raions (fe)	55	63	55	63
R-squared	0.01	0.01	0.02	0.02
p-value	0.388	0.311	0.116	0.013

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion level. Robust standard errors are in brackets. Reference group is "born in 1966" Born in 1974-1975 is omitted from the regression sample.

Appendix Table 1 - Description of Key Variables in the Enrollment Dataset

Variable	Description
Conflict Exposure Variables	
HDD	Indicator equaling to one if household reported damage dwelling
CDD	Indicator equaling to one if at least one household in the primary sampling unit reported damage dwelling
RCA	Indicator equaling to one if there are records of high conflict activity in the community
Educational Outcomes	
Indicator of School Enrollment	Indicator equaling to one if a respondent was enrolled/ studying in the academic year 1998-1999 (2002-2003)
Total years of education completed (years)	Total number of years of education completed (in years)
Currently enrolled students only	
Missed school for 2 weeks	Indicator equaling to one if a respondent missed school for more than two weeks in the academic year 1998-1999
Missed school for 4 weeks	Indicator equaling to one if a respondent missed school for more than four weeks in the academic year 2002-2003
Hours missed school last week	Hours absent from school per week outside of vacation[1]
Time travelled to school	Time travelled to school (one way, fraction of an hour)
Individual Variables	
Age	Respondent's age (in years)
Year of birth	Year of birth
Female	Indicator equaling to one if female
Household Characteristics	
Parent's education (years)	
Mother	Mother's education (years)
Father	Father's education (years)
Parent's age (years)	
Mother	Mother's age (years)
Father	Father's age (years)
Indicator variables controlling for missing information for	
Mother	Mother's information is not available
Father	Father's information is not available
N adults ages 17-65	
Females	Number of females ages 17-65 in a household
Males	Number of males ages 17-65 in a household
Household size	Household size
Per capita household expenditure (rubles)	Per capita household expenditure (rubles) for 1999 data
Per capita household expenditure (somoni)	Per capita household expenditure (somoni) for 2003 data
HH owns > 0.1 hectare of land (=1)	Household owns more than 0.1 hectares of land
Community Characteristics	
Distance to school	Distance to school (km)
Rural	Resident of rural area
Regions:	
Dushanbe	Resident of Dushanbe
RRS	Resident of RRS
Khatlon	Resident of Khatlon
GBAO	Resident of GBAO
Sugd	Resident of Sugd

Appendix Table 2 - Descriptve Statistics for Key Variables in the Enrollment Dataset. Chidren, Ages 7-15, TLSS 1999 and Ages 8-16, TLSS 2003.

Variable	Children, ages 7-15, TLSS 1999 data					Children, ages 8-16, TLSS 2003 data				
	Panel A					Panel B				
	# of Obs.	Sample Mean	Standard Deviation	Min	Max	# of Obs.	Sample Mean	Standard Deviation	Min	Max
Conflict Exposure Variables										
HDD	3285	0.08	(0.27)	0	1	na				
CDD	3285	0.43	(0.49)	0	1	5562	0.62	(0.48)	0	1
RCA	3285	0.51	(0.50)	0	1	6055	0.51	(0.50)	0	1
Educational Outcomes										
Indicator of School Enrollment	3285	0.89	(0.32)	0	1	6055	0.93	(0.26)	0	1
Total years of education completed (years)	3285	4.37	(2.59)	0	11	6047	5.19	(2.63)	0	11
Currently enrolled students only										
Missed school for 2 weeks	2915	0.37	(0.48)			na				
Hours missed school last week	2910	2.49	6.46	0	42	na				
Time travelled to school	2915	0.26	(0.17)	0	1.5	5472	0.25	(0.18)	0	2.67
Missed school for 4 weeks						5605	0.05	(0.23)		
Individual Variables										
Age	3285	11.32	(2.38)	7	15	6055	12.03	2.53	8	16
Year of birth	3284	87.15	(2.41)	82	93	6055	90.97	2.53	87	95
Female	3285	0.51	(0.50)			6055	0.49	0.50	0	1
Household Characteristics										
Parent's education (years)										
Mother	3285	9.96	(2.00)	0	15	6055	10.12	(1.80)	0	21
Father	3285	11.63	(2.31)	0	18	6055	11.62	(2.11)	0	27
Parent's age (years)										
Mother	3285	37.89	(4.88)	17	54	6055	37.75	(4.68)	17	49
Father	3285	41.88	(6.20)	24	74	6055	41.24	(4.96)	20	73
Indicator variables controlling for missing information for										
Mother	3285	0.15	(0.35)			6055	0.21	(0.41)		
Father	3285	0.25	(0.43)			6055	0.35	(0.48)		
N adults ages 17-65										
Females	3285	1.68	(1.16)	0	7	6055	1.80	(1.09)	0	8
Males	3285	1.76	(1.07)	0	7	6055	1.73	(1.16)	0	7
Household size	3285	8.20	(3.17)	2	27	6055	7.69	(3.17)	1	31
Per capita household expenditure (rubles)	3285	13709	(8841)	903	128398					
Per capita household expenditure (somoni)	na					6055	45.7	(30.11)	1	380
Per capita household expenditure (somoni in rubles)[2]	na					6055	35131	(23131)	988	291644
HH owns > 0.1 hectare of land (mean for 1999) (=1)	3285	0.87	(0.34)			6055	0.996	(0.06)		
HH owns > mean amount of land (=1) (2003 data)	na					6055	0.221	(0.42)		
Community Characteristics										
Distance to school	3285	0.76	(1.00)	0	30	6055	1.05	(6.47)	0	384
Distance to school (0 to 10 km)[3]						6027	0.83	(0.90)	0	10
Rural	3285	0.79	(0.40)			6055	0.72	(0.45)		
Regions:										
Dushanbe	3285	0.06	(0.23)			6055	0.11	(0.32)		
RRS	3285	0.24	(0.43)			6055	0.21	(0.41)		
Khatlon	3285	0.43	(0.49)			6055	0.32	(0.47)		
GBAO	3285	0.04	(0.20)			6055	0.10	(0.30)		
Sugd	3285	0.24	(0.42)			6055	0.25	(0.44)		

Notes:

[1] 5 observations with values higher than 45 hours per week were omitted.

[2] Calculated from IMF (2003).

[3] 8 observations with values higher than 11 years of schooling were omitted.

na - stands for not appicable

Appendix Table 3.1 - Comparison of Schooling Outcomes. Group Sample Means by Exposure to Conflict Variables.

Panel A - Sample of chidren, ages 7-15. TLSS 1999.

Schooling variables	Sample means HDD=0	Sample means HDD=1	Difference		Sample means CDD=0	Sample means CDD=1	Difference	
	(1)	(2)	(3)		(4)	(5)	(6)	
Enrolled in school	0.89	0.80	0.09	***	0.91	0.87	0.04	***
	(0.01)	(0.03)	(0.02)		(0.01)	(0.01)	(0.01)	
Total years of education completed (years)	4.41	3.84	0.57	***	4.52	4.29	0.22	**
	(0.05)	(0.16)	(0.17)		(0.08)	(0.06)	(0.10)	
Currently enrolled students only								
Missed school for 2 weeks	0.36	0.51	-0.15	***	0.35	0.39	-0.04	*
	(0.01)	(0.04)	(0.00)		(0.01)	(0.01)	(0.02)	
Hours missed school last week	2.36	4.30	-1.94	***	2.40	2.61	-0.21	
	(0.01)	(0.04)	(0.00)		(0.24)	(0.18)	(0.30)	

Panel B - Sample of chidren, ages 8-16. TLSS 2003.

Schooling variables	Sample means CDD=0	Sample means CDD=1	Difference		Sample means RCA=0	Sample means RCA=1	Difference	
	(1)	(2)	(3)		(4)	(5)	(6)	
Enrolled in school	0.95	0.91	0.04	***	0.94	0.91	0.03	***
	(0.00)	(0.00)	(0.01)		(0.00)	(0.01)	(0.01)	
Total years of education completed (years)	5.32	5.10	0.22	***	5.30	5.09	0.20	***
	(0.06)	(0.04)	(0.07)		(0.05)	(0.05)	(0.07)	
Currently enrolled students only								
Missed school for 4 weeks	0.06	0.05	0.01		0.05	0.06	-0.02	***
	(0.01)	(0.04)	(0.01)		(0.00)	(0.00)	(0.01)	

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level.
Standard errors are in parenthesis.

Appendix Table 3.2 - Comparison of Group Means by Exposure to Conflict Variables. Sample of children, ages 7-15, TLSS 1999 and ages 8-16, TLSS 2003.

Covariate	*Panel A: Sample Means and Differences for the sample of children, ages 7-15, TLSS 1999*								*Panel B: Sample Means and Differences for the sample of children, ages 8-16, TLSS 2003*							
	Sample means		Difference		Sample means		Difference		Sample means		Difference		Sample means		Difference	
	HDD=0	HDD=1			CDD=0	CDD=1			CDD=0	CDD=1			RCA=0	RCA=1		
	(1)	(2)	(3)		(4)	(5)	(6)		(1)	(2)	(3)		(4)	(5)	(6)	
Age	11.32	11.34	-0.02		11.39	11.28	0.11		12.08	11.99	0.09		12.07	11.99	0.08	
	(0.04)	(0.15)	(0.16)		(0.07)	(0.05)	(0.09)		(0.05)	(0.04)	(0.07)		(0.05)	(0.05)	(0.06)	
Female	0.50	0.55	-0.05		0.51	0.50	0.00		0.49	0.49	0.00		0.49	0.49	0.00	
	(0.01)	(0.03)	(0.03)		(0.01)	(0.01)	(0.02)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	
Parent's education (years)																
Mother	10.02	9.25	0.76	***	10.21	11.56	-1.35	***	10.31	9.99	0.32	***	10.28	9.98	0.30	***
	(0.04)	(0.16)	(0.13)		(0.05)	(0.05)	(0.08)		(0.04)	(0.03)	(0.05)		(0.03)	(0.03)	(0.05)	
Father	11.66	11.27	0.39	***	11.78	11.56	0.22		11.57	11.58	-0.01		11.55	11.68	-0.13	**
	(0.04)	(0.14)	(0.15)		(0.07)	(0.05)	(0.08)		(0.04)	(0.04)	(0.06)		(0.04)	(0.04)	(0.08)	
Parent's age (years)																
Mother	37.88	38.04	-0.16		38.00	37.84	0.16		37.80	37.74	0.07		37.70	37.79	-0.09	
	(0.09)	(0.29)	(0.32)		(0.15)	(0.10)	(0.18)		(0.09)	(0.29)	(0.13)		(0.09)	(0.08)	(0.12)	
Father	41.85	42.22	-0.37		41.78	41.93	-0.15		41.15	41.32	-0.17		41.08	41.39	-0.31	**
	(0.11)	(0.32)	(0.41)		(0.19)	(0.13)	(0.23)		(0.11)	(0.08)	(0.14)		(0.09)	(0.09)	(0.13)	
N adults ages 17-65																
Females	1.76	1.83	-0.08		1.69	1.80	-0.11		1.74	1.82	-0.08	***	1.71	1.89	-0.19	***
	(0.02)	(0.08)	(0.07)		(0.03)	(0.02)	(0.04)		(0.02)	(0.02)	(0.03)		(0.02)	(0.02)	(0.03)	
Males	1.69	1.60	0.09		1.58	1.73	-0.15	***	1.75	1.70	0.04		1.69	1.77	-0.08	**
	(0.02)	(0.07)	(0.08)		(0.03)	(0.03)	(0.00)		(0.02)	(0.02)	(0.03)		(0.02)	(0.02)	(0.03)	
Household size	8.16	8.64	-0.48	**	7.84	8.39	-0.55	***	7.44	7.82	-0.39	***	7.23	8.13	-0.90	***
	(0.06)	(0.21)	(0.21)		(0.08)	(0.07)	(0.12)		(0.06)	(0.06)	(0.09)		(0.05)	(0.06)	(0.08)	
Per capita household expenditure (rubles)	13838.39	12132.34	1706.05	***	12255.81	14459.07	-2203.26	***								
	(161.57)	(501.03)	(581.04)		(197.22)	(208.80)	(323.25)									
Per capita household expenditure (somoni)									40.85	48.44	-7.59	***	42.41	48.89	-6.47	***
									(0.51)	(0.57)	(0.83)		(0.49)	(0.59)	(0.77)	
HH owns > 0.1 hectare of land (=1)	0.86	0.94	-0.07	***	0.90	0.85	0.05	***	0.22	0.21	0.01		0.20	0.25	-0.05	***
	(0.01)	(0.02)	(0.02)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	
Distance to school	0.77	0.72	0.05	***	0.73	0.78	-0.05		1.21	0.89	0.32	***	1.09	1.02	0.07	
	(0.00)	(0.00)	(0.00)		(0.02)	(0.02)	(0.04)		(0.15)	(0.03)	(0.12)		(0.14)	(0.10)	(0.17)	
Distance to school (<11 km)[1]									0.92	0.78	0.13	***	0.87	0.79	0.08	***
Rural	0.79	0.85	-0.06	**	0.82	0.78	0.05		0.80	0.65	0.14	***	0.79	0.65	0.14	***
	(0.01)	(0.02)	(0.03)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)	

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Standard errors are in parenthesis.

[1] 28 observations with values above 10 km are omitted.

Appendix Table 4 - Description of Key Variables in the Completion of Mandatory Schooling Dataset. Adults, years of birth 1966-1973 and 1976-1986. TLSS 2003

Variable	Description	# of Obs.	Sample Mean	Standard Deviation	Min	Max
Conflict Exposure Variables						
CDD	Indicator equaling to one if at least one household in the primary sampling unit reported damage dwelling	6733	0.58	(0.49)		
RCA	Indicator equaling to one if there are records of high conflict activity in the community	7401	0.46	(0.50)		
Educational Outcomes						
Indicator of Mandatory School Completion	Indicator equaling to one if a respondent completed nine grades of education	7401	0.89	(0.31)		
Years of education completed (0-9)	Years of education completed (between 0 and 9)	7401	8.73	(1.17)		
Indicator for school attendance	Indicator equaling to one if a respondent ever attended a school	7401	0.99	(0.11)		
Total years of education completed (years)	Total number of years of education completed (in years)	7401	10.48	(2.28)	0	23
Individual Variables						
Age	Respondent's age (in years)	7401	24.9	(6.20)	17	37
Year of birth	Year of birth	7401	1978.1	(6.20)	1966	1986
Born in 1966-1973	Indicator equaling to one if born in 1966-1973	2194	0.3			
Born in 1976-1986	Indicator equaling to one if born in 1976-1986	5207	0.7			
Moved since January of 1990	Indicator equaling to one if a respondent moved since January 1990	7400	0.00	(0.07)		
Female	Indicator equaling to one if female	7401	0.52	(0.50)		

Appendix Table 5 - Enrollment by gender and reports of conflict activity (RCA) in the community of residence, TLSS 1999 vs TLSS 2003

Enrollment rates by Conflict Activity (RCA)	TLSS 1999 sample (ages 7-16)			TLSS 2003 sample (ages 8-16)		
	Boys	Girls	Total	Boys	Girls	Total
Conflict activity reported	0.90	0.81	0.85	0.94	0.88	0.90
s.e.	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
% of sub-sample	48	50	49	51	51	51
No records	0.92	0.85	0.88	0.95	0.93	0.94
s.e.	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
% of sub-sample	52	50	51	49	49	49
N observations	1,806	1,817	3,623	3,098	2,957	6,055

Source: author's calculations. TLSS 1999 and 2003.

Appendix Table 6 - Enrollment by age, gender and reports of conflict activity in a community of residence (RCA). TLSS 1999 and 2003

age	*Panel A: Children ages 7-15, TLSS 1999*						*Panel B: Children ages 8-16, TLSS 2003*					
	Girls			Boys			Girls			Boys		
	Conflict activity		p-value	Conflict activity		p-value	Conflict activity		p-value	Conflict activity		p-value
	Reported	Not		Reported	Not		Reported	Not		Reported	Not	
7	0.77	0.78	0.94	0.74	0.80	0.60						
8	0.87	0.90	0.49	0.92	0.96	0.35	0.92	0.94	0.55	0.93	0.95	0.58
9	0.95	0.87	0.03	0.93	0.98	0.11	0.95	0.98	0.35	0.95	0.99	0.09
10	0.92	0.92	1.00	0.92	0.95	0.29	0.96	0.98	0.20	0.95	0.98	0.10
11	0.90	0.91	0.67	0.94	0.92	0.64	0.93	0.97	0.17	0.96	0.97	0.65
12	0.88	0.88	0.87	0.95	0.94	0.87	0.97	0.95	0.17	0.97	0.98	0.47
13	0.82	0.84	0.76	0.91	0.91	1.00	0.86	0.91	0.12	0.95	0.94	0.73
14	0.77	0.89	0.02	0.90	0.91	0.86	0.85	0.93	0.01	0.94	0.97	0.23
15	0.58	0.79	0.00	0.89	0.89	1.00	0.79	0.91	0.00	0.90	0.94	0.17
16	0.55	0.58	0.69	0.78	0.82	0.49	0.66	0.81	0.00	0.90	0.87	0.39
N	901	916		933	873		1518	1439		1580	1518	

Appendix Table 7 - Grades completed by age, gender and reports of conflict activity in a community of residence (RCA). TLSS 1999 and 2003

age	*Panel A: Children ages 7-15, TLSS 1999*						*Panel B: Children ages 8-16, TLSS 2003*					
	Girls			Boys			Girls			Boys		
	Conflict activity		p-value	Conflict activity		p-value	Conflict activity		p-value	Conflict activity		p-value
	Reported	Not		Reported	Not		Reported	Not		Reported	Not	
7	0.81	0.78	0.89	0.65	0.77	0.34						
8	1.29	1.26	0.84	1.17	1.53	0.02	1.47	1.57	0.18	1.64	1.54	0.15
9	2.10	1.98	0.39	2.04	2.28	0.07	2.29	2.51	0.16	2.39	2.55	0.19
10	3.03	3.23	0.18	2.79	3.31	0.00	3.34	3.33	0.46	3.46	3.40	0.06
11	3.69	3.95	0.13	3.98	4.00	0.91	4.13	4.21	0.55	4.22	4.37	0.36
12	4.88	4.95	0.70	4.99	5.06	0.64	5.30	5.22	0.22	5.42	5.33	0.32
13	5.87	6.10	0.29	5.68	6.26	0.01	5.82	6.04	0.13	6.31	6.12	0.11
14	6.83	7.18	0.14	7.08	7.07	0.97	6.59	7.19	0.01	7.62	7.19	0.54
15	7.37	7.87	0.07	7.89	8.19	0.15	7.62	7.95	0.02	7.76	8.26	0.00
16	8.55	8.59	0.87	8.65	9.17	0.00	8.30	8.63	0.07	8.90	9.43	0.63
N	901	916		933	873		1518	1439		1580	1518	

Appendix Table 8- Community Damage Dwelling and Interactions of Students per Teacher in the 1998-1999 academic year variable with age dummies, ages 7-15, by gender. TLSS 1999

Explanatory variables and controls	Dependent Variable: Child's Enrollment in the 1998-1999 academic year			
	Boys		Girls	
	(1)	(2)	(3)	(4)
Community Damage Dwelling (=1)	0.055**	0.058**	0.007	0.006
	[0.025]	[0.025]	[0.029]	[0.029]
HH owns > 0.1 hectare of land (=1)	-0.054*	-0.053*	0.051	0.051
	[0.027]	[0.028]	[0.037]	[0.037]
Distance to school (km)	-0.009*	-0.009	-0.012	-0.01
	[0.005]	[0.005]	[0.008]	[0.008]
Interactions of "students per teacher in 1998-1999 academic year" and age dummies				
ages 8-15 * students per teacher		+		+
Controls for				
Parental education	+	+	+	+
Missing information on parents	+	+	+	+
Household income	+	+	+	+
Age dummies	+	+	+	+
N adults	+	+	+	+
Rural location	+	+	+	+
Observations	1580	1562	1626	1604
Number of raions (fe)	56	55	56	55
R-squared	0.08	0.09	0.1	0.11
Joint F test: "students per teacher in 1998-1999 academic year"*age (8-15)=0				
p-values		0.045		0.185

Notes:

Significantly different from zero at 90% (*), 95% (**) and 99% (***) level. Columns represent OLS coefficients. All regressions contain community fixed effects at the raion (district) level. Robust standard errors are in brackets. Reference group is "age 7".