Persistent effects of civil conflict on schooling and earnings in Nepal

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Empirical cross-country and cross-regional studies of the impact of civil conflict, albeit variation in duration of recovery, suggests that the effects of the severe periods of violence on economic and human capital outcomes vanishes over time (Chen et al. 2008, Cerra and Saxena 2008, Miguel and Roland 2011 etc.). Micro-level studies have mostly focused on short-term impact of conflict on child educational and health outcomes (Akresh and De Walque (2010), Akresh et al. 2010, Arcand and Wouabe 2009, Annan and Blattman 2010, Valente 2013 etc.) and find negative immediate impacts. Leon (2012) is an exception, which investigates long-term impact of political violence on educational achievement in Peru and finds only cohorts that have long-term losses are those that are exposed to violence during their early childhoods; others are able to recover.

This paper aims to add to the micro literature of conflict, in particular the latter, by investigating the short, medium and long-term effects of civil conflict on educational attainment in Nepal. In additional, the micro literature of civil conflict, to my knowledge, have mostly ignored the long-term impact of violence on individuals' labor market outcomes and earnings. This paper aims to fill some of this gap by investigating how one's exposure to conflict during his/her critical stage of schooling cycle affects his/her earnings during adulthood. If the macro-level trends are true at the micro-level, local labor market and individuals should be able to recover and any effect of civil conflict should vanish in the longer-run. On the other hand, however, the well-established micro literature of "fetal origin hypothesis" suggest that in-utero and early childhood exposure to shocks have irreversible consequences on health, education, and income (see Almond and Currie 2011 for the comprehensive review of the topic).

Therefore, depending on timing of the exposure to conflict one would expect heterogeneous effect of the conflict on the long run educational and earning outcomes.

In order to investigate the topic, this paper exploits the variation in geographical level casualties of the conflict and variation in the exposure to the conflict by birth year within the geographical region. We use the detailed individual level data of the victims of the Maoist insurgency in Nepal to define conflict intensity across districts and over-time. We merged the conflict data with individual level data from pre, during, and post conflict periods to answer the short, medium and long-term effects of civil conflict (see data and empirical section).

Conflict Data:

The Informal Sector Service Center (INSEC) is a very active Nepalese non-governmental human right organization. INSEC extensively collected information on human rights violations during the Maoist insurgency and created an archive of the victims' information. The INSEC database is considered the most reliable data source on casualties of the conflict. Many studies including Do and Iyer (2010), Nepal et al. (2011), Valente (2014) and Libois (2016) have used the database. We exploit detailed individual level data created by Joshi and Pyakurel (2014) using the INSEC's documentation on the victims. The dataset provides rich information on each victim's demographic, social and economic characteristics. Importantly, it reports the district of the incident, victim's permanent district, and the date of the incident.

Table 1 reports the descriptive summary of the victims. In total the dataset contains information on 14,982 victims, with most (13,210) being fatal casualties. More than 60% of the casualties are the results of the state being the main perpetrator of the incident. The average

age of the victims is 28.3 and almost all the victims are male (89.9%). Slightly less than the half of the victims are from higher caste (44.73%) and most likely to have had some secondary school. As expected, the rebel (CPM-M) side has the most casualties and most victims were actively involved in politics. Noteworthy, slightly above 7% of the victims are either students or teacher, which may have direct effect on schooling outcome explored in the paper.

Total number of casualties over-time is presented in figure 1. The conflict started in 1996 and ended in February 2006 with the agreement of peace accord. As seen in the figure, the early years of the conflict saw few casualties but the figures increased drastically after 2000, with most casualties in 2002. We use the intensity of the conflict as the main explanatory variable. It is normalized to per 1000 population. We use district population from 1991 census (pre-conflict) to normalize. Figure 2 and 3 present the variation in geographical intensity of the insurgency by the location of the incident and the victim's place of origin respectively. Figure 4, presents the variation in intensity of conflict over-time by district of the event.

Individual and Household Data:

Individual and household data from the 2003/04 and 2010/11 Nepal Living Standard Surveys and the 2008 Nepal Labor Force Survey data are merged with the local conflict intensity data. Both the NLSS and NLFS are nationally representative data collected by the Central Bureau of Statistics (CBS) Nepal and both follow the World Bank's LSMS methodology and share same sampling framework. Figure 1 presents various household level data that are available for the analysis. We choose the above three surveys, in particular, because of their timing, which allow us to look at short, medium and long-term impact of the conflict on educational

attainment and labor market outcome. The three surveys cover wide range of topics: demography, health, household members' detailed educational, work and earning history. We plan to use the 2001 and 2011 Population Censuses for robustness checks.

Empirical Strategy:

Following the standard practice in the literature evaluating the impact of civil conflict on individual outcomes, we exploit the variation in exposure to the conflict by birth year cohort and geographical residence of individuals surveyed. Since most of the violence and destruction of schooling infrastructure took place in the rural places, we restrict our analysis to the individuals living in the rural areas.[1] As seen in table 1, many of the victims of the insurgency have had some secondary schooling. This is likely because many of the moist recruits during the insurgency were secondary school dropouts. Therefore, it is likely that individuals who are exposed to the conflict during their primary-schooling age may have different experience than those exposed during their secondary-school years. Leon (2012) finds differential effects between preschoolers and those already in school at the beginning of the conflict in Peru. We, thus, break the individuals into three cohorts: in-utero and preschoolers in 1995 (aged 0-5), primary school aged 6-10, and secondary school aged 11-16. We use the cohort aged 17 to 20, those who would have completed their secondary school in 1995, as our control group.[2] We use individuals aged 20 to 25 in 1995 as a second control group for placebo tests.

$$E_{icdt} = \delta_d + \eta_t + X_{id} + \gamma_r(c) + \beta(\lambda_c \times Violence_d) + \varepsilon_{idt} \qquad (1)$$

[1] Most of the schools in rural Nepal teach until secondary school, SLC. Students who passed the SLC exams usually move to cities for further studies.

[2] These cohorts would become aged 8-13, 14-18, and 19-24 in 2003, aged 13-18, 19-23 and 24-29 in 2008, aged 15-20, 21-25 and 26-31 in 2010. Preschoolers in 1995 are especially interesting as they will have completed secondary school by the NLSS III.

where E_{icdt} is a schooling outcome (years of schooling, completion of primary school or SLC) of individual i of cohort c residing in district d born in year t. While δ_d are district fixed effects, η_t are birth year indicators. X_{id} is a vector of individual time-invariant characteristics such as ethnicity and gender. We also include development region specific cohort trends, $\gamma_r(c)$, to isolate the variance in cohort's outcome in deviation from the long-run trend in his/her development region.[3] The interaction term, $\lambda_c \times Violence_d$, is an interaction between the cohort fixed effects (λ_c) and number of casualties due to insurgency normalized to 1,000 inhabitants till the time of the survey in district d. We run separate regression for the 2003/04 NLSS, 2008 NLFS and 2010/11 NLSS surveys.[4] Additionally, instead of estimating just three βs in above equation, one can interact the conflict intensity with each year of birth cohort dummies and estimate the impact on each birth cohort.

Under the assumption that there is no correlation between the number of district level casualties and unobserved factors varying with district and birth cohort within the development region, β in equation 1 identifies the causal effect of conflict intensity on schooling. While interpreting the results, given the set of fixed effects in equation 1, β do not identify the effect at national level rather identified due to the exposure to conflict by district and birth cohort net of cohort trends common to all the districts within the region. However, one would still be worried about endogenous migration due to conflict. To control for such endogeniety, we use conflict intensity at the place of birth instead of where the individuals are observed at the time of the survey. District of birth is a good instrument for place of residence as 85.2% of Nepali

[3] Nepal, before the new constitution in 2015, was divided into five development regions that are relatively homogenous in terms of development, geographical terrain and ethnic composition.
[4] As the conflict ended in 2006, variable $Violence_d$ is same for 2008 and 2010/11.

individuals are observed to be residing in the same district as their birth in the 2011 Population Census.

In addition to the above strategy, we utilize the NLSS I data (pre-conflict period) and estimate the following equation that is identified through the exposure to conflict by survey year and district.[5]

$$E_{ids} = \delta_d + \eta_s + X_{ids} + \gamma_r(s) + \beta(\lambda_s \times Violence_{sd}) + \varepsilon_{ids} \quad (2)$$

where E_{ids} is a schooling outcome of individual i residing in district d surveyd in year s. η_s are survey year indicators. X_{ids} is a vector of individual time-invariant characteristics such as ethnicity and gender for an individual in survey year s. $\gamma_r(s)$ are development region and survey-year specific trends. The interaction term, $\lambda_s \times Violence_d$, is an interaction between the vectors of survey identifiers and number of casualties per 1,000 inhabitants in district d that occurred between the person's year of birth and survey year s. We use NLAA I, II and III for this analysis and use people who are 15-25 years of age. While a person aged 15 in district d observed in NLSS I will have 0 exposure to the insurgency, a person of same age in the same district but observed in NLSS II will have 7 years of exposure. Similarly, an individual aged 15 observed in NLSS II will have observed full 11 years of the violence. One can use the 2008 labor force survey instead of the 2010/11 NLSS to see medium-term impact. The advantage of this approach is that the impact is identified using the cohorts that are born only 7 years apart but have experienced drastically different degrees of conflict. Equation 2 identifies the impact of conflict intensity on educational attainment under the assumption that there is no correlation

[5] Valente (2013) used similar strategy but for years 2001 and 2006 DHS data in Nepal.

between the cumulative district level casualties until the survey year and unobserved district-survey-varying factors.

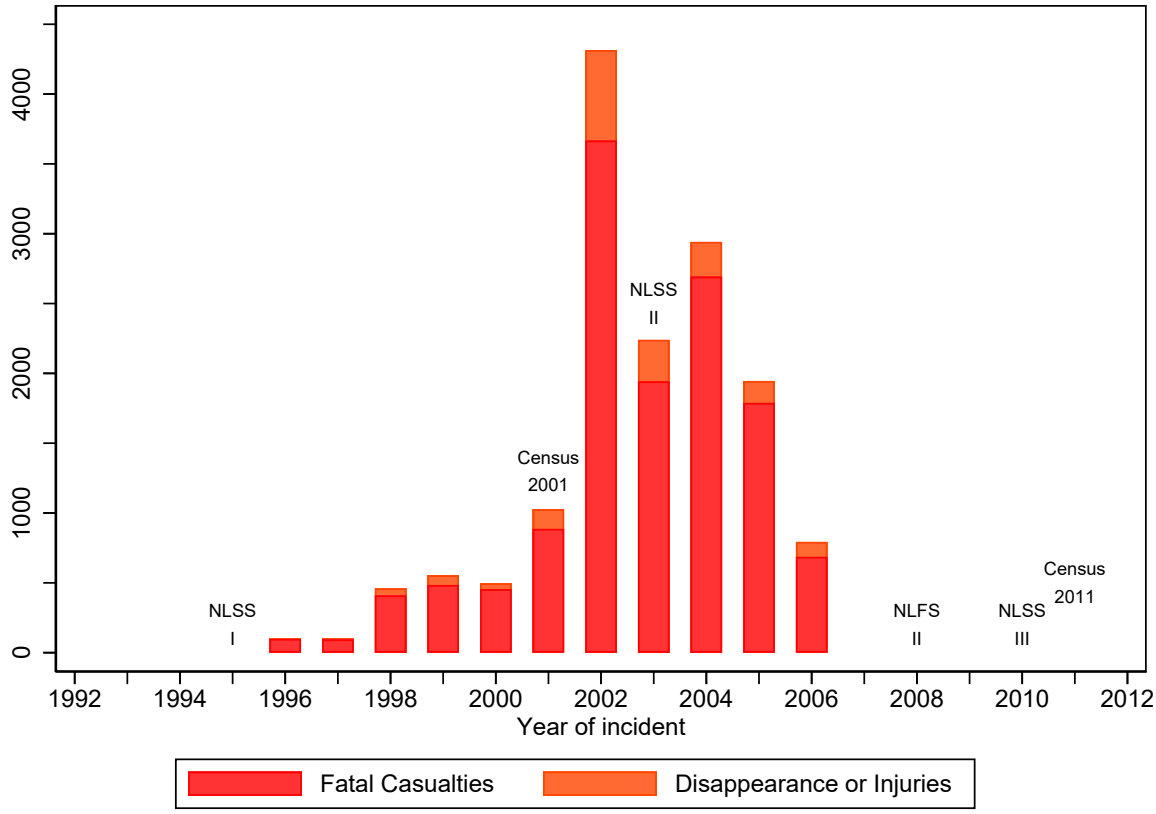
One can use equation (2) to estimate the impact of conflict on labor market outcomes of individuals. The conflict is likely to have affected district labor markets as well and hence the wages. Equation 1, thus, will provide biased estimates of the impact of conflict on wages. Additionally, precisely because of these reasons, it is difficult to provide the causal estimate of return to education in this context. However, equation 2 will provide reduced-form evidences.

Table 1: Characteristics of the victims of civil conflict in Nepal

Total casualties	14982	Political affiliation (%)	
Killed	13210	Nepali Congress	3.19
Disappeared	998	CPN-UML or ML	1.50
Injuried	774	CPN Maoist (rebel)	48.32
		Other parties	0.91
Perpetrator		No affiliation	46.07
State	9208		
Maoist	5302	Occupation (%)	
Other	472	Agriculture	21.01
		Wage laborer	2.27
Age (mean)	28.34	Employed	1.47
Female (%)	11.10	Teacher	1.68
		Police	11.92
Social caste (%)		Army	6.53
Bramin or Chettrey	44.76	Lawyer	0.05
Janajati, Aadibashi or Dalit	46.82	Doctor	0.04
Madeshi or Muslim	6.25	Politician	43.89
Other	2.17	Social worker	0.16
		Rights activists	0.03
Education (%)		Sports personality	0.05
Bachelors degree or more	2.61	Driver	0.23
Intermediate	7.30	Student	5.50
Secondary school	26.26	Journalist	0.03
Lower secondary school	21.99	Businessman	1.57
Primary school	14.32	Ex-security personnel	0.01
Literate	15.05	Other, not clear	3.56
Illiterate	12.47		

Notes: Data is created by Joshi and Pyakurel (2014) using INSEC's archived on the conflict victims (http://www.insec.org.np/victim/). While classes 8 to 10 are defined as secondary school, 6 and 7 are lower secondary school. Nepali Congress (Democratic) and Nepali Congress are combined as one as the former was formed due to a vertical split of Nepali Congress into two in 2002. However, the parties merged into one in 2007. Similarly, Communist Party of Nepal - Marxist Leninists (CPN-ML) was reunited with the Communist Party of Nepal - Unified Marxist Leninists (CPN-UML) in 2002 but few members refused to go along the merger forming a new party with the same name. Party's sister organizations and student wings are also accounted for while assigning party affiliation.

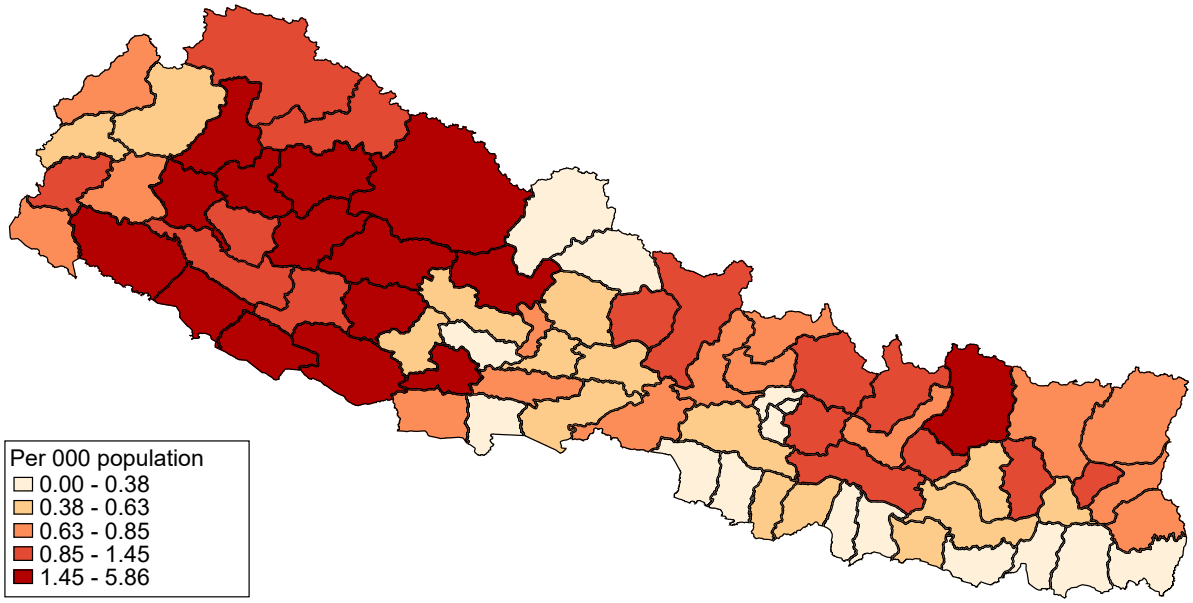
Figure 1: Conflict timeline and structure of the data



Sources: Informal Sector Service Center (INSEC) Nepal; Joshi and Pyakurel (2014).

Notes: The data set is created by Joshi and Pyakurel (2014) using INSEC's archived on the conflict victims http://www.insec.org.np/victim/.

Figure 2: Number of casualties by district of incident



Sources: Informal Sector Service Center (INSEC) Nepal; Joshi and Pyakurel (2014).

Notes: Casualties numbers are normalized to per 1,000 population. District populations are based on the 1991 Population Census.