# The Flight of White-Collars

Arzu KIBRIS

Sabanci University

akibris@sabanciuniv.edu

Abstract

By analyzing two novel data sets from Turkey, we provide empirical evidence for yet another negative consequence of civil conflicts. We show that the long running civil conflict in Turkey has been driving away doctors and other highly trained medical personnel from conflict areas, and that availability of medical personnel is positively associated with public health. By doing so, we illuminate an important, yet never analyzed before mechanism through which civil conflicts exert their long-term negative influences on public health in host societies. We then proceed to provide some evidence that a similar dynamic is in play in education as well.

## 1. INTRODUCTION

Civil conflicts have both immediate and long-term effects on social well-being. There is the immediate sufferings in the form of casualties, displacements, and the destruction of infrastructure and property, then there are the indirect and longer term negative impacts on health, education, economic activity, and social cohesion and trust. Indeed, there are good reasons to presume that the indirect consequences of conflict are much more important and substantial in many cases than the direct ones. Lacina and Gleditsch concur that direct conflict fatalities do “not provide a remotely adequate account of the true human costs of conflict”. Nevertheless, it is only recently that academic interest turned towards analyzing and understanding the true extent of the damages civil conflicts inflict upon host societies. As Blattman and Miguel (2010) argue in their detailed review of the literature on civil conflicts, existing works only scratch the surface of the range of possible impacts on the economy and society. More evidence is required on the social, political, and economic costs of civil conflicts. The leading question is not whether these conflicts harm societies, but rather in what ways, how much, and how persistently—all crucial questions for

understanding the impacts on economic, political and social development, as well as priorities for post-conflict assistance.

This study contributes to the literature that aims to answer these crucial questions. By analyzing two novel data sets from Turkey, we provide empirical evidence for yet another negative consequence of civil conflicts. We show that the long running civil conflict in Turkey has been driving away doctors and other highly trained medical personnel from conflict areas, and that availability of medical personnel is positively associated with public health. By doing so, we illuminate an important, yet never analyzed before mechanism through which civil conflicts exert their long-term negative influences on the most important "life chance" of societies (Boop and Ford, 2010), namely, the chance to lead a healthy life. We then proceed to provide some evidence that a similar dynamic is in play in education as well.

As the literature review in the next section demonstrates, there is an emerging literature which has already firmly established that civil conflicts harm public health in host societies. Nevertheless, we still need a better understanding in terms of the mechanisms through which such detrimental effects occur. The flight of medical personnel from conflict areas is one such mechanism which, despite its importance, has not received much scholarly attention yet. While there are studies which have acknowledged the existence of such a mechanism, to our knowledge, this is the first study to provide empirical evidence of how a civil conflict drives doctors and other medical personnel away from areas where the fighting takes place, leaving the local populations without adequate health care services. The main reason why the issue has so far been left unexplored is the lack of data. The fundamental challenge in quantifying the adverse impacts of a conflict is that information systems, particularly civil registration systems that record the indicators of social well-being, often cease to function in populations affected by conflict. Another commonly encountered problem is the reluctance of officials to share information in an effort to hide the true extent of the damage caused by the conflict. Consequently, data on the availability of medical personnel across locations and time is hard to come by for states with civil conflicts.

The second major contribution of this study is its provision of such a data set for Turkey. Through extensive research on state archives, we have constructed an interesting data set that includes yearly information on the number of doctors, nurses, dentists, midwives, and health technicians across provinces in Turkey between 1964 and 2010, along with some important public health indicators. This panel data which spans an impressive 46-year period enables us to analyze whether the Kurdish-Turkish armed conflict that has been

going on since 1984 has had any impact on the availability of the medical personnel in the provinces where the fighting has been taking place. The results reveal a significant negative impact. We then analyze the association between the availability of medical personnel and some public health indicators. The significant positive associations we find indicate that the negative impact of civil conflicts on the availability of medical personnel is a very important but neglected mechanism through which these conflicts exert their long-term negative influences on public health.

In the following section, we look into the literature on the effects of civil conflicts on public health. In the third section, we briefly discuss the Turkish case. In the fourth section, we present our model and data. We present our results in the sixth section and conclude in the seventh.

## 2. PUBLIC HEALTH AND CIVIL CONFLICTS

Civil conflicts are humanitarian disasters. The ordinary civilians who typically have no say in whether the conflict is initiated or settled are the ones who suffer most from the adverse consequences of these conflicts. And unfortunately, the immediate sufferings in the form of displacements, casualties, and the destruction of infrastructure and property are only “the tip of the iceberg of their longer-term consequences for human misery” (Ghobarah et al., 2003).

Carlton-Ford and Boop (2010) sum these long-term adverse consequences as the negative impacts of civil conflicts on “life chances” by which they mean the well-being of civilian populations and the development of human capabilities. In their analyses they focus on the impact of civil conflicts on what they deem to be the most important of these life chances, namely, health, economic welfare, and education.

In recent years, a growing body of literature has assessed the impact of conflict on public health outcomes. Ghobarah et al.(2003) empirically demonstrate the long term damaging effects of civil conflicts on the ability of civilian populations to lead a disability-free life. Guha-Sapir and Van Panhuis (2002) demonstrate that in host societies mortality rates are higher after civil conflicts than before. Similarly, Hoeffler and Reynal-Querol (2003) find a highly persistent increase in child mortality rates in conflict areas. Li (2005) comes up with a similar result for adult mortality. Akresh et al. (2009) study the Rwandan case, and reveal the stunting effect the civil conflict has on the physical development of children. Davis and Kuritsky(2002) show that countries in sub-Saharan Africa that have experienced violent conflict have significantly worse health outcome indicators compared to countries that have been at peace. Zaryab (2006) studies the health adjusted life expectancy (HALE) in

states member to the World Health Organization and reveals the extent of damage armed conflicts have on this summary measure of public health. Degomme and Guha-Sapir (2010) study Darfur and argue that more than 80% of excess deaths were the result of an increased spread of disease, which in turn drive up infant mortality rates. Relatedly, Berrang-Ford et al. (2011) associate the reemergence of the Human African Trypanosomiasis disease in sub-Saharan Africa with the armed conflicts in the region. Finally, Gates et al. (2012) conduct an analysis of the effect of armed conflict on progress in meeting the United Nation's Millennium Development Goals and demonstrate that conflict has clear detrimental effects on the reduction of poverty and hunger, on primary education, on the reduction of child mortality, and on access to potable water.

In short, there is ample evidence of the detrimental impact of civil conflicts on public health. Nevertheless, we still do not have a complete understanding of the mechanisms through which these damages occur. This kind of understanding is extremely important for formulating effective policies to counteract these effects. While existing works offer theoretical discussions on possible mechanisms, there are very few studies that actually provide empirical evidence of those mechanisms discussed and the extent of damage created by them. One very comprehensive discussion is offered by Ghobarah, Huth, and Russett (2003; 2004). They argue that the destruction of infrastructure such as hospitals, roads, water supply, and power grids; the increased risk of exposure to diseases due to displacement of large populations and due to crowding, bad water, and poor sanitation in refugee camps, as well as malnutrition and stress which compromise people's immune systems; the lack of public and private financial resources for expenditures on health care due to economic hardship; the diversion of economic resources from public health to military uses; the reduction in the efficient use of resources allocated to public health; and finally the depletion of human resources needed for health care due to the flight of highly trained medical professionals from conflict areas are the mechanisms behind the detrimental impact of civil conflicts on public health. Zaryab (2006) adds to this list the disruptions in agricultural production which may then lead to widespread famines.

In this study we focus on the damage on the flight of highly educated human resources from conflict areas, and provide empirical evidence from the Turkish case demonstrating how the ongoing civil conflict is negatively associated with the number of medical professionals in provinces. We then proceed to present some evidence on the positive link between the availability of health professionals and public health which allows us to argue that one mechanism through which civil conflicts hurt public health is by driving away

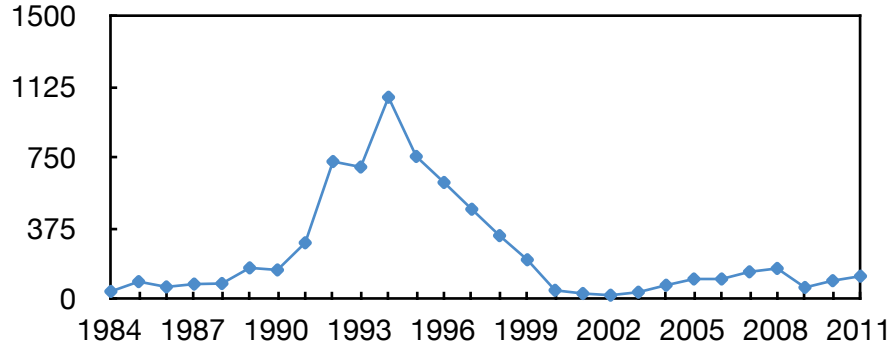
medical professionals from conflict areas. To our knowledge this is the first study to focus on this important dynamic.

## 3. THE TURKISH CASE

Since late 1984, Turkey has been suffering from an insurgency campaign led by the Kurdish separatist guerilla organization Kurdistan Workers' Party (Partiya Karkaren Kurdistan), the PKK. The organization was first founded with the goal of establishing an independent Kurdish state in southeastern Turkey, though later on in the 1990s, it appeared to have rolled back on its goal to a federational structure that would grant more autonomy to the large Kurdish minority in Turkey. Armed activities of the PKK are almost completely concentrated in southeastern and eastern Turkey which is a poor, and underdeveloped part of the country, and which has traditionally been inhabited by ethnic Kurds. The attacks mostly targeted security forces and facilities in the area. Nevertheless, PKK insurgents also attacked schools and public offices, and public employees like teachers, clergymen, administrative officers, and also civilians whom they accused of “collaborating with the Turkish Republic”.

Financially, the conflict has cost the country billions of dollars. But more importantly, it has cost more than 40 thousand lives (Şener, 2010). Our knowledge about civilian and insurgent casualties is limited to aggregate numbers sporadically released by contending sources as there is no credible and publicly available dataset on them. Nevertheless, Kibris(2013) offers a unique database on security force (i.e. soldiers and police officers) casualties (SFCs).

**Chart 1: Total Number of Security Force Casualties**




As can be clearly seen in Chart 1 above which depicts the total number of SFCs over the years, the 90s has been the most bloody period of the conflict. There were clashes between the security forces and the insurgents almost everyday. Only in 1994, 1031 soldiers and 37 police officers were killed in the attacks. The PKK received a major blow

when its leader Abdullah Öcalan was captured in Africa in 1999, brought back to Turkey, tried and sentenced to life in prison. Headless and divided, the PKK ceased its attacks in the early 2000s. Unfortunately, peace in the area did not last long. The PKK resumed its attacks in 2004. Interrupted by short lived cease-fires by the PKK the armed conflict between the Turkish security forces and the PKK has been going on for twenty nine years now. The destructiveness of the conflict resulted in the deepening of the economic and social disparity between the conflict zone and the rest of the country. The area has lost its economic and social appeal for business and people, and has come to be considered as exile by public employees like doctors and teachers who are subject to periodical appointments by the state.

## 4. THE DATA

In this study we employ a database we constructed on the number of specialist and practitioner doctors, dentists, nurses, midwives, and health technicians across provinces in Turkey in the 1964-2010 period[1]. To construct this database we conducted a thorough study in the Turkish State Archives and went through and brought together numerous documents and publications by the Ministry of Health and several other health institutions in Turkey. We provide a detailed explanation of our source documents in the Appendix. Our database also includes the yearly percentage of births unattended by health personnel for the 1964-1981 and 1993-2005 periods, and age-zero group BCG vaccination rates for the 1994-2006 period across provinces.

In order to measure the intensity of the conflict we refer to the casualty database by Kibris (2011; 2013a; 2013b). This is a unique data set on Turkish military and police force casualties (security force casualties-SFCs) that the Kurdish insurgency claimed since the beginning of armed attacks in 1984. The data set includes the date, and place of death for a total of 6851 SFCs. The number of SFCs provide our measure of conflict intensity across localities. While the number of SFCs does not correspond to the total number of casualties, which is a commonly used measure of conflict intensity in the literature, Kibris argues that one can expect a high correlation between the two. In fact, the yearly aggregates are 84% correlated with the yearly total casualties and 98% correlated with the yearly total number of PKK attacks reported by the Turkish General Staff (Şener, 2010). The correlation between the yearly total casualty numbers reported by the Federation of American Scientists (www.fas.org) and the yearly aggregates of SFCs in the database is

[1] Only 2004 and 2005 are missing.

even higher at 96%, while the correlation between SFCs and other casualties (civilians, insurgents and village guards) is 95%. These high correlations are not surprising considering the fact that attacks by the PKK, and offensive military operations by the Turkish security forces claim lives from both the security forces and the PKK insurgents. Unfortunately they also claim the lives of civilians. Also, village guards (civilian villagers armed by the state as local guards against insurgents) make up a significant portion of total casualties, and in many cases village guards get killed alongside security forces in PKK attacks on their villages, or during search or pursuit missions in the area. Another major cause of civilian casualties is landmines set down by the PKK in the vicinity of military facilities and police stations, and along the transit routes of these security forces. Needless to say, landmine casualties among security forces and civilians are expected to be highly correlated. Most importantly, as the correlation between the number of SFCs and PKK attacks clearly demonstrate, SCFs in a county is a good measure of the PKK presence in the area. The presence of PKK insurgents and activity in an area cause a great deal of inconvenience for the civilian residents. Not only it means that they can get caught in crossfire, or become a landmine victim, it also means that their daily lives are disturbed by the heightened security measures like the increased number of security personnel in the area, and the frequent security checks and controls that are imposed on the civilians, and also by the frequent interruption of normal day-to-day life as a result of attacks and armed skirmishes between security forces and the PKK. In many cases it also means they will be pressured, threatened or even killed by PKK militants searching for hide-outs, shelters, supplies or political support. Thus, we conclude that SFCs provide a good measure of the level of conflict civilians are exposed to.

Finally, we derive the other socioeconomic indicators we include in our model from the Turkish Institute of Statistics.

## THE ANALYSES

In our first model, the dependent variable is the number of medical personnel across provinces, in other words, we are modeling count data. Consequently, our base model is the following fixed effects negative binomial regression model.

$$E(Y_{i,t}) = \lambda_{i,t} = \exp(\alpha + \beta_1 C_{i,t-1} + \beta_2 X_{i,t} + \beta_3 T + \beta_4 P + u_{i,t})$$

where $Y_{it}$ is the number of medical personnel in province i in year t. We analyze the number of total doctor, the number of practitioners, the number of specialists, the number of dentists, the number of midwives, the number of nurses, and the number of health

technicians respectively. $C_{i,t-1}$ is the number of security force casualties in province p in year (t-1); $X_{it}$ is the population of province p in year t in ten thousands; T is a vector of year dummies controlling for time specific effects; P is a vector of province dummies controlling for province specific effects. Population numbers are the only available demographic control we have for the 1964-2010 period. It allows us to control for the demand for medical personal, and also for the size of the locality. Nevertheless we were also able to collect data on GDP per capita in constant prices across provinces for the 1975-2001 period. We present below the results when we include this variable in the model as well. GDP per capita is a good indicator of economic conditions across provinces. Note that the inclusion of this variable restricts the time period of the analyses in accordance with data availability.

Then we continue on to demonstrate the detrimental impact of the conflict on public health indicators and the role medical personnel play in this impact, and we estimate the following linear model using a Tobit regression analysis:

$$Z_{i,t} = \alpha + \beta_1 Y_{i,t} + \beta_2 C_{i,t-1} + \beta_3 X_{i,t} + \beta_4 T + \beta_5 P + u_{i,t}$$

where $Z_{i,t}$ will be the percentage of births unattended by medical personnel, and BCG vaccination rates among new borns respectively. $Y_{it}$ is the number of midwives in province i in year t. $C_{i,t-1}$ is the number of security force casualties in province p in year (t-1); $X_{it}$ is the population of province p in year t in ten thousands; T is a vector of year dummies controlling for the time trend and other time specific effects; P is a vector of province dummies controlling for province specific effects. Note that we control for the number of midwives rather than doctors or nurses because of the nature of the health indicators we analyze. In Turkey, vaccination of new borns are conducted by midwives (Turkish Ministry of Health, ...). Similar to the first set of analyses, we also estimate the model with the inclusion of GDP in constant prices across provinces which again restricts the time period covered.

Table 1 below presents the descriptive statistics of the variables we employ .

**TABLE 1: Descriptive Statistics**

| Variable | Time span | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Number of specialist doctors | 1964-2003<br>2006-2010 | 341.15 | 1112 | 1 | 14437 |

| TABLE 1: Descriptive Statistics | | | | | |
|---|---|---|---|---|---|
| **Variable** | **Time span** | **Mean** | **Standard Deviation** | **Minimum** | **Maximum** |
| Number of practitioners | 1964-2003 2006-2010 | 306.45 | 766.97 | 5 | 9625 |
| Number of dentists | 1964-2003 2006-2008 | 133.64 | 440.40 | 1 | 5636 |
| Number of nurses | 1964-1999 2001-2003 | 477.13 | 989.59 | 4 | 10112 |
| Number of midwives | 1964-1999 2001-2003 | 309.34 | 370.12 | 4 | 3271 |
| Number of health technicians | 1964-1999 2001-2003 | 261.91 | 449.57 | 11 | 5377 |
| Security force casualties in previous year | 1984-2010 | 1.67 | 9.83 | 0 | 236 |
| Population in ten thousands | 1964-2010 | 73.55 | 104.29 | 0.51 | 1362.42 |
| GDP per capita in constant prices | 1975-2001 | 11408.98 | 6386.92 | 746.80 | 44889 |
| Percentage of births unattended by medical personnel | 1964-1981 1993-2005 | 18.24 | 17.53 | 0 | 100 |
| BCG vaccination rates among new borns | 1994-2006 | 75.82 | 20.89 | 2 | 100 |

RESULTS

Table 2 and 3 below present the results for the negative binomial regression analyses. Note that the estimated coefficients are the expected difference in the number of health personnel (in logs) for each additional security force casualty. For ease of reading we report the natural log of estimated parameters which corresponds to the *incidence rate ratio*. Correspondingly, the parameter for SFCs, for example, tells us that an additional SFC leads the number of expected specialist doctors to be multiplied by 0.992, in other words, leads to a 0.8% decrease.

The numbers in parenthesis are z-values. We do not report the estimated parameters for year and province fixed effects as there are too many of them to fit in a table. Results are available upon request.

| Table 2: Results of the negative binomial regressions on the number of medical personnel | | | | | | |
|---|---|---|---|---|---|---|
| **Dependent variable:** / **Independent Variables** | **Number of specialist doctors** | **Number of specialist doctors** | **Number of practitioner doctors** | **Number of practitioner doctors** | **Number of dentists** | **Number of dentists** |
| Number of SF casualties in previous year | 0.992*** (-8.91) | 0.997*** (-2.82) | 0.996*** (-5.54) | 0.998*** (-3.38) | 0.995*** (-4.38) | 0.998** (-1.97) |
| Population in ten thousands | 0.999*** (-5.00) | 0.999 (-1.61) | 0.999*** (-5.92) | 0.999 (-0.91) | 1.0001 (1.77) | 1.0007*** (5.02) |
| GDP per capita in constant prices | | 1.00001*** (5.50) | | 1.000004 (1.51) | | 1.00003*** (6.88) |
| Year dummies | not reported, available upon request | | | | | |
| Province dummies | not reported, available upon request | | | | | |
| ***: significant at 1% level; **: significant at 5% level | | | | | | |

| Table 3: Results of the negative binomial regressions on the number of medical personnel- continued | | | | | | |
|---|---|---|---|---|---|---|
| **Dependent variable:** / **Independent Variables** | **Number of nurses** | **Number of nurses** | **Number of midwives** | **Number of midwives** | **Number of health technicians** | **Number of health technicians** |
| Number of SF casualties in previous year | 0.998*** (-2.62) | 0.998*** (-2.78) | 0.996*** (-5.94) | 0.996*** (-5.88) | 1.0003 (0.77) | 1.0005 (1.07) |
| Population in ten thousands | 1.0004*** (6.31) | 1.0006*** (8.10) | 1.0006**** (9.21) | 1.0008*** (9.25) | 0.999** (-2.37) | 0.999*** (-4.11) |
| GDP per capita in constant prices | | 1.00002*** (10.18) | | 1.00002*** (8.29) | | 0.999 (-0.53) |
| Year dummies | not reported, available upon request | | | | | |
| Province dummies | not reported, available upon request | | | | | |
| ***: significant at 1% level; **: significant at 5% level | | | | | | |

As the results clearly reveal, except for health technicians the conflict is significantly and negatively associated with the number of medical personnel across provinces. The insignificancy of the association for the number of health technicians is not surprising

considering that health technicians are the the least educated among the medical personnel we consider. It seems the conflict has been driving away the highly educated medical personnel from provinces where the clashes take place. A look at the distribution of SFCs over the years and provinces makes the magnitude of the impact more clear. In 1993, the average number of SFCs in provinces with positive casualties was 26, and there were 12 provinces with higher number of casualties. Based on the estimated coefficients, a province with 26 SFCs is expected to have 20% less specialist doctors, 10% less practitioners, 12% less dentists, 5% less nurses, and 10% less midwives in 1994 compared to provinces away from the conflict zone. These declines correspond to 38% less specialists, 20% less practitioners, 25% less dentists, 11% less midwives in provinces with around 56 SFCs, which is only one standard deviation away from the mean number of casualties, compared to provinces with no casualties. Note that there were five provinces with a higher number of SFCs in 1993. Even more strikingly, in 1994, when the conflict peaked, the average number of SFCs in provinces with positive casualties was 35, and there were 9 provinces with a higher number of SFCs.

Clearly, the conflict has a negative association with the availability of medical personnel. The question now is whether availability of medical personnel is an important determinant of public health outcomes. The next table (Table 4) presents the results we get when we estimate our Tobit model of public health outcomes.

**Table 4: Results of the tobit regressions on public health indicators**

| **Dependent variable:** / **Independent Variables** | **Percentage of births unattended by medical personnel** | **Percentage of births unattended by medical personnel** | **BCG vaccination rate among new borns** | **BCG vaccination rate among new borns** |
|---|---|---|---|---|
| Number of SF casualties in previous year | 0.112*** (7.08) | 0.130*** (7.73) | -0.184*** (-7.15) | -0.10*** (-3.32) |
| Population in ten thousands | 0.019*** (3.60) | 0.01 (1.61) | -0.009 (-1.04) | -0.011 (-1.26) |
| Number of midwives in the province | -0.01*** (-5.83h) | -0.009*** (-3.51) | 0.01*** (2.87) | 0.015*** (2.81) |
| GDP per capita in constant prices | | 0.002 (0.33) | | -0.002 (-0.24) |

| Table 4: Results of the tobit regressions on public health indicators | | | | |
|---|---|---|---|---|
| **Dependent variable:** / **Independent Variables** | **Percentage of births unattended by medical personnel** | **Percentage of births unattended by medical personnel** | **BCG vaccination rate among new borns** | **BCG vaccination rate among new borns** |
| Year dummies | not reported, available upon request | | | |
| Province dummies | not reported, available upon request | | | |
| ***: significant at 1% level; **: significant at 5% level; *:significant at 10% level | | | | |

The estimated coefficients indicate that while the conflict is associated with a worsening in these indicators, the number of midwives is associated with an improvement. These results support our claim that the flight of medical personnel away from conflict areas is one important mechanism through which civil conflicts hurt public health in host societies.

FLIGHT OF TEACHERS

Like public health, education is also a life chance that is severely hampered by civil conflicts. Recent studies provide substantial empirical evidence that civil conflicts are indeed negatively associated with educational attainment, school enrollment, learning in classroom, and educational spending in host societies.

Chamarbagwala and Moran (2011) demonstrate the strong negative impact of the Guatemala's 36-year-long civil war on the educational attainment of the most disadvantaged social and ethnic groups of the Guatemalan society. De Walque (2006) finds that the Cambodian genocide had a lasting impact on the educational attainment of the population. Investigating the effect of Uganda's civil conflict on combatants, Blattman and Annan (2010) find that young males who were recruited into armed groups received less schooling, are less likely to have a skilled job, and more likely to earn lower wages. Merrouche evaluates the long run impact of Cambodia's 30 years of war on education levels and earnings. Akresh and De Walque (2008) study the impact of Rwandan genocide on children's schooling and find a strong negative impact. Studying cross country UNESCO education data, Lai and Thyne (2007) find that both educational spending and enrollment decline during periods of civil war. Poirier (2012) measures the impact of war on a sample African countries, and shows that periods of conflict have a strong positive impact on the number of children not attending school, and a strong negative impact on

secondary school enrollment rates. For Central Asia, Shemyakina (2011) finds that the civil war in Tajikistan had a dampening effect on educational attainment and school enrollment of girls. Singh and Shemyakina (2013) report a substantial negative effect of the Punjab insurgency on the educational attainment by girls. Analyzing the standardized test scores of Turkish high school students, Kibris (2013) demonstrates how the ethnic conflict in Turkey reflects negatively on the educational achievement of students in the conflict zone.

Kibris (2013) provides similar discussion on the possible mechanisms behind the negative impact of civil conflicts on education and points to the destruction of schools, and infrastructure; the displacement of large populations from their homes and the resulting deterioration of their life conditions; financial and psychological distress of parents, students and educators; the diversion of economic resources from education to military uses; disruptions in daily life; and finally the flight of teachers from conflict areas. Kibris argues that in the Turkish case, the last one of these mechanisms, that is, the lack of experienced and skilled teachers in the conflict zone is responsible for the low educational performance of students from those regions.

Following Kibris' argument, we collected data on the yearly number of primary school teachers across provinces in Turkey in the 1986-2003 period, and analyzed whether the conflict had any association with these numbers. We estimated the following model, again using negative binomial regression analysis.

$$E(R_{i,t}) = \lambda_{i,t} = \exp(\alpha + \beta_1 C_{i,t-1} + \beta_2 G_{i,t} + \beta_3 S_{i,t} + \beta_4 T + \beta_5 P + u_{i,t})$$

where $R_{i,t}$ $G_{i,t}$ is the number of teachers in primary education in province i, in year t; $C_{i,t-1}$ is the number of SFCs in province i, in year (t-1); $G_{i,t}$ is the GDP per capita in constant prices in province p in year t; $S_{i,t}$ is the number of primary education students in province p in year t; T is a vector of year dummies; and P is a vector of province dummies. Table 5 below presents the results.

**Table 5: Results of the negative binomial regression on the number of primary education teachers**

| **Dependent variable:** | **Number of primary education teachers** |
|---|---|
| **Independent Variables** | |
| Number of SF casualties in previous year | 0.996*** (-8.58) |
| Number of primary education students | 1.00*** (22.25) |

| Table 5: Results of the negative binomial regression on the number of primary education teachers | |
|---|---|
| **Dependent variable:** | **Number of primary education teachers** |
| **Independent Variables** | |
| GDP per capita in constant prices | 1.00<br>(1.61) |
| Year dummies | not reported, available upon request |
| Province dummies | not reported, available upon request |
| ***: significant at 1% level; **: significant at 5% level; *:significant at 10% level | |