

# The Labor Market, Education and Armed Conflict in Tajikistan

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July 2011



## Abstract

Shortly following its independence in 1991, Tajikistan suffered a violent civil war. This study explores the effect of this conflict on education and labor market outcomes for men and women. The results are based on the data from the 2003 and 2007 Tajik Living Standards Measurement Surveys that were separated from the 1992–1998 Tajik civil war by five and nine years, respectively. The regression analysis that controls for the cohort and regional-level exposure points toward a persistent and lasting gap in the educational attainment by women who were of school age during the war and

lived in the more conflict-affected regions as compared with women the same age who lived in the lesser affected regions and also to the older generation. These empirical results support the anecdotal and observational evidence about the decline in female educational attainment in Tajikistan. Interestingly, this group of young women is more likely to hold a job as compared with the rest of the analytical sample. Conditional on being employed, men and women in the more conflict-affected areas do not receive wages that are significantly different from wages received by men and women in the lesser affected areas.

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This paper is a product of the Gender and Development Unit, Poverty Reduction and Economic Management Network, with generous funding from the Government of Norway. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at [olga.shemyakina@econ.gatech.edu](mailto:olga.shemyakina@econ.gatech.edu).

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## **The Labor Market, Education and Armed Conflict in Tajikistan**

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*JEL codes:* J22 - Time Allocation and Labor Supply, O12 Microeconomics Analyses of Household Behavior

*Keywords:* Labor Markets, Tajikistan, Armed Conflict, Gender, Education

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## 1. Introduction

Several studies that investigate the impact of armed conflict on the long-term development of a country find no significant effects (Davis and Weinstein, 2002; Miguel and Roland, forthcoming). By contrast, most studies that focus on the effects of conflict on the education and health of birth cohorts that were affected by a conflict find strong negative and lasting effects of armed conflicts (Bundervoet, Verwimp, and Akresh, 2009; Akresh, Verwimp and Bundervoet, forthcoming; Blattman and Annan, 2010; Akbulut-Yuksel 2009; Shemyakina, 2011; Valente, 2011). Other studies that examine the effect of conflict on education by gender find no significant negative impacts (Annan et al. 2009; Justino, Leone and Salardi 2010). Further, a small literature finds that veterans have significantly lower earnings than those who did not serve in the military (Angrist 1990; Angrist and Krueger 1994; Angrist 1998; Imbens and van der Klaauw 1995). Kondylis (2010), Menon and van der Meulen Rodgers (2011) and Galdo (2010) examine the impact of exposure to armed conflict on the labor market outcomes of the general population in the context of Bosnia-Herzegovina, Nepal and Peru respectively. Kondylis finds that displaced men and women are less likely to be employed as compared to those who did not move. Menon and van der Meulen Rodgers find that married women in conflict affected areas are more likely to participate in the labor market or become self-employed; which can be explained by “the added worker effect” where women increase their labor supply in response to the conflict related displacement, migration and deaths of men. Galdo finds that exposure to the armed conflict early on decreases one’s earnings later in life in Peru.

This is one of the first studies to explore the effect of armed conflict on the labor market outcomes of men and women who were of school age or just completed school when the conflict started. In particular, this study examines the effect of the 1992-1998 armed conflict in Tajikistan on the educational attainment and labor market experiences of the birth cohort that was of school age during the conflict and who lived in the more conflict affected areas. The study combines the 2003 and 2007 Tajik Living Standards Surveys data to address this question.

The results suggest that the conflict has a lasting impact on the completion of basic and secondary education levels by women who were of school age during the war (henceforth, “war-cohort”) and lived in the more conflict affected areas. Further, in the conflict affected regions, men from the war-cohort were also significantly less likely to complete at least a secondary education.

The conflict also had a lasting impact on employment of young women. Women who were of school age during the war or just completed school when the conflict started and who lived in areas more affected by conflict were more likely to be employed in the last 14 days as compared to women of the same age who lived in the less affected areas. Wages of men and women who lived in the war-affected regions do not appear to be significantly different from wages of comparable individuals in the lesser affected regions. If the conflict had a significant and negative impact on the education of women, wages are likely to be affected through the education channel and not at the joint regional and cohort level exposure to conflict. The results are robust to the use of alternative sub-samples and inclusion of additional covariates.

The present study expands the literature on armed conflict and labor market outcomes by including men and non-married women in the analysis and is most closely related to the study by Menon and van der Meulen Rodgers (2011), supporting their findings of an increased labor supply by ever-married women from the more conflict-affected regions of Nepal. The current analysis also confirms a strong negative and lasting effect of armed conflict on the educational attainment of men and women in Tajikistan.

The next section provides a brief overview of the related literature followed by the background information on the Tajik armed conflict. Section 4 describes the data, the key variables, and the empirical identification strategy. The main results are then discussed and the final section concludes.

## **2. Literature Review and Theoretical Expectations**

### **2.1 Recent literature**

The literature on the gender-level impacts of armed conflicts has been growing in recent years due to improved access to household level data for conflict-affected economies. This section briefly reviews studies that address the effect of armed conflict and large-scale economy-wide disruptions on the education and labor market outcomes of individuals that were either exposed to the conflict as civilians or through participation in the military.

The research on the relationship between armed conflict and education began with an examination of cross-country differences in aggregate enrollment rates in developing and developed countries (Stewart, Huang and Wang 2001). Once individual and household level datasets became available, researchers turned to the examination of the impact of conflict on differences in educational attainment across birth cohorts and regions (Merrouche 2006; Akresh and de Walque 2008; Shemyakina, 2011). These studies observe a decline in the education of affected cohorts but do not reach the same conclusions. Akresh and de Walque find that the education of boys from wealthy households suffers due to the genocide in Rwanda, while Shemyakina's analysis indicates that in Tajikistan the impact is stronger for older girls from affected household as compared to younger girls from similar households. These studies contemplate that the observed decline in education may be related to school closure, migration and displacement, quality and availability of school facilities and shocks to income and security. The studies also note that the observed decline in education is likely to have a negative impact on the future productivity and wages of affected cohorts.

Two recent studies connect large economic and political shocks to labor market experience and education. Meng and Gregory (2007) investigate the impact of the Chinese Cultural Revolution on the earnings of the cohort who lost a substantial number of years of education due to the Revolution. They find that the earnings of the individuals who did not receive university degrees (but would have if they had been raised during a different period) were about 46-76 percent lower. Blattman and Annan (2010)

find that child soldiers in Northern Uganda experience a significant loss of years of labor market experience, which may negatively affect their employment outcomes later on.

The main focus of the literature on armed conflict and labor market outcomes has been on the effects of military service on individual earnings. These studies use conscription rules to control for non-random selection into military service (Angrist 1990; Angrist and Krueger 1994; Angrist 1998; Imbens and van der Klaauw 1995). With respect to outcomes for civilians, Menon and van der Meulen Rodgers (2011) find that married women in conflict affected areas are more likely to participate in the labor market or become self-employed. The authors argue that these results could be explained by “the added worker effect” where women increase their labor supply in response to displacement, migration and deaths of men due to armed conflict. Galdo (2010) finds that exposure to the armed conflict as a child decreases one’s earnings later in life in Peru using difference-in-differences strategies. Menon and van der Meulen Rodgers employ probit and Galdo uses OLS regressions.

## **2.2 Theoretical expectations of the effect of armed conflict on labor market outcomes**

The conflict may affect the labor supply through several channels. First, if the conflict affected areas were significantly damaged during the war, employment opportunities may also have vanished, increasing the unemployment rate. Killingsworth (1983) discusses two effects associated with high unemployment rates during the business cycle. The first is the “discouraged-worker effect” where the overall labor force participation rate falls partially due to an increase in the amount of working age unemployed people who are not looking for jobs. The second effect is called the “added worker effect” (AWE) where married women enter the labor market when husbands become unemployed.

There is an extensive literature analyzing the AWE in various countries (for example, Lundberg 1985; Finegan and Margo 1994; Fernandes and de Felicio 2005). The AWE is relatively small when studies look at the long-term supply of labor, such as the average hours worked in the previous 12 months. A sizable AWE is usually found in analyses of women’s transition in and out of the labor force in response to the husband’s unemployment in the presence of borrowing constraints. Such studies argue

that the labor supply of women adjusts to temporary changes in their husband's employment and thereby reduces income, while household consumption responds to permanent changes in income, e.g. persistent unemployment (Lundberg, 1985; Fernandes and de Felicio, 2005).

We may additionally observe gender-differentiated labor market effects in a conflict-affected country. First, if the education of individuals suffers as a result of the conflict, then the cohort whose education is affected by the conflict is likely to have poorer labor market outcomes as well. This group may have fewer years of labor market experience due to war-related disruptions such as military service, a reduction in economic activity in the affected regions, and an increased focus on subsistence agriculture.

Second, the labor force participation rate may increase among women in conflict-affected areas as women have to enter the labor force to substitute for the labor of men who were killed, migrated or in military service. Such effects on the labor supply of women may persist even after the conflict ends (Acemoglu, Autor and Lyle 2004), as women may learn about job opportunities and the acquired employment experience changes their preferences regarding work. Conflict-affected areas often also have a disproportionate number of female-headed households. In such households, women may be the main breadwinners.

Third, labor force participation rates and/or wages may be higher among males in the more conflict affected communities. Men of working age who survived and live in the conflict affected areas now demand a higher wage premium due to scarcity of male labor. An increase in wages for men would increase their opportunity cost of leisure and thereby increase labor hours supplied in the market. However, the hypothesized increase in wages for males may have a two-fold impact on the labor hours supplied. A substitution effect may be observed where men exchange leisure for labor (an increase in the participation rate, or number of hours worked). Alternatively, there could be an income effect as well, when men do not have to work as long to earn the same income due to higher wages. If the two effects offset each other, there would be no significant difference in the male labor force participation or hours supplied across the greater and lesser conflict-affected regions. Furthermore, an increase in male wages may be a short-term effect only, as higher wages in the conflict affected areas attract migrants from low



wage areas, and the influx would equalize wages across affected and lesser affected areas. However, the premium may remain intact if people are hesitant to migrate into areas that were affected by conflict because they are afraid of the recurrence of violence. Female wages in the conflict-affected areas may decrease due to an increased supply of female labor. However, if women tend to take on jobs previously filled by men, we should expect to see higher female wages in the conflict affected areas, and lower wages for males in these occupations (Acemoglu et. al. 2004).

Therefore, we may observe a higher number of women and men in the workforce in the conflict affected areas. The entry into the workforce is likely to be higher for younger women with no children at the time the conflict started and who thus were available to take on the jobs vacated by men, however for reasons described above the theoretical effect of the conflict on wages is ambiguous.

The analysis in this paper focuses on the supply side of labor market. However, the conflict could have also affected the demand side of the labor market by destroying labor market opportunities.

### **3. The 1992-1998 Armed Conflict in Tajikistan<sup>1</sup>**

Soon after its independence in 1991 Tajikistan was afflicted by a violent civil war that started in early 1992 and was followed by a prolonged armed conflict ending in 1998.<sup>2</sup> The cause of the war was a combination of long-standing grievances and perceived opportunities to gain a larger share of the pie that became available once the country became independent. The war led to significant destruction of state and private property. The capital, Dushanbe, and southern region Khatlon and the Rayons of Republican Subordination (RRS) were severely affected by the war and the accompanying terror, including assassinations, hostage-taking, rapes, murders and robberies.<sup>3</sup> The government was unable to contain the conflict independently and negotiated for outside political and military assistance, provided by Russia and Uzbekistan from 1992 to 1999. Some regions in Tajikistan, such as Khatlon, the Regions of Republican Subordination (RRS) and the country capital Dushanbe, were greatly affected by the conflict, while other

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<sup>1</sup> This section heavily relies on the description of the Tajik armed conflict provided in Shemyakina (2007).

<sup>2</sup> University of Uppsala Conflict Database. (Accessed: April 2010.)

<sup>3</sup> Based on the “Vechernii Dushanbe” and “Narodnaya Gazeta” news material for 1991-1999.

regions, such as Sugd and Gorno-Badakhshon Autonomous Oblast (GBAO) enjoyed relative stability due to their geographic isolation from the conflict affected areas.<sup>4</sup>

The 1992-1998 armed conflict took a significant toll on the country's physical infrastructure and destroyed much of its human and social capital. The first year of fighting brought the most damage. According to official government sources, 80 percent of the country's industry was destroyed by the end of 1992. The regional damage was felt more in the south, where 100 percent of industry was destroyed.<sup>5</sup> Agriculture was also severely affected. For example, in some areas there were reports of stolen livestock from kolkhozes and in other areas, newspapers reported on the absence of people to help with the collection of cotton in the fields.

The human costs of the conflict were substantial for the population of Tajikistan. The largest loss of life attributed to fighting occurred in 1992-1993 with estimates varying between 50,000 and 100,000 people. The conflict exacerbated the economic problems that Tajikistan had experienced immediately after the dissolution of the Former Soviet Union (FSU) in 1991. Over the course of the conflict, various military warlords and the government fought over the control of important agricultural and industrial centers, many of which are located in the south. About 10 percent of the population (600,000 people) was displaced internally and another one percent temporarily crossed the border into neighboring states while 500,000 people emigrated permanently (Falkingham 2000). Many displaced persons returned to their places of residence by 1995. The fighting led to the destruction of infrastructure and disruption of communication and transportation. The mass displacement of people during the first years of the war affected the agricultural and industrial production in the south of Tajikistan leading to shortages of labor in these areas.

The war and a surge in criminal activity disrupted children's schooling, however the impact differed across regions. In the Khatlon region, in the city of Kurgan-Tube and the surrounding areas the

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<sup>4</sup> Leninobod region is connected to the rest of Tajikistan by a narrow road that is easy to block. The pass was blocked during the war. GBAO is located in a mountainous area which is difficult to access. During the war GBAO was associated with opposition forces that were stationed in GBAO, and the region benefited from this alliance by relative peace and stability (Gomart, 2003).

<sup>5</sup> Nezavisimaja Gazeta, December 23, 1992 (as quoted in Fridman, 1994).

official start of the academic year 1992-1993 was delayed by two months. When the schools were opened in November, many concerned parents kept their children at home. In Dushanbe, the government sent students of professional technical institutions for an extended winter holiday from November 13, 1992 to February 1<sup>st</sup>, 1993, motivated by the low attendance of students and teachers due to the unstable situation in the capital.<sup>6</sup> Apart from closures, many schools suffered extensive physical damage. Approximately 20 percent of schools in Tajikistan were destroyed beyond repair during the conflict and many teachers fled war affected areas (IMF 1998).

The perceived and sometimes actual danger to children was high in conflict areas. For example, parents from Gharm raion located in the RRS region worried that older girls would be harassed or abused by soldiers at checkpoints on their way to school. 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).<sup>7</sup> In Dushanbe alone, two separate incidents of attempted hostage taking were registered in schools and colleges in October of 1992.<sup>8</sup>

Conflict may have led to a change in the gender roles in an unexpected fashion. The southern regions of Tajikistan that were more affected by the conflict were also becoming more Islamic with women losing their rights and privileges acquired during the Soviet times.<sup>9</sup> However, in some areas during unstable times, older women were more likely to travel to market as they had better chances to pass through security checkpoints without serious trouble as compared to men who were afraid to leave their villages (Gomart, 2003). In many conflict-affected areas women had to take care of their households by either entering formal employment or engaging in various income generating activities because men

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<sup>6</sup> Narodnaya Gazeta, Nov. 13, 1992 and Jan. 23, 1993.

<sup>7</sup> 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 late December 1992 Narodnii Front militias killed 300 people and took away hundreds of people in Dushanbe (unfortunately the data used in this paper do not allow for identification of various ethnic groups and clans in Tajikistan).

<sup>8</sup> Narodnaya Gazeta, Oct. 15, 1992 and Oct. 16, 1992.

<sup>9</sup> The age at first marriage has decreased in Tajikistan to 14 to 16 years old. Many religious parents believe that girls who reached puberty should not interact with non-related males. Such parents may prevent their daughters from attending secondary school. In some rural areas, women cannot travel long-distances without male chaperone. (Salimova 2008).

were either in hiding to avoid a mandatory draft, migrated or dead (Tadjbakhsh, 1996). Gomart (2003) notes though that families that were more prone to poverty were families with few working age men or female-headed households with many small children.

#### **4. Data, Main Variables and Identification Strategy**

##### **4.1 Data**

This analysis in the study uses data for the 2003 and the 2007 Living Standards Measurement Studies for Tajikistan (henceforth, TLSS). The surveys are nationally representative surveys of households and communities. The sample frame used a two-stage method based on the 2000 Census of Tajikistan. More information about the surveys can be obtained from the World Bank web-site dedicated to Living Standards Measurement Studies (LSMS). The 2007 survey was prepared by the World Bank in collaboration with UNICEF and carried out by the National Committee for Statistics (Goskomstat).

The surveys include data on household consumption of a wide range of food and non-food items; the socio-demographic composition of the household; labor market activities, such as participation in the labor force during the last 14 days and number of hours worked<sup>10</sup>; the health and education of household members; sources of household income such as individual wages, both cash and in-kind; and transfers to the household from various sources. The 2007 data contain extensive information on the migration of individual household members, including those who are currently present or away, as well as remittances and transfers, such as inter-household and government transfers. The survey differentiates between main and secondary jobs held by individuals.

The analysis of education employs data from the 2003 and 2007 surveys to get an understanding of the long-term impact of armed conflict on education of the cohorts who were of school age during the

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<sup>10</sup> While studies quoted earlier in the paper emphasize the differences between the long and short-run employment outcomes and AWE (e.g. Fernandes and de Felicio 2005), such studies were based on the panel data which allows for such comparisons. My study of labor market outcomes in Tajikistan is based on the cross-sectional data for 2007. The cross sectional nature of the data limits the scope of the analysis of employment to short-term outcomes.

war (henceforth, war-cohort). The findings from the analysis of education are then used to motivate the analysis of employment outcomes of the war-cohort.<sup>11</sup>

The analysis of the effect of conflict on employment of the war-cohort is based on a sample of 10,583 prime-age men and women (age 22-49 in 2007). The definition of employment in the last 14 days is based on the questions 1, 2, 3, 5 and 6 from Module 5: Labor Market Section. The definition is consistent with the ILO definition of employment (see Appendix B). The analysis of wages is based on monetary and in-kind wages received by an individual from the occupation in which an individual was employed the longest number of hours. The choice which occupation was the main and which was secondary was made by the 2007 TLSS survey personnel based on the answers to questions 5 and 7 of Module 5: Labor, Part B. Question 5: “For how many hours a week in the last 14 days did you do this work?” Question 7 (to be filled by survey personnel: “Check for first and second highest answers to Q5 (hours worked per week) for this individual.” Based on the answers individual’s wages and in-kind payments from the main and secondary occupations were calculated. The average total income earned in the primary (287 somoni per month) and secondary (7 somoni per month) occupations are drastically different, indicating that secondary jobs provide only a minimal supplementary income.

#### **4.2 Conflict exposure variable**

The geographical exposure to the conflict differed significantly in Tajikistan. The southern and eastern regions, such as Khatlon and the Raions of Republican Subordination (RRS) and the country capital Dushanbe were severely affected by the conflict over a long period of time. These regions suffered from repeated clashes between the government and the opposition, or were subjected to the occupation by various factions participating in the conflict over several years. To evaluate the impact of the conflict on the population, this study employs a conflict variable based on a compilation of some of the events related

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<sup>11</sup> The summary statistics for the samples used in the analysis of education and employment are reported in Appendix Tables 1.1 and 1.2. Appendix Table 2 tests for the equality of means for variables used in the analysis of employment with the conflict affected area defined as inclusive and exclusive of Dushanbe. The t-tests indicate that based on the observable characteristics the sub-samples from the affected and lesser affected areas are significantly different from each other, and therefore it is important to control for these characteristics in the regression analysis.

to the conflict. To identify these events and their geographical locations, I used the main Tajik newspapers for 1991-1999, and books and reports about the conflict. The conflict data are given at the raion (district) level as most of the sources referred to raions or groups of raions when discussing events related to the conflict.

The number of incidents reported in newspapers is incomplete by nature, as newspapers may be more likely to report events that occur in major cities, places close to the place of the publication or localities that are easier to access. For example, the two central newspapers published in Dushanbe that I surveyed, reported 124 events related to conflict between 1992 and 1999 for the capital city Dushanbe, while the raions of Gharm (Rashtr) and Tavildara that were heavily affected by the war and often occupied by opposition forces were mentioned only 18 and 19 times respectively. Kolhozabad that was a place of major battle and changed hands in the course of the war six times was mentioned only five times. Thus, my preferred measure of conflict activity is a dummy variable (“Reports of Conflict Activity”<sup>12</sup>) that is equal to “1” if a raion experienced high exposure to the conflict defined as repeated mentions of the raion with respect to fighting, economic damage, insecurity, presence of military groups and attacks on civilians or military personnel. The raion is assigned a measure of “0” if an exposure was lower. Since the conflict affected most of the country in some way, this measure is likely to lead to underestimation of the true impact of the war on the variables of interest. Several qualitative accounts on Tajikistan (Tadjbakhsh, 1996; Gomart, 2003) mention that conflict first started in areas that were a subject to Soviet forced resettlement policies where population was brought into valleys from the mountains to increase available labor. Since the areas with more resettlement were more heterogeneous, they suffered from a higher level of conflict argues Tadjbakhsh (1996). Many resettled families lived in their new locations for generations but were considered to be outsiders as they continued to marry within their own community.

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<sup>12</sup> I also used several alternative specifications of the conflict variable such a count measure of events and a dummy variable – catch-all definition of conflict affected area by region, where all raions (districts) in Dushanbe, Khatlon and RRS were defined as areas affected by conflict and all raions in Sugd and GBAO were defined as not affected. The count measure of conflict has no significant effect, while the “catch-all” measure has a similar if not stronger impact as the “reports of conflict activity measure” defined above on the dependent variables used in this study. In my future research, I plan to evaluate the effect of particular events, e.g. fighting in a raion, presence of military groups, attacks on civilians, on the dependent variables of interest by using sub-sets of the count event data.

Unfortunately, I do not have access or knowledge of any raion-level data on forced resettlement or any pre-war data on other raion-level covariates that could be used to test for selection into conflict. The surveys also do not provide any information on the pre-war characteristics of households and raions. The migration history that is available from the TLSS surveys is usually limited to the several recent years and thus can not be used to construct an index for forced resettlement in 1930s during the Soviet time. In a related study, Shemyakina (2011) shown that damage to household's dwelling during the Tajik civil war was not statistically significantly associated with the observable pre- and post-war characteristics of the households.

### 4.3 Identification strategy

The study examines the impact of the 1992-1998 conflict in Tajikistan on education, labor market participation, and wages of men and women who were of school age during the war. For this analysis I employ a difference in differences strategy. To identify an individual's exposure to the conflict during their schooling years their education and labor market outcomes are linked to the war damage variables at the district (*raion*) level. Equation (1) is specified as follows:

$$(1) \quad S_{ijk} = \alpha_{1j} + \beta_{1k} + (P_j K_i) \gamma_2 + \delta * C_i + \varepsilon_{ijk}$$

where the dependent variable  $S_{ijk}$  denotes educational attainment or a specific labor market outcome.

Subscripts on the dependent variable denote individual  $i$  residing in the raion  $j$  and born in year  $k$ .  $\alpha_{1j}$  is a fixed effect for the individual's region of residence in 1992.  $\beta_{1k}$  is a cohort of birth fixed effect.  $P_j$  is the intensity of the conflict in the district of residence during schooling/ early adulthood.  $K_i$  is a dummy variable indicating whether the individual  $i$  belongs to the young "exposed" cohort. In the analysis of education,  $C_i$  is a vector of individual-specific characteristics, such as the education of parents, ethnicity and rural residence. In the analysis of labor market outcomes,  $C_i$  includes variables controlling for an individual's educational attainment, marital status, household composition and access to land, rural residence, non-labor income, migration and employment of household members.

I compare the educational attainment of two groups. The first consists of adults whose mandatory schooling was completed before the war started (born 1966-1973). The second group contains individuals who were of school age or relatively young during the war (“exposed” cohort - born 1976-1985). The latter group is then sub-divided into two subgroups where one of the subgroups lived in the areas highly affected by the conflict (the main group of interest) and the second subgroup lived in the lesser affected areas. The inclusion in the exposed cohort is determined by the age of mandatory school attendance, where children in Tajikistan are required to start attending school at age seven and nine years of education is mandatory and free of charge. I assume that a child was exposed to the conflict if he was between ages 7 and 15 during the 1992-1998, and therefore was eligible to be enrolled in a publicly funded school. The study of educational outcomes in 2007 is a follow-up on Shemyakina (2011) who found using the 1999 and 2003 data that in the short- and medium runs, young girls from the households and regions more affected by the conflict, were less likely to be enrolled in school or less likely to complete nine grades (equivalent to basic education level) of schooling by 2003 as a cohort. This analysis explores the long-run effect of conflict on educational outcomes and uses a pooled data from the 2003 and 2007 surveys.

As explained in more detail in section 5.2, the sample for the analysis of labor market outcomes is limited to those who were 22-49 year old in 2007. This age group is the most economically active. In the analysis of labor market outcomes, the “war-affected cohort” is defined as those born between 1970-1985 and thus also includes individuals whose early labor market experiences may have been disrupted by the war. The comparison group is set to those born in 1958-1969.<sup>13</sup>

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<sup>13</sup> Since exposure to conflict could affect all birth cohorts differentially, my initial model specification for women and men included a full set of interactions between 5-year birth cohort dummies and residence in the more affected area. The regression analysis indicated that the estimated coefficients for the younger cohorts of women were close to each other in size (about 11 percentage points increase in employment for those born in 1970-1975 and 1976-1979 (significant at 1%) and about 8.5 percentage points increase for those born in 1980-1985) and were significant for cohorts born in 1970-1975 and 1976-1979. The analysis of employment in this paper uses a catch-all cohort term for those born in 1970-1985 interacted with the conflict exposure variable to evaluate an average effect of the conflict exposure for this cohort. Thus, the use of one cohort term provides us with a more conservative impact of conflict on employment for women.



The analysis is performed separately for men and women as factors driving their educational<sup>14</sup> and employment experiences are very different in Tajikistan. In Equation (1) the main coefficient of interest is  $\gamma_2$ , or the interaction between the dummy variables for being of school age during the conflict and also living in the areas highly affected by conflict. By comparing the estimated coefficients for men and women it is possible to establish the gender specific impact of exposure to the conflict, while a comparison of the coefficients across cohorts shows the cohort-specific impact. For example, the estimated coefficient on the cohort term will demonstrate whether the younger cohort achieved less education than the older cohort or whether the cohort is more likely to be employed.

The correct estimation of Equation 1 is based on the following assumptions. First, in the absence of conflict activity in the exposed regions, all raions had a similar time trend and would have all been on the same time trend after 1992 if the civil war had not occurred (parallel trend assumption). Second, there are no omitted time-varying and region specific effects correlated with the regional conflict measures. The estimation strategy also controls for fixed effects at the raion level which makes it possible to control for a set of raion specific factors that are the same for all individuals. Note that each raion includes one or more primary sampling units (psu), and this allows me to include in the regression analysis variables that vary at the raion level such as rural residence and a proportion of households in the primary sampling unit that have migrants.

## **5. Results**

### **5.1 Education**

#### **Basic trends**

I start my analysis of the effect of conflict on education with an examination of basic trends in the completion of number of grades of schooling by cohorts who were of school-age during the war (aged 2-

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<sup>14</sup> The data support the separate estimation of the regression equations for men and women. I estimated two base specifications of the main regression equations with the dependent variable (DV) being “completed basic education or more” and “completed secondary school or more” where I added interactions between the independent variables and the female dummy. I then used a joint F-test to evaluate whether the estimated coefficients on the interaction terms and the female dummy were equal to zero. The test has rejected the equality of coefficients on the independent variables for men and women (DV: “completed basic education or more” -  $F(8, 67) = 4.07, p = 0.0005$ ; DV: “completed secondary school or more” -  $F(8, 67) = 30.38, p = 0.000$ ). Therefore, all subsequent regressions were estimated separately for men and women.

16 in 1992) and cohorts who should have completed their mandatory school education before the conflict started. The education of the “young” cohort may have been affected by various disruptions associated with the conflict, such as lack of school facilities and teachers, decrease in household income, uncertainty and insecurity associated with the conflict.

Figures 1 and 2 show the average years of schooling completed by women and men by year of birth using the 2003 and 2007 data respectively. The solid lines represent the average educational attainment by individuals who lived in the regions not significantly affected by the war (mostly in Sugd and GBAO) while the dashed line represents the average educational attainment by cohorts of individuals who lived in the more conflict affected regions (mostly in Dushanbe, Khatlon and RRS). Figure 1 indicates that the younger cohort of women in the conflict affected regions (age 2-16 in 1992) obtained about 0.54 fewer years of schooling than women who were of the same age but lived in the lesser affected regions.

Figure 2 presents longer-term evidence of the effect of the conflict on education. The gap in education between the more and less conflict affected areas is greater for the younger cohorts (aged 2-16 in 1992) (0.52 years less) than the gap for women who were aged 18-34 in 1992 (0.21 years less) and who should have completed their schooling before the conflict started. Interesting observation: The gap is the largest for those aged 9-16 in 1992, averaging 0.62 years of schooling, and those aged 3-5 in 1992, averaging 0.71 years of schooling. The gap is the smallest for those aged 6-8 in 1992, at 0.28 years.

## **Regression results**

In the regression analysis that follows, I first use the 2007 TLSS data to estimate the determinants of completion of “basic level of schooling or higher” (that constitutes eight or nine grades depending on when an individual entered schooling) and “secondary school or higher” levels of education. The choice of these dependent variables is based on the system of education in Tajikistan where the basic level of education (nine grades) is compulsory. Students who completed secondary education level qualify for a secondary school diploma. Only students who completed secondary school level can apply for admission

to a university. The use of 2007 TLSS data allows me to include a set of controls for ethnicity and education level of his/her parents. Such control variables are not available in the 2003 data.

Next, to estimate whether students who lost on their education during the war were able to catch up between 2003 and 2007, I use pooled data from the 2003 and 2007 TLSS. To be consistent between the surveys, in the regression analysis of the pooled 2003 and 2007 data, I use the answers to the survey question on the highest level of schooling completed. In both surveys this question appears in Module 3, part B, question 5: “What is the highest diploma you have obtained? (do not include incomplete degrees)” with the following categories: none; primary (grades 1-4); basic (grades 1-8(9)); secondary general (grades 9-10(11)); secondary special; secondary technical; higher education; graduate school/aspirantura.

Table 1 reports results of regressions using the 2007 TLSS data that control for an individual’s ethnicity and rural residence. All regressions include fixed effects at the raion level and are estimated with robust standard errors. The results from these regressions provide a longer-term perspective of the effect of the conflict on schooling as the 2007 data were collected about nine years after the end of the war in 1998. Two dependent variables are being used. The first dependent variable is equal to one if an individual completed at basic level of schooling or more and the second is equal to one if an individual completed secondary school or more (zero otherwise).

Looking at these two levels of completion separately allows us to understand at what level of education the conflict had the most impact in the long-run. The main coefficient of interest is the one estimated on the interaction between the war cohort dummy (born in 1976-1985) and living in an area more affected by the conflict.

The regression results (Table 1, Panel B: Col. 5) suggest that women from the war cohort and who lived in the affected regions are about 2.3 percentage points less likely (significant at 5% level) to complete at least nine years of mandatory schooling as compared to women of the same age who live in the lesser affected areas. The effect decreases to -3.1 percentage points (significant at 1% level) when I

add to the regressions controls for the educational attainments of woman's mother and father.<sup>15</sup> This increase in the absolute value of the estimated coefficient suggests that education of parents is positively correlated with the residence in the more conflict affected area. Further (Col. 7) women from the war-cohort in the more affected regions were about seven percentage points less likely to complete 11 grades of education than comparable women from the lesser affected regions. Again, the estimated coefficient on the interaction term increases in absolute value once I add to the regression a set of controls for the educational attainment of parents.

The coefficient on the stand-alone "war-cohort" dummy is negative and significant in regression for the sample of men with a dependent variable "Completed secondary schooling" (Col. 3) indicating that men who were of school age during the war were about 5.7 percentage points less likely to complete secondary school or above than men who were able to complete their schooling prior to the start of the war. The cohort dummy is also negative and significant in the regressions for the sample of women in Col. 7 and 8, indicating that women who were of school age during the conflict were seven (ethnicity controls only) or 12 (ethnicity and education of parents controls) percentage points less likely to complete secondary school as compared to women who were 18 years and older when the conflict started. No similar statistically significant effect is found on the education of men. In Table 1, Col. 3, the effect of being of school age during the war translates to a 5.7 percentage points (significant at 1% level) lower chances of men completing secondary school or more. However, this effect turns insignificant when controls for parental education are added to the regressions (Table 1, Col. 4).

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<sup>15</sup> I also used a specification where in the regressions with the 2007 data I used a dummy ("school closure" for schools in the raion being closed by the government decree or school holidays extended due to instability or other negative events related to schools, e.g. attempts to take students as hostages. The regression results suggest that school closure had a significant and negative effect on the completion of basic education by women who were of school age during the war (significant at 1% level). The estimated coefficient is very small though suggesting that on an average women from the war-cohort in the raions with "school closures" were 0.24 percentage points less likely to complete basic schooling. The estimated coefficient in the regressions for men with a DV: "completed secondary schooling or more" is borderline significant at 11% level and is also very small, suggesting 0.47 percentage points decrease in chances of completion of this school level. All regressions include a full set of ethnicity and parental education controls and are estimated with fixed effects at the raion level (results not reported). The difference in the estimated coefficients on the interactions between "school closure" and "RCA" measure of conflict as reported above possibly indicate that "school closures" was only a temporary measure limited to several months in 1992-1993, while RCA measures conflict activity and instability that was occurring throughout the conflict period.

Other variables of interest include residence in a rural region, ethnicity dummies and the controls for education of parents. Living in a rural area increases chances that an individual completed at least nine years of schooling, while rural residence is negatively related to a chance of completing 11 grades of schooling. Taken as a group, the estimated coefficients on the dummies for the educational attainment by parents of women are statistically significant at 1% level for the completion of basic or more and secondary or more levels of schooling (Table 1, Col. 6 and 8). For men, the education of their parents has a significant impact on the completion of at least secondary schooling (Table 1, Col. 4). The ethnicity dummies taken as a group have a significant impact on the completion of basic and secondary levels by men (Col. 1 and 3), and secondary level by women (Col. 7). However, the effect of ethnic group is robust to the inclusion of parental education dummies only in the regressions for women (Col. 8).

I also estimated the same regression models for the larger sample, adding to the control group these born in the 1958-1965. The results (not reported) are very similar to those shown in Table 1. The estimated coefficients on the interaction terms are slightly larger in absolute value (significant at the 5% level) in the regressions for women, suggesting that the results reported in Table 1 provide us with a conservative estimate of the effect of this conflict on education.

To test whether the individuals from the affected cohort were able to catch-up on the years of schooling between 2003 and 2007, we should estimate the same base specification for the pooled samples of the 2003 and 2007 data with the same dependent variable and add to the regressions a dummy for a survey year. Note that the 2003 TLSS survey did not include questions on the respondent's ethnicity or education of his/her parents. Therefore the pooled regressions include only variables that are found in both datasets such as "war cohort", war cohort interacted with residence in conflict area and rural residence. All regressions include fixed effects at the raion level (69 groups). Tables 2.1 and 2.2 report results of the OLS regressions based on the pooled samples of 2003 and 2007 TLSS data for men and women, respectively.

The results from regressions on the pooled sample of 2003 and 2007 data for men (Table 2.1, Col. 3) indicate that there was some catch-up in the completion of basic education by individuals born in 1976-

1985 in 2007 as compared to 2003. The estimated coefficient on the interaction between the "war cohort" dummy and the survey dummy is positive and significant (0.016, significant at 1% level). The estimated coefficient on this term in the regressions with a dependent variable "completed secondary school of more" is also positive but not statistically significant. The estimated coefficient on the interaction between the war-cohort and living in the more war-affected area is negative and statistically significant in the regressions for men. The last result indicates that men who were of school age during the conflict and lived in the more affected areas, were about seven percentage points less likely to complete secondary school as compared to men of the same age who lived in the lesser affected regions (Table 2.1, Col. 4 and 5).

The results from the regressions for women on the pooled sample (Table 2.2, Col. 1 and 2) indicate that women from the "war-cohort" in the more affected regions were on average 2 percentage points (significant at 1% level) less likely to complete basic schooling as compared to similar women from the lesser affected regions. The estimated coefficient increases to 2.8 percentage points when I add to the regression terms interacted with the survey dummy (Col. 3). The stand-alone war-cohort term is not significant at a level higher than 10% in any of the regressions that use "completion of basic education" as a dependent variable. The estimated coefficients on the "war-cohort" dummy term are negative and statistically significant in the regressions with the dependent variable "Completed secondary schooling or more", indicating that women who were of school age during the war were about 4.2 percentage points less likely to complete this level of education than women who were age 19-26 when the conflict started (born in 1966-1973) (Table 2.2, col. 4 and 5). However, the estimated coefficient on the interaction between the war-cohort dummy and the survey year is positive and statistically significant suggesting that on overall between 2003 and 2007, across Tajikistan, women from the war-affected cohort were able to catch-up to older women in the completion of the secondary level of education. However, the estimated coefficient on the triple interaction between the "war cohort", "survey 2007" and "residence in the conflict affected area" dummies is positive but not statistically significant. This result suggests that in the more conflict-affected areas women were not able to catch up on the lost years of schooling between 2003

and 2007. Further, results from the two regressions with a dependent variable being "completed secondary school or more" indicate that women from the war cohort who lived in the more affected areas were about 11.2 percentage points less likely to complete secondary schooling than women of the same age from the lesser affected areas (Table 2.2, Col. 4 and 5).

## **5.2 Labor market**

### **Basic statistics**

My further analysis focuses on the labor market participation of individuals aged 22-49 in 2007. This group has a labor market participation rate of 54.5 percent as compared to 45.5 percent for those aged 16-65. On average, 60.5 percent of men and 33.7 percent of women aged 16-60 in 2007 were working in the past 14 days in 2007. Respondents aged 22-49 made up the largest share of workers, with a 73.6 percent participation rate for men and 38.0 percent for women. Work participation declines with age for both men and women.

The 22-49 age group consists of active labor market participants who are significantly less likely to be in school than those aged 16-21 and are less likely to be retired than those aged 50 to 65.<sup>16</sup> Thus, I define as the primary working age group age 22-49 and focus on this group in further analysis of the labor market. The sample statistics are reported in Appendix Table 1.

Table 3a report individual's work status in the last 14 days and Table 3b reports reasons for not working in the past 30 days for those aged 22-49 in 2007.<sup>17</sup> The proportion of working individuals is greater among the older cohorts, both men and women. 46.7% of women and 81.8% men born in 1958-1969 were employed in the last 14 days as compared to 33.5% of women and 69% of men from the younger birth cohorts (born in 1970-1985). Among employed individuals, the distribution of type of employment across categories was similar across cohorts for men and women respectively. The

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<sup>16</sup>Among those aged 16-21, 51.6% report studying as the primary reason for not working. For those aged 22-49 this category is only 5.6%. On the upper age range, 44.0% of individuals aged 50 and above report being "retired" as one of the primary reasons for non-working, while this category amounts only to 1% among the age group 22-49.

<sup>17</sup> There is a discrepancy in the survey where the question on having worked is asked for a period of 14 days and the question on reasons for not being employed is asked for the last 30 days.

distribution of women and men across work categories differed, where 36.6% of employed women report working on a farm owned by self/or a household member and only 20.3% of men. Men were more likely to report working on an own account or for a business owned by a household member, 27.7% for men vs. 12.6% of women. A small number of men and women had occasional jobs or were on a leave from their permanent job.

Among reasons for not working (Table 3b), the proportion of discouraged<sup>18</sup> workers was greater for the younger cohort, both men and women, while older men and women were slightly more likely to report that they are not working because they were “Not in the labor force”.

The proportion of employed individuals is slightly higher in the areas that were more affected by conflict. 74.7% of men and 39.1% of women in the more conflict-affected areas were employed in the last 14 days vs. 72.0% of men and 36.6% of women in the lesser affected areas. Both, younger and older men from the more conflict affected areas were more likely to be employed than men of comparable age in the lesser affected regions. Younger women (born 1970-1985) in the more affected areas were more likely to be employed than women of the same age in the lesser affected areas: 35.7% vs. 30.3%. However, women from the older cohort in the more affected areas were less likely to be employed than their peers in the lesser affected areas: 45.9% vs. 48.2%.

In conflict affected areas about 45.4% of younger males report that they do not work because they are not in the labor force as compared to 37.9% of younger males in less affected areas (Table 4b). Younger males in the conflict affected areas are more likely than older males in the same region to report that they are “discouraged workers”: 27.4% vs. 20.9% respectively. However, the proportion of discouraged workers is larger in the lesser affected regions where 42.1% of not currently employed belong to this category vs. 25.8% of men in the lesser affected areas. For women this difference amounts to 6.76 percentage points.

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<sup>18</sup> The “discouraged worker” category includes two sub-groups, with 6.05% who reported that they “believe I do not have a chance to find a job” and 93.95% who said that there are “no jobs”.



## Regression results

Table 5 presents results from the linear probability regressions where the dependent variable is a binary variable equal to one if an individual reported to have worked in the last 14 days and 0 if not.<sup>19</sup> The analytical sample consists of individuals born in 1958-1985. The main independent variables of interest are the interactions of the residence in the war-affected region (RCA=1) with a birth cohort dummy that is equal to one for those born in 1970-1985. I estimate three models for men and women. The first model includes only birth cohort and ethnicity dummies, non-labor income and residence in a rural area (Col. 1). The second model adds to the regressions a household size and dummies for a household having access to land. The third model includes a full set of controls that include variables that were potentially affected by the conflict such as education level attained and a control for being married, household head being female and household composition. Education and marriage for women are potentially correlated with exposure to conflict (Shemyakina, 2008; Shemyakina, 2011). Households in the areas affected by conflict are more likely to be headed by women and may also have a lower proportion of working age men (Tadjbakhsh, 1996; Gomart, 2003). All regressions include fixed effects at the raion level.

The estimated coefficient on the interaction term between the dummy for “born in 1970-1985” and residence in the war affected region is positive in the regressions for men and women but statistically significant only in the regressions for women. Women born in 1970-1985 and who lived in the more affected areas were about 8.3 percentage points (significant at 5% level) more likely to have had a job in the last 14 days than women of the same age who lived in the lesser affected region (Table 5, col. 4 and 5). The interaction term increases to 9.5 percentage points (significant at 5% level) when all controls are added to the regressions (Table 5, col. 5 and 6). These young women might have entered the labor market during or soon after the conflict to substitute for men and remained in the workforce even when the conflict was over.

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<sup>19</sup> Another possible model choice would be a logit or a probit regression. I estimated the models above using probit specifications and the regression results are very similar to the results reported in this study. When a model includes fixed effects, the linear probability model is preferable to the probit regressions. In the probit regressions the estimates of regression coefficients in the regressions with fixed effects are inconsistent (Greene, 2001).

Other coefficients of interest have expected signs. The probability of employment increases with age. On average, men and women from the younger birth cohorts (1970-1985) are less likely to be employed, which is consistent with a relatively large proportion of this group reporting that they are still in school. An increase in education has a significant and positive effect on employment for men and women, and the estimated coefficient is greater for women. Married men/women are more/less likely to work. Russian women are significantly more likely to have had a job in the last 14 days. Women from larger households are significantly less likely to hold a job.

The household's composition has a strong negative effect on the employment of women, while an increase in the number of dependents (children age 0 to 15 and elderly age 65 and above) increases chances of employment for men. Non-wage income<sup>20</sup> that includes old-age pensions and scholarships has a negative impact on employment of males (significant at 5%), but no significant effect on the employment of women.

Access to land is positively correlated with rural residence. Access to land increases employment of males and females. The coefficients are almost twice as high for women as compared to men in the households that have access to own and rental land of "11-20" and "21 and above" sotkas (Col. 2, 3, 5 and 6).<sup>21</sup>

### **Robustness checks**

In Tables 6-8 I test whether the results on the interaction term that are reported above could be attributed to the added worker effect at a household-level, in particular, whether migration or unemployment of other household members had a significant impact on the labor force participation of men and women.

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<sup>20</sup> Non-wage income is calculated as in Lokshin and Glinskaya (2009: page 493, footnote 9): "Nonwage income is defined as the sum of all government and private transfers, such as, pensions and scholarships, that are exogenous to household migration and labor force participation decisions; it excludes interhousehold transfers, donations, and other private transfers that may respond to the household's migration and labor supply decisions.

<sup>21</sup> Sotka is "a Russian name for the *are*, a metric unit of area equal to 100 square meters. This unit is commonly used to state the areas of small tracts of land. One sotka is approximately 1076.4 square feet, 119.60 square yards, or 0.02471 acre." <http://www.unc.edu/~rowlett/units/dictS.html> (Accessed: October 11, 2010.)

Table 6 is estimated for the full analytical sample for Model 3 that includes a full set of controls. In addition to individual and household-level covariates that appear in the base regressions presented in Table 5, the regression models in Table 6 sequentially include variables that control for migration of other household members. These variables are a dummy for a household having a migrant who is currently abroad, a proportion of households in the primary sampling unit that have migrants, and a dummy variable for a household receiving remittances from household members and other relatives. The coefficients on the interaction terms between the birth cohort and residence in the conflict affected region remain robust to inclusion of migration and remittance dummy variables in the regressions for men and women, with women's labor supply remaining higher for the war-cohorts in the more affected areas. Having a migrant in a household (Table 6, Col. 1 and 4) is associated with reduced employment by 6.7 and 4.2 percentage points for men and women respectively (significant at 5% and 1% level respectively). The receipt of remittances from household members (Table 6, Col 3 and 6) reduces labor force participation of men by 8.2 and women by 4.7 percentage points. These effects should not be interpreted as causal as the reverse causation between migration and employment may be present.<sup>22</sup>

In Table 7, I evaluate the effect of having an unemployed household head on the labor market participation of other household members. The estimated coefficients on the dummy variable for non-employment of the household head are positive for women and negative for men. However, both coefficients are not statistically significant. The positive sign on the estimated coefficient for unemployment of household head in the regressions for women suggests that we also observe here a compensating behavior where women engage in employment if a household head is not employed.

In Table 8, I test the effect of a spouse's labor market status (or his/her absence) on the employment of currently married individuals.<sup>23</sup> I estimate a base Model 1 and add a set of dummy variables that control for a spouse being absent from a household or not employed. In Model 2, I add a

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<sup>22</sup> A detailed examination of the effect of migration of household member on individual labor supply is outside of the scope of this study.

<sup>23</sup> The sample excludes individuals who said that they are currently separated. Including these individuals in the analysis makes the results stronger.

dummy for “spouse does not live currently in the household” (this category does not include spouses who migrated for work). In Model 3, I add to the base specification a dummy for “spouse did not work in the last 14 days”. The estimated coefficient on the spouse’s absence is negative and statistically significant in the regressions for men, and positive but not significant in the regression for women. The positive coefficient in the regressions for women result suggests a weak added worker effect (AWE). The estimated coefficient on the main variable of interest (an interaction between “war cohort” and “living in more affected area”) is positive and statistically significant in the regressions for women, although it is smaller in absolute value than in the regressions for the whole sample.<sup>24</sup>

Thus, the women from the war-cohort who also lived in the war affected regions in 1992 are more likely to be employed in 2007. These results are robust to the use of alternative subsamples and controls for migration of household members, unemployment of the household head, and absence of a spouse from a household. These results indicate that young women, who received fewer years of schooling as a result of the war as documented earlier in this paper surprisingly, are more likely to be employed in 2007. This higher workforce participation by women in the regions that had a deficit of males is consistent with findings by Acemoglu et al. (2004) and Menon and van der Meulen Rodgers (2011).

### *Wages and Conflict*

Next, I turn to the evaluation of the effect of conflict on wages. Table 9 presents results from Tobit regressions with raion-level fixed effects. Fixed effects enter regressions as a full set of raion-level dummy variables. The dependent variable is the natural logarithm of an individual’s monetary and in-kind wages from his or her main occupation (the occupation where the individual reported the highest number

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<sup>24</sup> I also tested the effect of having relatively fewer males as compared to women in the working age group on labor market participation. For this test, I used two raion-level sex ratios of men to women for 1989. The first ratio is for the age group 20-49 and the second one includes ages 15 to 64. The age groups cut-off points are based on the cut-offs for the population numbers published by the State Statistical Committee of Tajikistan and based on the 1989 Census. The linear probability regressions are estimated with robust standard errors that control for heterogeneity at the raion level to control for effects that are common for individuals living in the same community. Unfortunately, I can not use fixed effects at the raion level in this model as the sex-ratio variables are available only at a raion level and is constant for all observations in a particular raion. The estimated coefficient on the sex ratio for the 20-49 year olds has a positive impact on the employment by men and women in 2007, but is significant only in the regressions for the sample of men (results not reported), suggesting that an increase in the number of men relative to women prior to the war had a positive and significant effect on the labor force participation of men.

of hours worked in the last 30 days). The independent variables include the interaction term, the full set of birth cohort dummies, rural residence and education. The estimated coefficient on the interaction term is positive in the regressions for men and negative in the regressions for women, suggesting that younger males in the conflict-affected areas earn more than men of the same age in the lesser affected areas. However, the estimated coefficient is not statistically significant in any of the models. The sign on the estimated coefficient in the regression for males partially supports the hypothesis that males and especially younger males in the conflict affected areas receive a wage-premium that may be attributed to a possible deficit of males in the conflict affected areas due to death or migration. The estimated coefficients are negative and statistically significant for the cohort born in 1976-1980, with younger males receiving lower wages possibly due to their lower work experience. The cohort-wage profile for women appears to be flat, with older or younger women receiving wages that are not different from each other.

As it was expected, individuals in the rural areas earn significantly less than urban dwellers and the effect is larger for women. The estimated coefficient on the proportion of households in a primary sampling unit that have a migrant is negative but not statistically significant.

### **5.3 Potential pathways of the effect of conflict**

The results reported above support the findings from earlier studies that women from younger cohorts in the conflict affected areas of Tajikistan received fewer years of education due to the conflict as compared to women of similar age (Shemyakina, 2011). The results also indicate that there was a partial catch-up in the completion of basic and secondary education levels by men and women from the war-affected cohorts. Further, the present study also finds that women from younger cohorts were also more likely to be employed in the last 14 days as compared to women of the same age who lived in the lesser affected areas. These results are observed nine years after the end of the war.

Why are the young women from the conflict affected areas more likely to be employed than older women in the same region or younger women who live in the lesser affected regions? First, young women may have been drawn into the labor force during the conflict to replace the labor of men who were either

dead, fighting or absent. As the data suggest, these women remained in the labor force as of 2007, consistent with the findings of Finegan and Margo (1994) and Acemoglu et al. (2004). Finegan and Margo documented long-term attachment to the labor force among married women and infrequent transitions in and out of labor force in the post-WWII United States.

Second, some characteristics of the conflict-affected regions may partially explain higher labor force participation by women. For example, Dushanbe – country’s capital was significantly affected by the conflict. Presently Dushanbe is one of the least conservative cities in Tajikistan with respect to female employment and education. However, the regression results remain to be stable when observations from Dushanbe are omitted from the regression analysis.<sup>25</sup> Also the analysis employed here, an OLS regression framework with fixed effects, allows to purge from the estimation all factors that are constant within a raion.

Third, a recent study found that women from younger cohorts in the conflict affected areas of Tajikistan were more likely to get married at a later age than women from less affected areas (Shemyakina 2007). It is possible that the expectation of a delayed or potentially no marriage by younger women in the conflict affected areas induced these women to enter the labor market. These women expected to have to support themselves (and possibly their families) for a longer period of time than women in less affected areas that expected or actually got married earlier. However, marital status alone does not fully explain the increased entry in the labor market. The regression models above control for marital status and married women are less likely to work. The sex ratio does not have a significant impact on female employment or wages.

If women entered the labor market to replace men, did they actually take jobs that were previously filled by men? Unfortunately, it is difficult to evaluate this claim as we do not have access to

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<sup>25</sup> The estimated coefficient on the variable of interest (the interaction term) actually increases to 10.1 percentage points (significant at 5% level) in employment for women in the sample that omits Dushanbe as compared to 8.3 percentage points increase female employment in the models estimated for the full sample. (results not reported).

gender and raion disaggregated employment data on employment in various industries.<sup>26</sup> It is likely that a comparison of pre-and post- war employment rates of males and females by industry would provide us with a distorted view anyway. Possible differences (if found) could not be entirely attributed to shifts in male and female employment due to conflict, but rather to the destruction of various industries during the war or changes in the industrial orientation due to transition processes. Further, if women entered “male” occupations, we should expect female wages to be higher in the more affected regions. However, the results presented above do not indicate that female wages differ across regions or birth cohorts.

The top industries where men and women found employment in 2007 demonstrate that women tend to work in “female” and men in “male” occupations (Appendix Table 3). On average, the top three industries, with about 60% of total male employment in Tajikistan, for men are “Agriculture, hunting, forestry” (29.4%); “Sale, maintenance and repair of motor vehicles and motorcycles, retail sales of automotive fuel” (16.5%) and “Construction” (14.4%). For women, the top three industries of employment are “Agriculture” (53.0%), “Education” (14.4%) and “Sale, maintenance and repair of motor vehicles and motorcycles, retail sales of automotive fuel” (8.1%), with about 76% of female employment. If we look at employment by industry and cohort, then we can see that women and men from the younger cohorts in the more affected areas are more likely to work in agriculture than older cohorts who live in the same areas (31.1% vs. 22.7% for men and 61.4% vs. 48.4% for women). This could be a reflection of the lower labor market skills of such individuals. This phenomenon could also indicate a structural shift in the economy as the proportion of population in Tajikistan employed in industries steadily declined from 13.0% in 1991 to 5.7% in 2005 and proportion employed in agriculture (including personal plots) increased from 44.7% in 1991 to 67.5% in 2005 (State Statistical Committee of Tajikistan, 2006).

Figure 3 shows us the ratio of female to male employment by region of residence to visualize industries with high level of female employment. The industries are ranked by overall share of total employment from highest to lowest. The total employment in the industries

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<sup>26</sup> Most of the employment data published by the State Statistical Committee of Tajikistan for earlier years, e.g. 1991, are available at the country or regional levels. The available raion-level employment time-series that are industry specific (with the industry being broadly defined into a handful of categories) start from 1991-1993 and the series are not disaggregated by gender.

presented on the graph is 95.4% and 94.2% in the lesser and more conflict affected areas. The ratio equal to one would mean that the share of men employed in a particular industry is equal to employment of women in that industry is equal. The pattern in Figure 3 is largely consistent for the more and less conflict affected areas, where women tend to be almost as or more likely to be employed as men only in “agriculture, hunting and forestry”, “education”, “health and social work”, “hotels and restaurants” and “manufacture of textiles” industries. A significantly higher proportion of men than women is employed in other industries that appear on the graph, such as “sale, maintenance and repair of motor vehicles and sale of automotive fuel”, “construction” and etc. Further, males in the conflict affected areas work in a wider range of industries than men in the lesser affected areas which could either represent a broader availability of various industries in the more affected areas.

There is a relatively consistent pattern in the choice of occupations by men and women in the areas more and less affected by the conflict (Appendix Table 4). The top occupation reported by men and women is “market gardeners” with 22.9% and 46.5% of overall male and female employment respectively. The choice of top five occupations for men is relatively consistent across the regions, with men from lesser affected areas more likely to categorize themselves as “unskilled workers” (11.3% vs. 6.9%) and more men in the more affected areas place themselves into “building finishers and related trade workers” category (12.8% vs. 10.7%). Women are more likely to be employed as educators, nurses and midwives than men. Men are more likely to be employed in government and industry, as legislators and senior officials, professionals (e.g. architects, engineers) motor vehicle drivers, construction or unskilled workers than women. Overall, women are more likely to work in “female” occupations and men in “male” occupations. Both, women and men from younger age groups in the conflict affected areas are more likely to work in agricultural professions than older cohorts in the same region. Again, this effect could be related to potentially lower skills and employability of younger individuals.



## 6. Discussion and Conclusion

The present study uses data from the 2003 and 2007 TLSS surveys to evaluate the long-term impacts of the 1992-1998 armed conflict in Tajikistan on education and labor market outcomes for men and women. The analysis of education focuses on those born in 1966-1973 and 1976-1985 (war-cohort). These cohorts should have completed at least secondary school by 2007. The analysis of labor market outcomes focuses on those aged 22-49 in 2007. The results of difference in difference regressions suggest that residence in the region more affected by conflict during an individual's youth had a significant negative impact on the educational attainment of women. These women are also more likely to participate in the labor market, but their wages are not statistically different from the wages earned by the rest of the sample. No significant relationship between residence in the more affected region during one's secondary school and early labor market years and employment or total earnings in 2007 is found for men.

The results are robust to alternative specifications and the inclusion of additional household and community controls that purport to have a significant impact on employment, such as migration and remittances and the employment status of household heads and spouses. Men's labor supply is more responsive to changes in non-labor income than female labor supply.

The higher employment among young women in the more affected areas could be attributed to a "persistence" factor. It is possible that entry into the labor force is rather costly. The main share of the cost is not necessarily in terms of money or investment in acquiring education (as younger women received lower education in the conflict affected areas) but the intrinsic cost of adjusting to employment. Anecdotal evidence suggests that there is relatively little socialization among young women in Tajikistan once they stop attending schooling. Thus, employment may provide an avenue for such socialization, an extra income and a break from the drudgery of housework. An employment during the time of war may also have provided women with a valuable labor market experience and connections that help women to keep their job (although not with a higher income). While the maintaining employment is good for a female autonomy, lower wages traditionally received by women (on average female wages are 2.77 times lower in Tajikistan than average male wages), and lower education indicate that women are not

necessarily getting the best outcomes. While regions that were more affected by the conflict were reported to have become more conservative, the statistical evidence in this study allows us to question the consistency between what families would want their young women to do (presumably stay at home and raise a family) and what they allow them to do, when the need for survival exceeds the desire to adhere to traditional values.<sup>27</sup>

What are the implications of the higher female employment? On the positive side, we should observe greater female empowerment, financial independence and an acquisition of labor market experience. On the negative side, studies suggest that women who work outside their household spend almost the same amount of hours in non-market activities such as preparing food, fetching water, taking care of children and elderly<sup>28</sup> as women who do not hold outside employment. Both, market and non-market employment contribute to exhaustion and lower the amount of time spent with children.

The results have important policy implications. The increased workforce participation among younger women signals that they are likely to positively respond to new employment opportunities if the government were to invest in industrial development policies. The creation of new local jobs would be particularly welcomed by women<sup>29</sup> as they are on average significantly less geographically mobile than men due to societal constraints and childcare duties. Further research that employs a combination of quantitative and qualitative techniques would help to understand better the benefits and disadvantages of an increase in female employment in Tajikistan and the fruitful directions for regional development policies.

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<sup>27</sup> I would like to thank Shahrbanou Tadjbakhsh for this observation.

<sup>28</sup> The 2007 TLSS data suggest that on average women in Tajikistan spent about 60 hours per week on non-market activities.

<sup>29</sup> Olimova and Bosc (2003) mention that until very recently there were very few young unmarried women travelling outside of Tajikistan in search of employment. Living abroad without close supervision by neighbors and relatives damages may damage reputation of such women and make them unmarriageable.

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Fig.1– Average grades completed, (0-11) by gender, born in 1946-1990, by RCA. Data source: TLSS 2003.

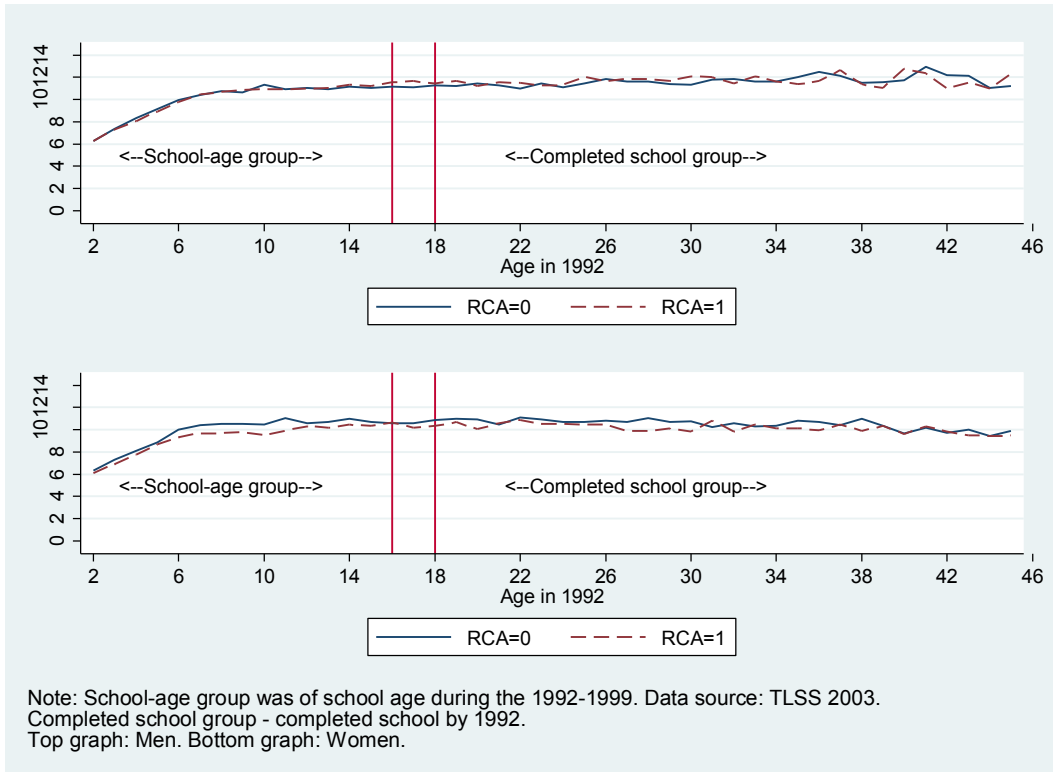


Fig. 2 - Average grades completed (0-11) by RCA for men and women, born in 1946-1998. Data source: TLSS 2007.

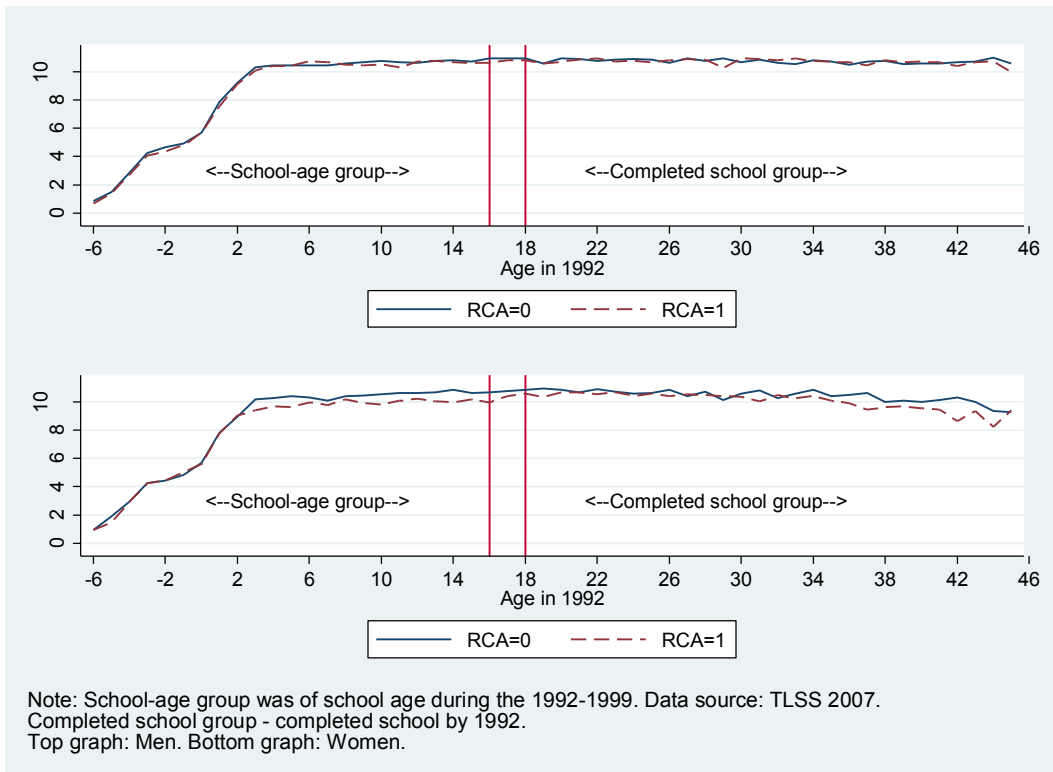
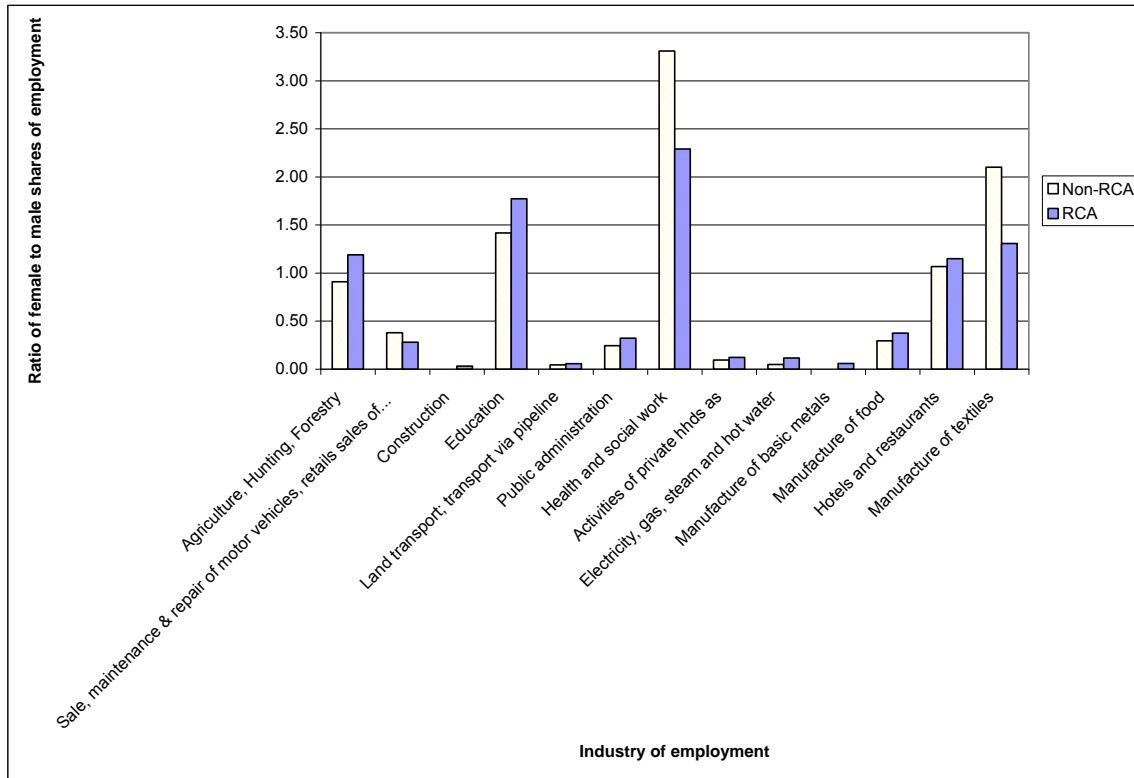


Figure 3- Ratio of women to men in industries by residence in the more (RCA) or less (Non-RCA) conflict affected area.



Source: Author's calculations using TLSS 2007 data. Notes: Age group: 22-29 in 2007. The figure includes only industries with more than 1% of total employment in either "RCA" or "non-RCA" area, where "RCA"=1 for more conflict affected raions and is zero otherwise.

Table 1 – Determinants of completing basic or more and secondary or more education. Cohorts 1966-1973, 1976-1985. Data source: TLSS 2007.

	Panel A: Men				Panel B: Women			
	Completed basic education or more		Completed secondary school or more		Completed basic education or more		Completed secondary school or more	
	1	2	3	4	5	6	7	8
RCA * Born in 1976-1985	-0.002 (0.006)	0.006 (0.023)	-0.016 (0.030)	0.027 (0.070)	-0.023** (0.010)	-0.031*** (0.011)	-0.070** (0.032)	-0.091*** (0.030)
Born in 1976-1986	-0.001 (0.004)	-0.011 (0.019)	-0.057*** (0.021)	-0.058 (0.060)	-0.011 (0.007)	-0.008 (0.008)	-0.091*** (0.020)	-0.119*** (0.019)
Uzbek	0.017** (0.007)	-0.003 (0.008)	0.004 (0.028)	-0.022 (0.032)	0.018** (0.009)	0.01 (0.010)	0.068*** (0.025)	0.074*** (0.024)
Russian	-0.175 (0.215)	-0.345 (0.322)	-0.116 (0.236)	-0.364 (0.323)	-0.013 (0.056)	-0.05 (0.062)	0.133* (0.071)	-0.015 (0.063)
Other ethnic group	-0.199 (0.146)	0.001 (0.013)	-0.278* (0.149)	-0.088 (0.080)	-0.028 (0.085)	-0.053 (0.141)	-0.037 (0.104)	-0.344*** (0.098)
Rural	0.017** (0.008)	0.007 (0.010)	-0.041** (0.016)	-0.024 (0.027)	0.016** (0.008)	0.020** (0.008)	-0.065*** (0.020)	-0.046** (0.021)
Father's education dummies		yes		yes		yes		yes
Mother's education dummies		yes		yes		yes		yes
Constant	0.973*** (0.005)	1.009*** (0.013)	0.956*** (0.015)	0.915*** (0.056)	0.966*** (0.007)	0.947*** (0.015)	0.890*** (0.020)	0.823*** (0.043)
N	3356	895	3356	895	4013	2949	4013	2949
R squared	0.02	0.04	0.01	0.03	0.01	0.02	0.03	0.07
F-test (coefficients=0), p-value								
Father's education dummies		0.339		0.001		0.014		0.000
Mother's education dummies		0.549		0.743		0.039		0.000
Ethnic group dummies	0.036	0.740	0.321	0.474	0.182	0.415	0.012	0.000

Notes: Fixed effects included at the raion level. Cohort 1966-1973 is the reference group. Reference categories: Ethnicity: "Tajik"; mother's (father's) education: "No education".

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01.



Table 2.1 – Men: Determinants of completing basic or more and secondary or more education. Cohorts 1966-1973, 1976-1985. Data source: TLSS 2003 and 2007.

	Panel A: completed basic education or more			Panel B: completed secondary school or more		
	1	2	3	4	5	6
RCA * Born in 1976-1985	-0.007 (0.004)	-0.006 (0.004)	-0.014** (0.006)	-0.072*** (0.016)	-0.072*** (0.016)	-0.086*** (0.018)
Born in 1976-1985	0.009 (0.006)	0.009 (0.006)	0.009 (0.006)	-0.015 (0.013)	-0.016 (0.013)	-0.016 (0.013)
Rural	-0.005 (0.010)	-0.005 (0.010)	-0.005 (0.018)	-0.023 (0.021)	-0.023 (0.021)	-0.032 (0.030)
Survey=1 if TLSS 2007, 0 if TLSS==2003		0.008 (0.007)	-0.002 (0.005)		-0.007 (0.016)	-0.030** (0.013)
Survey* Born in 1976-1985			0.016*** (0.005)			0.029 (0.020)
Survey* Born in 1976-1985 * RCA area			-0.003 (0.017)			0.012 (0.041)
Constant	0.981*** (0.006)	0.977*** (0.005)	0.982*** (0.006)	0.947*** (0.010)	0.950*** (0.012)	0.963*** (0.011)
N	6660	6660	6660	6660	6660	6660
R squared	0.00	0.00	0.00	0.02	0.02	0.02
F-test for significance of survey terms						
p-value			0.009	0.066		

Notes: Fixed effects included at the raion level. Cohort 1966-1973 is the reference group. Standard errors in parentheses. Significance levels: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. Data source: Author's calculations using TLSS 2003 and 2007.

Table 2.2 - Women: Determinants of completing basic or more and secondary or more education. Cohorts 1966-1973, 1976-1985.

	Panel A: completed basic education or more			Panel B: completed secondary school or more		
	1	2	3	4	5	6
RCA * Born in 1976-1985	-0.020*** (0.006)	-0.020*** (0.006)	-0.028*** (0.009)	-0.112*** (0.018)	-0.113*** (0.018)	-0.141*** (0.023)
Born in 1976-1985	0.013 (0.008)	0.013 (0.008)	0.013* (0.008)	-0.042*** (0.015)	-0.043*** (0.015)	-0.042*** (0.015)
Rural	-0.024** (0.011)	-0.024** (0.011)	-0.027 (0.017)	-0.098*** (0.030)	-0.097*** (0.030)	-0.113*** (0.036)
Survey=1 if TLSS 2007, 0 if TLSS==2003		0.01 (0.008)	-0.002 (0.006)		-0.017 (0.016)	-0.063*** (0.014)
Survey* Born in 1976-1985			0.017 (0.011)			0.057** (0.025)
Survey* Born in 1976-1985 * RCA area			0.003 (0.019)			0.023 (0.039)
Constant	0.975*** (0.007)	0.970*** (0.007)	0.976*** (0.007)	0.919*** (0.014)	0.929*** (0.018)	0.952*** (0.018)
N	7766	7766	7766	7766	7766	7766
R squared	0.01	0.01	0.01	0.05	0.05	0.05
F-test for significance of survey terms						
p-value			0.156	0.000		

Notes: Fixed effects included at the raion level. Cohort 1966-1973 is the reference group. Standard errors in parentheses. Significance levels: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. Data source: Author's calculations using TLSS 2003 and 2007.

Table 3a - Work status in the last 14 days by gender and birth cohort. Age: 22-49 in 2007.

<b>Panel A: Men</b>			
Employment status	1958-1969	1970-1985	Total
did not work in the last 14d	18.23	31.03	26.40
Worked:	81.77	68.97	73.60
for non hh member	52.24	48.77	50.17
farm owned by self/ or a hh member	18.86	21.27	20.30
on own account/ business owned by hh member	26.84	28.34	27.74
occasional job	0.21	0.37	0.30
on leave from permanent job	1.86	1.25	1.49
Total	100	100	100
N	1,777	3,136	4,913
<b>Panel B: Women</b>			
Employment status	1958-1969	1970-1985	Total
did not work in the last 14d	53.23	66.53	61.96
Worked:	46.77	33.47	38.04
worked for non hh member	47.15	49.48	48.49
farm owned by self/ or a hh member	34.76	37.91	36.58
on own account/ business owned by hh member	15.90	10.12	12.56
occasional job	0.22	0.16	0.19
on leave from permanent job	1.97	2.33	2.18
Total	100	100	100
N	1,950	3,720	5,670

Source: Author's calculations using TLSS (2007).

Table 3b - Main reason did not look for a job in the past 30 days? Ages 22-49.

	Panel A: Men			Panel B: Women		
	1958-1969	1970-1985	Total	1958-1969	1970-1985	Total
Not in the labor force	46.84	42.38	43.50	94.75	91.46	92.44
wait for job to start	9.97	10.79	10.58	0.49	0.49	0.49
Do not want to work	10.96	10.79	10.83	1.17	3.10	2.53
discouraged worker	29.57	33.59	32.58	2.92	4.62	4.11
other	2.66	2.45	2.50	0.68	0.33	0.43
Total	100	100	100	100	100	100
N	301	899	1200	1029	2448	3477

Source: Author's calculations using TLSS (2007).

Note: "Not in the labor force" includes students, housewives, retired, handicapped and in military service.

Table 4a - Work status in the last 14 days by gender, birth cohort and residence in the conflict area.

<b>Panel A: Men, RCA=1</b>			
Employment status	1958-1969	1970-1985	Total
did not work in the last 14d	17.45	29.66	25.32
Worked:	82.55	70.34	74.68
worked for non hh mem	44.39	36.52	39.31
worked on farm owned	10.83	13.40	12.49
worked on own account	25.70	19.74	21.85
occasional job	0.19	0.32	0.27
on leave from permanent job	1.44	0.37	0.75
Total	100	100	100
N	1,043	1,895	2,938
<b>Panel B: Men, RCA=0</b>			
Employment status	1958-1969	1970-1985	Total
did not work in the last 14d	19.40	33.20	28.05
Worked:	80.60	66.80	71.95
worked for non hh mem	40.30	29.14	33.30
worked on farm owned	21.99	16.72	18.69
worked on own account	16.53	19.24	18.23
occasional job	0.14	0.16	0.15
on leave from permanent job	1.64	1.54	1.58
Total	100	100	100
N	732	1,232	1,964
<b>Panel C: Women, RCA=1</b>			
Employment status	1958-1969	1970-1985	Total
did not work in the last 14d	54.12	64.32	60.88
Worked:	45.88	35.68	39.12
worked for non hh mem	23.03	18.73	20.18
worked on farm owned	14.52	13.02	13.52
worked on own account	7.44	3.33	4.72
occasional job	0.18	0.05	0.09
on leave from permanent job	0.72	0.55	0.61
Total	100	100	100
N	1,116	2,189	3,305
<b>Panel D: Women, RCA=0</b>			
Employment status	1958-1969	1970-1985	Total
did not work in the last 14d	51.82	69.66	63.36
Worked:	48.18	30.34	36.64
worked for non hh mem	20.94	13.48	16.12
worked on farm owned	18.64	12.29	14.54
worked on own account	7.38	3.37	4.79
occasional job	0.00	0.07	0.04
on leave from permanent job	1.21	1.12	1.15
Total	100	100	100
N	826	1,513	2,339

Source: Author's calculations using TLSS (2007). Note: "RCA=1" – resident lived in the region severely affected by the Tajik armed conflict; "RCA=0" - resident lived in the region lesser affected by the armed conflict.

Table 4b - Main reason did not look for a job in the past 30 days? By gender, birth cohort and conflict affected area residence. Age 22-49.

	Panel A: Men, RCA=1			Panel B: Men, RCA=0		
	1958-1969	1970-1985	Total	1958-1969	1970-1985	Total
Not in the labor force	51.16	45.40	46.83	41.09	37.87	38.69
wait for job to start	11.05	12.84	12.39	8.53	8.00	8.13
Do not want to work	13.95	12.07	12.54	6.98	9.07	8.53
discouraged worker	20.93	27.39	25.79	41.09	42.40	42.06
other	2.91	2.30	2.45	2.33	2.67	2.58
Total	100	100	100	100	100	100
N	172	522	694	129	375	504

	Panel C: Women, RCA=1			Panel D: Women, RCA=0		
	1958-1969	1970-1985	Total	1958-1969	1970-1985	Total
Not in the labor force	96.33	94.56	95.09	92.45	87.46	88.91
wait for job to start	0.50	0.36	0.40	0.47	0.68	0.62
Do not want to work	1.34	3.51	2.85	0.94	2.41	1.98
discouraged worker	1.00	1.36	1.25	5.66	8.97	8.01
other	0.83	0.21	0.40	0.47	0.48	0.48
Total	100	100	100	100	100	100
N	599	1,398	1997	424	1,037	1461

Source: Author's calculations using TLSS (2007).

Note: "Not in the labor force" includes students, housewives, retired, handicapped and in military service.

Discouraged worker category includes: "believe that I do not have a chance to get a job" and "no jobs" categories.

"RCA=1" – resident lived in the region severely affected by the Tajik armed conflict; "RCA=0" - resident lived in the region lesser affected by the armed conflict.

Table 5 – Dependent variable: “Worked in the last 14 days”, OLS regressions, sample aged 22-49 in 2007.

	Panel A: Men			Panel B: Women		
	1	2	3	4	5	6
RCA region * Born 1970-1985	0.039 (0.038)	0.035 (0.038)	0.039 (0.035)	0.083** (0.039)	0.083** (0.039)	0.095** (0.038)
<i>Birth cohort (ref. group: born in 1958-1964)</i>						
Born in 1965-1969	-0.012 (0.021)	-0.01 (0.022)	-0.024 (0.021)	0.01 (0.024)	0.015 (0.024)	0.002 (0.023)
Born in 1970-1975	-0.03 (0.034)	-0.025 (0.034)	-0.038 (0.033)	-0.107*** (0.035)	-0.097*** (0.036)	-0.118*** (0.035)
Born in 1976-1980	-0.108*** (0.037)	-0.104*** (0.037)	-0.087** (0.034)	-0.176*** (0.038)	-0.162*** (0.038)	-0.166*** (0.038)
Born in 1981-1985	-0.282*** (0.041)	-0.281*** (0.041)	-0.180*** (0.039)	-0.250*** (0.036)	-0.242*** (0.036)	-0.256*** (0.037)
<i>Ethnicity (ref. group: Tajik)</i>						
Uzbek	(0.000) (0.022)	(0.004) (0.021)	(0.002) -0.021	0.042* -0.025	(0.032) -0.022	(0.025) -0.022
Russian	0.11 (0.099)	0.11 (0.100)	0.164 (0.106)	0.280*** (0.097)	0.263*** (0.097)	0.213** (0.098)
Other ethnic group	-0.132 (0.158)	-0.12 (0.151)	-0.046 (0.134)	0.145** (0.068)	0.164** (0.065)	0.211** (0.092)
Rural	0.001 (0.023)	-0.039* (0.023)	-0.024 (0.022)	0.090*** (0.027)	0.026 (0.026)	0.036 (0.024)
ln_nonwage	-0.017*** (0.004)	-0.018*** (0.004)	-0.015** (0.006)	0.005 (0.004)	0.008* (0.004)	0.006 (0.004)
household size		-0.002 (0.002)	-0.004 (0.003)		-0.011*** (0.003)	-0.007*** (0.002)
<i>Access to land (ref. group: no access)</i>						
access to 1-10 sotkas of land		0.060* -0.034	0.058* -0.033		0.072** -0.027	0.073** -0.028
access to 11-20 sotkas of land		0.094*** (0.033)	0.084** -0.032		0.162*** -0.032	0.157*** -0.032
access to 21 plus sotkas of land		0.098*** -0.035	0.090** -0.035		0.174*** -0.034	0.184*** -0.035
Years of educ completed			0.018*** -0.003			0.031*** -0.003
Married			0.161*** -0.026			-0.126*** -0.022
Household head is female			(0.008) -0.02			(0.013) -0.018

Table 5 – Cont-ed

	Panel A: Men			Panel B: Women		
	1	2	3	4	5	6
<i>Household composition (ref. group: share of adult females in a household)</i>						
Share of children age 0-6			0.175** (0.068)			-0.300*** (0.060)
Share of children age 7-15			0.130** (0.063)			-0.051 (0.057)
Share of elderly, age 65 plus			0.196* (0.115)			-0.335*** (0.110)
Share of adult males in a hh			0.113 (0.077)			-0.336*** (0.062)
Constant	0.846*** (0.022)	0.836*** (0.032)	0.385*** (0.072)	0.387*** (0.028)	0.418*** (0.034)	0.312*** (0.053)
N	4913	4913	4912	5670	5670	5670
R squared	0.07	0.07	0.10	0.04	0.05	0.10

Source: Author's calculations using TLSS (2007).

Notes: "RCA=1" – resident lived in the region severely affected by the Tajik armed conflict; "RCA=0" - resident lived in the region lesser affected by the armed conflict. All regressions are estimated with raion level fixed effects. Robust standard errors are in parenthesis. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Table 6 – OLS Regressions. Dep. Var.: Worked in the last 14 days. Testing for effects of migration variables on labor supply. Sample: aged 22-49 in 2007.

	Panel A: Men			Panel B: Women		
	1	2	3	1	2	3
RCA region * Born 1970-1985	0.041 (0.034)	0.039 (0.034)	0.043 (0.034)	0.096** (0.038)	0.096** (0.038)	0.096** (0.038)
<i>Birth cohort (ref. group: born in 1958-1964)</i>						
Born in 1965-1969	-0.027 (0.021)	-0.024 (0.021)	-0.029 (0.021)	-0.001 (0.023)	0.002 (0.024)	-0.001 (0.023)
Born in 1970-1975	-0.041 (0.033)	-0.039 (0.033)	-0.042 (0.032)	-0.122*** (0.035)	-0.119*** (0.035)	-0.122*** (0.035)
Born in 1976-1980	-0.088** (0.034)	-0.088** (0.034)	-0.089*** (0.033)	-0.167*** (0.038)	-0.167*** (0.038)	-0.167*** (0.038)
Born in 1981-1985	-0.182*** (0.039)	-0.180*** (0.039)	-0.182*** (0.039)	-0.256*** (0.037)	-0.257*** (0.037)	-0.257*** (0.037)
years of education completed	0.017*** (0.003)	0.018*** (0.003)	0.018*** (0.003)	0.030*** (0.003)	0.031*** (0.003)	0.030*** (0.003)
ln_nonwage	-0.015** (0.006)	-0.015** (0.006)	-0.015** (0.006)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
Household has a migrant currently abroad	-0.067** (0.030)			-0.042*** (0.015)		
Proportion of households with migrants in psu		-0.120 (0.078)			-0.046 (0.087)	
HH receives remittances from hh members and other relatives			-0.082*** (0.023)			-0.047*** (0.017)
Constant	0.411*** (0.070)	0.401*** (0.070)	0.417*** (0.071)	0.330*** (0.054)	0.319*** (0.052)	0.334*** (0.056)
N	4912	4912	4912	5670	5670	5670
R squared	0.10	0.10	0.10	0.10	0.10	0.10

Notes: “RCA=1” – resident lived in the region severely affected by the Tajik armed conflict; “RCA=0” - resident lived in the region lesser affected by the armed conflict. All regressions are estimated with raion level fixed effects. All regression include ethnicity dummies, controls for the composition of the household, household size, access to land, rural residence, a dummy variable for being married, female headship. Robust standard errors are in parenthesis. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Table 7 - OLS regression with fixed effects at the raion level.  
 Dep. Var.: Employment in the last 14 days. Sample of non-household heads.

	Men	Women
	1	2
RCA region * Born 1970-1985	0.065	0.103**
	(0.053)	(0.041)
<i>Birth cohort (ref. group: born in 1958-1964)</i>		
Born in 1965-1969	0.039	-0.01
	(0.053)	(0.025)
Born in 1970-1975	0.02	-0.124***
	(0.056)	(0.037)
Born in 1976-1980	-0.029	-0.176***
	(0.060)	(0.040)
Born in 1981-1985	-0.121*	-0.260***
	(0.064)	(0.039)
years of educ completed	0.018***	0.030***
	(0.005)	(0.003)
ln_nonwage income	-0.008	0.008*
	(0.008)	(0.005)
HH head is not employed	-0.038	0.006
	(0.025)	(0.019)
Constant	0.281**	0.307***
	(0.119)	(0.063)
N	2820	5270
R squared	0.08	0.09

Notes: “RCA=1” – resident lived in the region severely affected by the Tajik armed conflict; “RCA=0” - resident lived in the region lesser affected by the armed conflict. All regressions are estimated with raion level fixed effects. All regression include a full set of birth cohort dummies, ethnicity dummies, controls for the composition of the household, household size, access to land, rural residence, a dummy variable for being married, female headship. Robust standard errors are in parenthesis. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01



Table 8 –OLS regression with fixed effects at the raion level. Dep. Var.: Employment in the last 14 days. Sample of married individuals, age 22-49 in 2007. updated 03/05/11

	Panel A: Men				Panel B: Women			
	1	2	3	4	5	6	7	8
RCA region * Born 1970-1985	0.043 (0.032)	0.043 (0.032)	0.043 (0.033)	0.046 (0.032)	0.070* (0.037)	0.070* (0.037)	0.070* (0.037)	0.083** (0.037)
years of educ completed	0.016*** (0.004)	0.016*** (0.004)	0.015*** (0.004)	0.016*** (0.004)	0.024*** (0.004)	0.024*** (0.004)	0.024*** (0.004)	0.025*** (0.004)
Spouse does not live in a hhd now		-0.179*** (0.059)	-0.151** (0.057)			0.005 (0.025)	0.004 (0.025)	
Spouse migrated for work			-0.143*** (0.036)				0.079 (0.092)	
Spouse did not work in the last 14days				0.002 (0.020)				0.01 (0.021)
Constant	0.561*** (0.071)	0.555*** (0.070)	0.580*** (0.071)	0.553*** (0.071)	0.272*** (0.060)	0.270*** (0.061)	0.270*** (0.061)	0.273*** (0.069)
N	3986	3986	3986	3906	4381	4381	4381	3972
R squared	0.04	0.05	0.06	0.04	0.09	0.09	0.09	0.09

Source: Author's calculations using TLSS (2007).

Notes: "RCA=1" – resident lived in the region severely affected by the Tajik armed conflict; "RCA=0" - resident lived in the region lesser affected by the armed conflict. All regressions are estimated with raion level fixed effects. All regression include a full set of birth cohort dummies, ethnicity dummies, controls for the composition of the household, household size, access to land, non-wages income, rural residence, female headship. Robust standard errors are in parenthesis. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

Table 9 – Tobit model. Dep. Var.: ln (total income from employment received in the last 30 days). Sample: age 22-49 in 2007.

	Panel A: Men			Panel B: Women		
	1	2	3	1	2	3
RCA region * Born 1970-1985	0.262 (0.185)	0.259 (0.184)	0.263 (0.184)	-0.365 (0.236)	-0.356 (0.233)	-0.348 (0.233)
Born in 1965-1969	0.049 (0.132)	0.05 (0.131)	0.051 (0.131)	-0.019 (0.174)	-0.067 (0.172)	-0.064 (0.172)
Born in 1970-1975	-0.299 (0.182)	-0.288 (0.181)	-0.289 (0.181)	0.272 (0.228)	0.207 (0.224)	0.21 (0.224)
Born in 1976-1980	-0.532*** (0.181)	-0.506*** (0.181)	-0.504*** (0.181)	0.149 (0.231)	0.108 (0.228)	0.108 (0.227)
Born in 1981-1985	-0.342* (0.181)	-0.28 (0.181)	-0.277 (0.181)	0.252 (0.228)	0.266 (0.226)	0.265 (0.226)
Rural	-0.550*** (0.121)	-0.516*** (0.121)	-0.500*** (0.122)	-1.545*** (0.191)	-1.382*** (0.191)	-1.343*** (0.192)
years of education completed		0.077*** (0.022)	0.077*** (0.022)		0.182*** (0.029)	0.180*** (0.029)
Proportion of households with migrants in psu			-0.479 (0.472)			-0.722 (0.570)
Constant	4.185*** (0.321)	3.205*** (0.425)	3.278*** (0.434)	4.711*** (0.264)	2.505*** (0.443)	2.616*** (0.449)
Sigma						
Constant	2.424*** (0.045)	2.420*** (0.045)	2.419*** (0.045)	2.375*** (0.054)	2.345*** (0.054)	2.343*** (0.054)
N	3612	3611	3611	2146	2146	2146

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. Total wages include monetary and in-kind wages received in the last 30 days. All regressions include a full set of dummies for all raions. Source: Author's calculations using TLSS (2007).

## Appendix A

Appendix Table 1.1 – Sample statistics: Analysis of Education

Variable	Panel A: TLSS 2003					Panel B: TLSS 2007				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Age	7595	25.84	5.94	18	37	7463	30.15	6.11	22	41
Year of birth	7595	1977	5.94	1966	1985	7463	1976.85	6.11	1966	1985
Female	7595	0.51				7463	0.55			
Completed basic education	7092	0.97				7369	0.97			
Completed at least secondary education	7092	0.83				7369	0.82			
More conflict affected area (RCA=1)	7595	0.53				7437	0.60			
Rural	7595	0.70				7463	0.69			
<i>Ethnic group</i>	7595	2003	0	2003	2003	7463	2007.00	0.00	2007	2007
Tajik	Na					7463	0.80			
Uzbek	Na					7463	0.19			
Russian	Na					7463	0.00			
Other ethnicity	Na					7463	0.01			
<i>Mother's education</i>	Na									
None	Na					4164	0.07			
Primary (1-4 grades)	Na					4164	0.22			
Basic (grades 8(9))	Na					4164	0.29			
Secondary general (grades 10(11))	Na					4164	0.29			
Secondary special	Na					4164	0.03			
Secondary technical	Na					4164	0.01			
Higher education	Na					4164	0.04			
Graduate school (aspirantura)	Na					4164	0.04			
<i>Father's education</i>	Na									
None	Na					4742	0.06			
Primary (1-4 grades)	Na					4742	0.12			
Basic (grades 8(9))	Na					4742	0.18			
Secondary general (grades 10(11))	Na					4742	0.30			
Secondary special	Na					4742	0.09			
Secondary technical	Na					4742	0.07			
Higher education	Na					4742	0.14			
Graduate school (aspirantura)	Na					4742	0.03			

Source: TLSS 2003 and 2007. Author's estimates. Sample excludes those born in 1974 and 1975.

Appendix Table 1.2 – Sample statistics: Analysis of Employment

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Worked in the last 14 days	10583	0.55	0.498	0	1
ln (total pay in the last 30 days)	5774	4.08	2.318	0	9
Age	10584	33.76	8.199	22	49
Year of birth	10584	1973.24	8.199	1958	1985
Female	10584	0.54			
Conflict affected area (RCA=1)	10584	0.59			
Educational level	10583	11.11	2.413	0	19
<b>Ethnic group</b>					
Tajik	10584	0.80			
Uzbek	10584	0.19			
Russian	10584	0.01			
Other ethnicity	10584	0.01			
Married	10584	0.79			
Rural	10584	0.69			
HH size	10584	7.43	3.136	1	21
Female head household	10584	0.16			
<b>HH composition</b>					
Share of children age 0-6	10584	0.15	0.145	0	1
Share of children age 7-15	10584	0.20	0.174	0	1
Share of elderly, age 65 plus	10584	0.04	0.083	0	1
Share of adult males in a hh	10584	0.29	0.148	0	1
Share of adult females in a hh	10584	0.32	0.140	0	1
<b>Access to land</b>					
HH has no access to land	10584	0.32			
access to 1-10 sotkas of land	10584	0.29			
access to 11-20 sotkas of land	10584	0.16			
access to 21 plus sotkas of land	10584	0.23			
ln (household nonwage income)	10584	1.59	1.935	0	6.8

Source: Author's calculations using TLSS (2007). Sample is 22-49 year olds in 2007.

Appendix Table 2 – Test for Differences in Means by Conflict area (employment sample)

Variable	Mean (rca=0)	Mean (rca=1, all)	Difference 1 (Col 1- Col 2)	p-value (Difference 1)	Mean (rca=1, no Dushanbe)	Difference 2 (Col 1- Col. 5)	p-value (Difference 2)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Worked in the last 14 days	0.53	0.56	-0.03	0.001	0.56	-0.04	0.001
ln (total pay in the last 30 days)	3.70	4.33	-0.64	0.000	4.14	-0.44	0.000
Age	34.08	33.54	0.54	0.001	33.41	0.68	0.000
Female	0.54	0.53	0.02	0.117	0.53	0.02	0.079
Educational level	11.15	11.08	0.07	0.172	10.88	0.26	0.000
<b>Ethnic group</b>							
Tajik	0.81	0.79	0.02	0.035	0.77	0.04	0.000
Uzbek	0.17	0.20	-0.03	0.000	0.22	-0.05	0.000
Russian	0.00	0.01	0.00	0.024	0.00	0.00	0.859
Other ethnicity	0.02	0.01	0.01	0.000	0.00	0.02	0.000
Married	0.80	0.79	0.00	0.704	0.80	-0.01	0.299
Rural	0.76	0.64	0.11	0.000	0.79	-0.03	0.001
HH size	6.92	7.78	-0.86	0.000	8.08	-1.16	0.000
Female head household	0.15	0.16	-0.01	0.070	0.14	0.01	0.456
<b>HH composition</b>							
Share of children age 0-6	0.13	0.16	-0.03	0.000	0.16	-0.03	0.000
Share of children age 7-15	0.19	0.21	-0.02	0.000	0.21	-0.02	0.000
Share of elderly, age 65 plus	0.05	0.04	0.01	0.000	0.04	0.01	0.000
Share of adult males in a hh	0.30	0.28	0.01	0.000	0.28	0.01	0.000
Share of adult females in a hh	0.33	0.31	0.02	0.000	0.31	0.03	0.000
<b>Access to land</b>							
HH has no access to land	0.22	0.38	-0.16	0.000	0.25	-0.03	0.000
access to 1-10 sotkas of land	0.35	0.25	0.10	0.000	0.30	0.05	0.000
access to 11-20 sotkas of land	0.14	0.18	-0.04	0.000	0.22	-0.08	0.000
access to 21 plus sotkas of land	0.29	0.19	0.10	0.000	0.23	0.06	0.000
ln (household nonwage income)	1.73	1.49	0.23	0.000	1.53	0.20	0.000

Source: Author's calculations using TLSS 2007.

Appendix Table 3 - Industry of main employment.

Industry of main employment	Panel A: Men		
	RCA=0	RCA=1	Total
Agriculture, Hunting and Forestry	31.97	27.8	29.44
Sale, maintenance and repair of motor vehicles and motorcycles, retail sales of automotive fuel	14.27	17.88	16.46
Construction	11.31	16.33	14.36
Land transport; transport via pipeline	7.8	8.69	8.34
Public administration and defense	6.68	6.23	6.41
Activities of private households as employers of domestic staff	8.85	3.37	5.52
Education	7.24	4.19	5.39
Electricity, gas, steam and hot water	1.48	2.37	2.02
Health and social work	1.83	1.73	1.77
Manufacture of food products and beverages	2.39	1.46	1.82
Manufacture of basic metals	0.21	2.32	1.49
Sub-total	94.03	92.37	93.02
N obs (total)	1,423	2,198	3,621
Industry of main employment	Panel B: Women		
	RCA=0	RCA=1	Total
Agriculture, Hunting and Forestry	48.2	56.28	53.04
Education	16.92	12.64	14.35
Sale, maintenance and repair of motor vehicles and motorcycles, retail sales of automotive fuel	8.92	8.53	8.69
Health and social work	10.08	6.74	8.08
Public administration and defense	2.67	3.41	3.11
Manufacture of textiles	2.55	1.32	1.81
Hotels and restaurants	1.85	1.78	1.81
Manufacture of wearing apparel; dressing and dyeing of fur	0.81	1.4	1.16
Manufacture of food products and beverages	1.27	0.93	1.07
Sub-total	93.27	93.03	93.12
N obs (total)	863	1,290	2,153

Source: Author's calculations using TLSS (2007). The industry is included in the table if it had more than 1% of total employment.

Appendix Table 4 - Main occupational group by residence in the conflict affected area. Age 22-49.

Occupational group	Panel 1: Men		
	RCA=0	RCA=1	Total
Market gardeners and crop growers	25.02	21.47	22.87
Building finishers and related trades workers	10.68	12.83	11.99
Unskilled workers (general) for all branches of economy	11.31	6.92	8.64
Motor vehicle driver	8.43	8.74	8.62
Stall and market salespersons	7.1	9.19	8.37
Building frame and related trades workers	2.53	4.82	3.92
Secondary education teaching professionals	4.43	2.5	3.26
Agricultural, fishery and related labourers	3.72	1.68	2.49
Shop salespersons and demonstrators	1.69	2.46	2.15
Physical science and engineering technicians	0.91	2.27	1.74
Machinery mechanics and fitters	1.12	1.59	1.41
Health professionals (except nursing)	1.19	1.36	1.30
Legislators and Senior Officials	0.98	1.36	1.22
Administrative associate professionals	0.84	1.41	1.19
Architects, engineers and related professionals	0.7	1.41	1.13
Managers of other services	1.05	1.05	1.05
Agricultural, earthmoving, lifting and other mobile	0.63	1.27	1.02
Sub-total	82.33	82.33	82.37
N obs	1,423	2,198	3,621

Occupational group	Panel B: Women		
	RCA=0	RCA=1	Total
Market gardeners and crop growers	39.98	50.93	46.54
Secondary education teaching professionals	8.00	5.35	6.41
Stall and market salespersons	6.14	5.89	5.99
Unskilled workers (general) for all branches of economy	6.03	5.81	5.90
Nursing and midwifery associate professionals	6.84	4.42	5.39
Market-oriented animal producers	1.85	3.64	2.93
Pelt, leather and shoemaking trades workers	3.13	2.79	2.93
Agricultural, fishery and related laborers	5.79	0.85	2.83
Primary education teaching associate professionals	3.48	2.09	2.65
Housekeeping and restaurant services workers	1.62	1.71	1.67
Shop salespersons and demonstrators	1.74	1.55	1.63
Health professionals (except nursing)	1.16	1.40	1.30
Administrative associate professionals	0.70	1.24	1.02
Sub-total	86.46	87.67	87.19
N obs	863	1,290	2,153

Note: An occupation is included in the table if more than 1% men/women reported to be in this category. Sample of people who reported their main occupation in employment. Source: Author's calculations using TLSS (2007).

## Appendix B –Definition of employment status

Below are the questions from the 2007 TLSS survey that were used to identify whether an individual was employed in the last 14 days (economically active). An answer “yes” to any of the questions would place an individual in an “employed in the last 14 days” category. The survey does not include information on the total length of employment in the last job/ occupation. The definition of employed used in this study is consistent with the ILO definition of employment<sup>30</sup> that includes individuals above certain age who were employed during a specified short period of time either one week or one hour. The employment categories in the ILO definition include paid and self-employment and individuals who had an attachment to work.

### TLSS 2007

#### Module 5: Labor Market

##### Part A

q.1 During the past 14 days have you worked for someone who is not a member of your households, for example, a public or private enterprise company, an NGO or any other individual?

q.2

During the past 14 days have you worked on a farm owned or rented by you or a member of your household, whether in cultivating crops or in other farm maintenance tasks, or have you cared for livestock belonging to you or a member of your household?

q. 3

During the past 14 days have you worked on your own account or in a business enterprise belonging to you or someone in your household, for example, as a trader, shop-keeper, barber, dressmaker, carpenter, taxi-driver, carwash, etc?

q. 5

Although you reported no work in the past 14 days, have you done any occasional jobs as sold goods in the street, helped someone for their business, sold some homemade products, washed cars, repaired cars etc. during this period?

q. 6

Do you have a permanent/long-term job even though you did not work in the last 14 days from which you were temporarily absent?

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<sup>30</sup> <http://stats.oecd.org/glossary/detail.asp?ID=764> (Accessed: February 28, 2011).