9-21-2007

Inequality, Polarization and Violent Conflict: The Maoist Insurgency in Nepal

Mani Nepal

Alok K. Bohara

Kishore Gawande

Inequality, Polarization and Violent Conflict: The Maoist Insurgency in Nepal

Mani Nepal*
University of New Mexico

Alok K Bohara**
University of New Mexico

Kishore Gawande***
Texas A&M University

(September 2007)

---

*Visiting Assistant Professor, Department of Economics, MSC 3060, University of New Mexico, Albuquerque, NM 87131, Email: Nepal@unm.edu, Tel. 505-277-7010 and Lecturer, Central Department of Economics, Tribhuvan University, Kathmandu, Nepal.
** Professor, Department of Economics, MSC 3060, University of New Mexico, Albuquerque, NM 87131, Email: bohara@unm.edu, Tel. 505-277-5903.
*** Professor, Bush School of Government and Public Service, Texas A&M University, College Station, TX 77843-4220, Email: kgawande@bushschool.tamu.edu , Tel. 979- 458-8043. We acknowledge Nepal Study Center (NSC) at the University of New Mexico for making available the necessary data for this research.

Abstract

We investigate the effect of inequality, measured by Gini and Polarization indices, on the level of Nepal's conflicts due to Maoist's People's War using rational choice theory. The number of people killed by Maoist rebels during 1996-2003 in each Nepalese village is modeled as count data at the village level, with heterogeneity across villages in each district. We find strong evidence that greater inequality escalates deadly violence; the presence of social network and the government welfare programs may reduce it; and the level of income is unrelated to conflict but may mitigate effect of inequality on conflict. The inequality variables themselves have distinct effects. Polarization appears to be a more resilient inequality that causes conflict.

Keywords: Inequality; Polarization; Killings; Negative binomial multilevel model;

JEL Classification: C23, D63, H56

INEQUALITY, POLARIZATION AND VIOLENT CONFLICT: THE MAOIST INSURGENCY IN NEPAL

1. **Introduction**

Is inequality associated with conflict? Sociologists, political scientists, and recently economists, have contributed to a rich theoretical literature in their attempts to answer this question. There is little doubt about the importance of this question and the implications it has for governance and government. Conflict is costly for society. In its cheapest form it alters the social and productive fabric of society that has been built over generations, and in its more expensive form it can destroy them beyond repair. If ameliorating inequality can forestall conflict, the role of government as an agency that can capably redistribute wealth and income is critical. To be sure, inequality need not be the only source of conflict. Weak rule of law, biased or ineffective enforcement of property rights and dearth of social capital are examples of poor or missing institutions that may mitigate conflict. Their absence can trigger conflict independently of inequality (Easterly 2001). When interacted with weak institutions, it is a trigger.

The objective of this paper is to empirically examine this association between inequality and conflict. The setting is the Maoist rebellion in Nepal that has claimed thousands of lives since it began in 1996. The regional variations across villages in Nepal afford a rich experiment, without having to use cross-country data, for exploring the nature of the association between conflict and inequality. When using cross-country data, the heterogeneity in cross-cultural norms, institutions, and unique historical settings can produce different reference points or anchors, and a lack of common anchor within the sample can bias the perception of the threat and hence the measurement of such variables. Cultural and historical differences may influence

the perception of acceptable levels of violence in cross-country settings. Our micro level sub-national data avoids such cross-cultural heterogeneity and differential perceptions.

The first contributions in this area were made theoretically by Gurr (1970) and empirically by Sigelman and Simpson (1977).[1] Cross-country studies of conflicts are not unequivocal about the relationship between inequality and conflict.[2] Using the terrorist conflict in Basque Country, one of the seventeen regions in Spain, as a case study, Abadie and Gardeazabal (2003) find a considerable reduction of per capita GDP in the Basque Country relative to a synthetic control region without terrorism. In a cross-national study of African countries, Easterley (2001) finds that ethnic fractionalization increases the likelihood of war casualties, and good institutions are effective in mitigating this threat.

We depart from previous empirical studies in three respects. First, the empirical specification is motivated by rational choice theory. The theory clearly brings out the logic for why, when society becomes unequal, agents may resort to forcible redistribution by unlawful means. In the absence of effective institutions these means can and do turn violent. The theory is used to produce testable hypotheses about the relationship between inequality and conflict. The issue variables in our model thus have a strong link with underlying theory. Second, our data are sub-national within Nepal. Thus, they suffer less from heterogeneity problem than do cross-country data that have been used frequently in the literature. Our data, assembled from human rights reports, consists of the number of deaths inflicted by the Maoist forces in each Nepalese village between 1996 and 2003. Empirically, we model killings by Maoists using a hierarchical (count-data) model in order to account for the remaining heterogeneity in the data.

[1] On sociology-of-conflict theories, see also Gurr (1980). Cross-country studies of conflict and inequality pervaded the early literature since this seminal paper. See Collier (2000), Mueller (1985), Mueller and Seligson (1987), Selbin (2002), Wang et al. (1993), Weede (1986, 1987), and Williams and Timberlake (1984), for example.

[2] Lichbach's (1989) survey indicates both positive and negative relationships in the literature.

Third, and perhaps most important, we go beyond the popular Gini index to measure inequality. We employ measures of polarization proposed in Esteban and Ray (1994, 1999).

This paper is organized as follows. In Section 2 we describe a theory that focuses on inequality as a cause of conflict. In Section 3, we advance three hypotheses based on the theory that we test using village-level data from Nepal. The Nepalese data are described in detail, and the estimating equation is motivated. In Section 4 we discuss the results, and Section 5 concludes.

2. Theory

Milante's (2004) simple model starkly demonstrates how inequality causes conflicts. In anticipation of the empirics, the theory focuses on inequality in wealth. Consider a two-period model of an economy with *N* agents. The agents are indexed in ascending order of their initial wealth w_n. Thus $w_1 < w_2, ..., < w_N$. Let the total wealth of all agents be normalized to unity so that w_n is agent *n*'s share of wealth. The main conclusions are particularly clearly demonstrated with a geometric distribution of initial wealth parameterized by $\Delta > 1$, and given by $w_n = \Delta w_{n-1}$, $n = 1, ...N$. Then agent *n*'s wealth may be written as a function of just agent *1*'s wealth as

$$w_n = \Delta^{n-1} w_1, \quad n = 1, ..., N. \qquad [1]$$

Summing across all agents and using [1], w_1 is solved as

$$w_1 = \frac{\Delta - 1}{\Delta^N - 1}. \qquad [2]$$

Perfect equality is represented by $\Delta = 1$. As Δ diverges from unity, inequality increases.[3] The parameter Δ determines the "distance" between the wealth endowments of any two agents. Clearly, the larger is Δ the greater the inequality in the distribution of wealth by any standard measure such as the Gini index. Δ is also directly linked with Esteban and Ray's (1994, 1999) concept of polarization. The wealth of agent *n* as a function of Δ is given as

$$w_n(\Delta) = w_1\Delta^{n-1} = \frac{\Delta^{n-1}(\Delta - 1)}{\Delta^n - 1}. \qquad [3]$$

2.1. Redistribution

In economic models, conflict is defined and modeled as resources devoted to redistribution or the amount of redistribution itself. Esteban and Ray (1999), for example, view conflict as the total amount of spending by agents to bend policy in the direction of their ideal preference. Persson and Tabellini (1994) and Perotti (1993) similarly define conflict in terms of redistributive activity (which increases with inequality). In Milante's (2004) model conflict is measured as the net change in wealth, after resources are spent on redistributive activities that "appropriate". Extending Milante's model to one in which a constraint is reached on the ability of some groups to come up with the resources necessary to prevent further redistribution, their deprivation increases and produces violent conflict beyond a threshold level.[4]

Suppose agents are able to expend part of their wealth on activities devoted to redistributing the total wealth in the economy in their favor. These activities take a variety of forms. In models of crime this consists of theft of property and wealth, and expenditures on armed guards to prevent such theft (Kelly 2000). In models of governmental corruption this takes

[3] By L'Hopital's rule, $\lim_{\Delta \to 1} \frac{\Delta^N - 1}{\Delta - 1} = N$, and from [3.2] $Nw_1 = 1$ or $w_1 = 1/N$.

[4] In Milante (2004) violence is disallowed, and a "privation" effect works to reduce the amount of redistribution.

the form of bribing officials or else productive activity is blocked (Bardhan 1997). In political-economy models this takes the form of lobbying politicians to bend policy and satisfying the resources politicians need to finance reelection campaigns (Baye, Kovenock and de Varies 1993). Denote the resources spent on appropriation activity by agent *n* as $g_n \in [0, w_n]$.

Governments must take steps to ensure that both rich and poor have equal access to institutions that redistribute. Otherwise, as we will see, inequality increases to a point of instability of the system that compels redistribution via violence and force. In this framework, agent *n*'s activity devoted to redistribution can take a form of violence if the required spending on such activity exceeds his available wealth, $g_n > w_n$.

The amount of the economy's wealth that is appropriable or redistributable depends on the extent of property rights laws and their enforcement. Denote by $0 \le \beta \le 1$ the fraction of any agent's wealth that cannot be redistributed or contested. Thus, the redistributable wealth of the economy is given by

$$(1-\beta)\sum_{i=1}^{N}(w_i - g_i), \qquad [4]$$

All individuals have equal access to this redistributive wealth.[5] Suppose the fraction of the contestable wealth captured by agent *n* is determined by the ratio of the resources devoted to redistribution by agents *n* to the total resources devoted by all agents towards redistributive

[5] In economies with weak legal institutions, this is not typically the case. In fact, agents in the position of power or with access to wealth have greater access to policy instruments that are used by politicians to redistribute wealth. In that case, the wealth inequality is further exacerbated.

activity, or $g_n / \sum_i g_i$.[6] Then agent *n*'s payoff, I_n, is the sum of his uncontested income and the amount of wealth he appropriates from the economy's pool of contestable wealth,

$$I_n = \frac{g_n}{\sum_{i=1}^{N} g_i}(1-\beta)\sum_{i=1}^{N} w_i - g_i) + \beta(w_n - g_n). \qquad [5]$$

Agent *n* chooses g_n to maximize this objective function. Milante (2004) shows that the optimal spending on redistributive activity by an agent is given by,[7]

$$g_n = g^* = \frac{(N-1)(1-\beta)}{N^2}, \qquad n = 1,...,N\ . \qquad [6]$$

Thus, the less contestable is other people's wealth, the lower is the per capita spending on redistributive activity.[8] At this optimal solution, the income of agent *n* is

$$I_n(\Delta) = (1-\beta)\frac{1}{N} - g^* + \beta w_n(\Delta). \qquad [7]$$

This leads to the main result about inequality and total redistribution. Define by $r_n(\Delta)$ the net change in agent *n*'s wealth (as a function of Δ). Then,

$$r_n(\Delta) \equiv I_n(\Delta) - g^* - w_n = (1-\beta)[\frac{1}{N} - w_n(\Delta)]\,. \qquad [8]$$

Note that this redistribution sums to zero over the full population: $\sum_n r_n(\Delta) = 0.$ Let $\bar{n}$ index the individual with the mean income. Since $w_{\bar{n}} = 1/N$, $r_{\bar{n}} = 0$. Denote by $R^+(\Delta)$ the total net wealth

[6] Different models differ in this assumption. Esteban and Ray (1999) have a full behavioral model in which the redistribution is a positive but a convex function of the amount of lobbying so that redistribution is expensive.

[7] In Esteban and Ray's (1999) more general behavioral model, different groups generally expend different amounts depending on the antagonism in that society. Antagonism is measured by "distance" of the utilities of each group's preferred positions from every other group's preferred position.

[8] Multiplying both sides of [6] by *N* yields total spending on redistributive activity as $Ng^* = (1-\frac{1}{N})(1-\beta).$ Thus, the fraction of the economy's total wealth devoted to redistribution is increasing and concave in *N*.

change accruing to the population with above mean income and by $R^{-}(\Delta)$ the total net wealth change accruing to the population with below mean income. Then

$$R^{+}(\Delta) = \sum_{n=\bar{n}}^{N} (1-\beta)[\frac{1}{N} - w_n(\Delta)], \qquad [9]$$

and, $$R^{-}(\Delta) = \sum_{n=1}^{\bar{n}} (1-\beta)[\frac{1}{N} - w_n(\Delta)]. \qquad [10]$$

Clearly, if $\Delta = 1$, indicating no inequality, $R^{+} = R^{-} = 0.$ However, with inequality, Milante (2004) shows that

$$\frac{\partial R^{+}}{\partial \Delta} < 0, \qquad [11]$$

and $$\frac{\partial R^{-}}{\partial \Delta} > 0. \qquad [12]$$

There are two important messages. The first is that in the presence of institutions that afford equal access to redistributive resources, redistribution reduces inequality. To take an example, suppose that the only instrument of redistribution is taxes levied by the government which are "earned" by each individual according to their lobbying expenditures g^{*}. Then under plausible conditions (more on this below), redistribution takes away from the above-mean-income individuals and gives to below-mean-income population, making the wealth distribution more equal. The second message is that the greater the inequality, the greater the redistribution.

This is a plausible story for developed countries which have developed such institutions. But two critical assumptions are required if the story is to end here. They are:

- The required per capita spending on redistributive activity does not exceed initial wealth, $g^{*} < w_n,\ n = 1,....,N,$ and

- There is an equal access for all individuals to instruments of redistribution, that is, the contestable wealth is equally accessible to all.

Suppose, as is often true is the developing world, these assumptions are violated. In addition, suppose legal institutions are weak. Specifically:

- There is weak enforcement of the law.

Then theft and violence also become instruments of redistribution, making the situation combustible. The same mechanism that would foster equality in the presence of requisite institutions now endangers violence. If only a small numbers of agents relative to the population experience deprivation in the sense of $g^* > w_n$, they will probably find it hard to organize, and will go about their appropriation activities individually.[9] However, if there is a great number of agents whose income falls below their optimal expenditure on appropriable activity, the coordination problems that prevented them from organizing due to their small numbers is overcome. This is especially true, as in the case of organized violence, if there are increasing returns to organizing. Then destructive inter-group conflict becomes a reality. In sum, a threshold level of inequality that leads to deprivation for a significant section of society lays the basis for violent conflict. When this section is too poor to afford the required resources for (peaceful) redistribution, then they must resort to violence as a means of redistribution, if that instrument is possible. The haves are able to continue to provide g^*, exacerbating the inequity. Violence is the only means at the disposal of the have-nots to prevent further deterioration in their wealth distribution. Where enforcement is weak, and critical mass is organized for violence, we see it unleashed.

[9] Risk-aversion on the part of agents works to further control the situation.

The sociology literature contains the most sophisticated early analysis. According to Gurr (1970), relative deprivation (RD), defined as a person's perception of the discrepancy between his income expectations and income capabilities, foments conflict.[10] The potential for collective violence varies strongly with the intensity and scope of relative deprivation among members of a group.[11]

Our analysis has thus far taken as given the existence of inequality in order to demonstrate the potential for inequality to lead to conflict. More commonly, inequality is the results of decades, even generations, of oppression by those in power. Granovetter and Tilly's (1988) analysis of why inequality exists and persists identifies five actors: capitalists, workers, organizations, households and government. These actors "contend over the rewards of labor in the three arenas of employment status, jobs, and labor market and do so primarily by attempting to influence the process of ranking and sorting" (p. 180).

The relative bargaining strengths of these actors are responsible for the (equilibrium) labor market outcome of the ranking and sorting processes. These translate into the nature and extent of income inequality, consumption inequality and wealth inequality in that society. The threat points in this bargaining game are importantly determined by the ability of these actors to solve internal organizational problems and coalesce in order to exert the greatest pressure during the sorting and ranking processes. Ebbs and tides in the relative threat points of these actors are determinants of historical changes in inequality. For example, if the monopsony power of landlords in rural labor markets gives rise to rural inequality, then inequality persists and

[10] Gurr uses the terms "value" expectations and "value" capabilities, which are more inclusive terms than our interpretation. Value expectations, in Gurr's terminology, refer to goods and conditions of life to which people believe they are rightfully entitled.

[11] In the theoretical model inequality is captured by the parameter Δ. If, as the theory has assumed, all agents have the same capabilities and expectations, this parameter is an adequate measure of RD. Modeling inequality with heterogeneity in capabilities and expectations within and across groups is more complex, but our polarization measures are designed to empirically capture this heterogeneity.

worsens as landlords' positions get stronger. If, however, property rights are not enforceable publicly by the government or privately by the landlords, the increasing inequality induces rural workers to organize and conduct appropriation activities as predicted by the theory.

In their analysis of the American experience with inequality, Willimson and Lindert (1980) suggest that uneven technological development, rapid increase in the supply of unskilled labor (due to the lack of education), and accelerated capital accumulation were the three most important factors behind the increases in inequality. Uneven technological development and accelerated capital accumulation sharply biased the receipt of rewards, while an increase in the supply of unskilled labor lowered the bargaining strength of labor.

If institutions that can peacefully redistribute come into being, or if the prevention of theft can be effectively enforced, the mechanism described above may be forestalled. Even in the absence of such legal institutions, other self-enforcing institutions may emerge to limit the amount of violent redistributive activity. While there is debate over how social capital (that measures civic engagement and social connectedness as defined by Putnam (1995)) influences institutions, there is a general acceptance of the idea that "good social capital" provides a solid foundation for democratic institutions. Putnam's (2000) definition of social capital as the collective value of all social networks and the "inclinations that arise from these networks to do things for each other" motivates our measurement of social capital. Often, the source of such institutions in developing countries is the learning that equitable sharing of the peace dividend from avoiding conflict is collectively and individually preferable to a situation with forcible appropriations, which is risky and in which only a few benefit. Lin (2001) likens social capital as economic investment in social relations motivated by market returns. Fukuyama (1995) suggests that social capital makes up for missing institutions by creating a set of informal values and

norms within groups that encourage members of the group to cooperate. Alesina and Angeletos (2005) focus on individual preferences and beliefs regarding what determines income in preventing extreme outcomes. Thus, culture and social capital voluntarily limit forcible appropriations.

Alternatives to engaging in such violent conflict would be voting with one's feet (Tiebout 1956) or using ballots with the hope that the outcome will change the existing situation (Black 1948). The above model predicts that if government makes a commitment towards non-distortionary tax through the agreed upon political process, and formulates credible redistribution programs with benefits that are at least as much as the agent's expected payoffs from appropriation activities, the government can avoid violent conflict. Effective social programs raise the opportunity cost of engaging in violence. If the expected net benefit from such alternatives is greater than that from violent acts, the probability of observing violent conflict is lowered. When institutions do not support outcomes based on voting with one's feet or at the ballot to restore equality, then, as Mueller (2003) observes, violence becomes a viable options. If the wealth distance is large, inter-group alienation works to unify groups into polarized entities (Esteban and Ray 1999, Akerlof and Kranton 2000), increasing the probability and intensity of violence, perhaps dramatically.

3. Hypotheses and Data

3.1. Hypotheses

We will empirically consider the situation in Nepal where violence has broken out in 1996. Although the decade-old Maoist People's War ended after signing the Comprehensive Peace Accord between the Nepalese government and the Maoists on November 21, 2006, the

potential still exists for the conflict to escalate in the future as long as the underlying causes remain unresolved. The motivation for this paper is to understand the root causes. The theory identifies them and also identifies other factors that work to prevent conflict. We focus on the main hypotheses that emerge from the theory, which help us to clarify what problems policy should target. We state the main hypotheses from the model as follows:

H1: *Greater inequality is associated with higher incidence of violent conflict.*

The extent of appropriable wealth in a society depends on property rights and their enforcement. In the case of high intensity conflict, the formal property rights enforcement mechanism may not be functional for obvious reasons. In fact, property rights enforcement is weak to begin with, which, in the presence of rising inequality, is the source of forcible appropriation and redistribution of wealth by violent means. In countries that have experienced weak institutions, institutions evolve in communities due to the need to keep continual disorder from impoverishing the community's wealth. These institutions are built around social values, norms, and networks. They help to enforce property rights informally, which is in the best interest of the community. We postulate that conflict is lower in communities with stronger social capital as measured by social networks that are built to endure. They work by providing mechanisms for shared governance and problem solving within the community without recourse to government institutions that are perceived as being ineffectual at best, and corrupt and biased at worst. Thus, while social capital may not lower inequality, it succeeds in reducing social tension in an unequal society. It provides a platform for the exchange of information among members of the community that promotes mutual understanding and tolerance. The potential for violent conflict is thus reduced.

H2: *Greater social capital is associated with lower incidence of violent conflict.*

The government can and does play a role in lowering poverty. To the extent that it succeeds in stemming the deterioration in the standards of living of the poorest, it may actually forestall conflict. To the extent government measures are unsuccessful, it fails in its bid to prevent the outbreak of violence. We advance two hypotheses about the ability of the government's social welfare programs to effectively lower the incentive for forcible redistribution by individuals.

H3a: *Larger transfers by the government are associated with a lower incidence of violent conflict*.

H3b: *Greater poverty is associated with a higher incidence of violent conflict*.

Thus, all else held constant, the theory explains conflict as:

$$CONFLICT = f(\underset{+}{INEQUALITY}, \underset{-}{SOCIALCAPITAL}, \underset{-}{GOVTGRANT}, \underset{+}{POVERTY}) \quad [13]$$

where *GOVTGRANT* refers to government transfers, and the sign below the variables indicates the type of relationship that we expect *a priori* between the respective variables and the dependent variable, *CONFLICT*.

3.2. Data and Measurement

The empirical setting in which we will investigate the hypotheses about violent conflict is the Maoist uprising in Nepal that began in 1996. Never since its unification in 1768 has Nepal experienced such a violent division within its own rank and file. Ganguly and Shoup (2005) provide an account of experiments with democracy, their failure to improve the average Nepalese citizen's living standards, and the rise of the Maoists.

During and after the 1990 People's Movement that re-introduced multi-party democracy in Nepal, key figures of the Maoist movement took part in the multiparty politics. The

democratic reforms implemented under the 1990 constitution were illusory because they failed to address the fundamental problems facing most Nepalese citizens – inequality and widespread poverty reflected in high infant-mortality, lack of access to basic amenities like power and clean water, and more importantly the rural-urban divide. These shortcomings were dire in the countryside. Further, the upper-caste Hindu-led parties pursued interests that were distant from the median voter – illiterate, with stronger ties to an ethnic community than to the nation.

In 1991 the communist party (United People's Front, UPF) was the third largest political party in the lower house of the parliament. In 1994, a fraction of the UPF broke away from its parent party and ran a parallel party, boycotted the mid-term elections, and planned to start a violent campaign. On February 13, 1996, they did. The People's War began with a simultaneous attack on three remotely stationed police outposts, a bank branch, a soft-drink bottling plant, a liquor factory, and a private house. Their strategy was of a guerilla nature – establishing bases in the rural and remote areas with the objective of surrounding urban centers in order to seize state power. In their base areas, the Maoists redistributed the captured land from absentee landlords and feudal interests to the locals to farm and use as cooperatives. What started as an insignificant and isolated incident in 1996 transformed into a devastating conflict claiming more than 13,000 lives and displacing over 200,000 people over the next ten years.[12] On November 21, 2006 the Maoist People's War was formally ended with signing of historic peace deal with the Nepalese government.

Why did the Maoist outbreak occur and catapult out of control for such a long time? Arguably, the continued expansion of Maoist membership and the increased scale of their activities are due to the prevalent socio-economic deprivation of the people based on caste, gender and ethnicity, which had degraded visibly in the past decades. The mechanism for the

[12] Mahat (2005) and Gurung (2003) describe the Maoist People's War in Nepal in detail.

violent outburst is captured by the theory which underscores deprivation, inequality and polarization as sources of violent conflict, especially in a system characterized by weak institutions.

The empirical challenge before us is to measure the variables as accurately as the theory requires. Nepal is administratively divided into 75 districts, with each district further subdivided into village development committees (VDCs, or 'villages'). There are over 4000 villages. For each village, the dependent variable, conflict, is measured as the number of persons killed by Maoists.[13] These data are drawn from annual reports over the 1996-2004 period of the Informal Sector Services Center (INSEC), a non-profit national human rights organization. The annual reports contain details such as the date of each event that resulted in human casualties, the circumstances surrounding the event, and the number of deaths. The casualty data are summed over the eight-year period from these reports. Due to unavailability of time-series data on important variables such as inequality, polarization and poverty, the natural experiment yields a cross-section. The dependent variable is measured as a stock over an eight-year period that leads other variables by many years. This reduces, but may not eliminate, concerns about endogenity.

The inequality measures we use are (i) the Gini index, and (ii) measures of polarization. Since data on assets or wealth are not available at the household level, we use consumption expenditure data that are available in the nationally representative household survey. Since the survey does not cover all the villages, we use recently developed micro-level estimation technique (described below) for survey-to-census imputation of household expenditures for all villages. The first step is to construct complete household expenditure data in order to measure

[13] An alternative to the count of deaths due to the violent activities would be percentage of people killed during the violence in each village. As an alternative to computing such percentages, we control for population densities of the respective villages.

inequality at the village level. We thus begin with a description of the household survey and the census data.

The data to construct our main explanatory variables are drawn mainly from World Bank's Living Standard Measurement Survey for Nepal conducted in 1995-96 (jointly with Nepal's Central Bureau of Statistics (CBS)), and the 2001 Nepal Population Census. We refer to the Nepal study as the Nepal Living Standard Survey (NLSS). The NLSS consists of nationally representative household survey responses to questions about household income and expenditures, and several socio-economic and demographic characteristics. The data set contains a national sample of 3373 rural and urban households. These households were selected from 274 primary sampling units around the country, or communities, based on a probability-proportional-to-size (PPS) sampling plan. In addition to the household survey, the NLSS also conducted a community-level survey designed to elicit information about community characteristics and the kinds of social networks present in the communities to which the surveyed households belonged.

The 2001 Nepal Population Census, conducted by the CBS, administered two types of forms – a complete enumeration (the "short" form) and sample enumeration (the "long" form). The long form was administered to one in every eight housing units, yielding a sample of 520,624 Nepalese households. In order to construct inequality variables (such as the Gini and polarization indices) and poverty-gap indices for all villages, we require detailed expenditure data for a thicker sample than provided by the NLSS sample.[14] The census sample is far more inclusive but lacks the all-important expenditure (and income) variables. We use a recently developed micro-level estimation technique, developed from small area statistics (Ghosh and

[14] As self-reported household income is less reliable than the measures of household expenditures (Deaton 2000) we use household expenditure as indicators of household welfare.

Rao 1994) to impute expenditures of the census-level households. Elbers, Lanjouw and Lanjouw (2003) provide the theoretical foundation of the micro-level estimation technique.

Essentially, we use the NLSS sample to impute expenditures for the census long-form sample using information on covariates that are common to both NLSS and the census. Let y_l be household *l*'s expenditure obtained from the NLSS survey. A regression of y_l on a vector of covariates X_l, where X_l are chosen so that they are also available for the census sample, is then estimated using generalized least squares. The estimated model is used to impute the census household expenditures. The (long form) census sample with the imputed expenditures is then used to construct our inequality and poverty measures as follows.

Let y_l denote the per capita consumption expenditure of household *l* in the given village. Then the Gini index for the village is given by (Deaton 2000, p. 139):

$$GINI = \frac{1}{\mu N(N-1)} \sum_{i>j} \sum_{j} | y_i - y_j | \qquad [14]$$

where μ is the average expenditure, *N* is sample size, $| y_i - y_j |$ is the absolute deviation of expenditure between a pair of households. An alternative, but related formulation of the Gini index is given by (Deaton 2000, p.139):

$$GINI = \frac{N+1}{N-1} - \frac{2}{N(N-1)\mu} \sum_{i=1}^{N} \rho_i y_i \qquad [14a]$$

where ρ_i is the rank of individual *i* in the *y*-distribution, counting from top so that the richest has the rank 1. For computational purpose, we use [14a].

Esteban and Ray (1999) show that the concept of polarization is fundamentally different from inequality as measured by the Gini coefficient, although the Gini is a special case of the polarization index. In our context, their approach posits that an adequate polarization measure for

consumption spending must reflect three characteristics: (i) in each village, the measure must partition the distribution of consumption spending into more than one group, and preferably not too many; (ii) there must be a high degree of intra-group homogeneity as measured by a large mass within each partition; and (iii) there must be a high degree of inter-group heterogeneity as measured by significant distances between the partitions.[15] Satisfying these conditions leads to a measure that may or may not be correlated with often-used inequality measures like the Gini coefficient. The polarization concept seeks to measure potential hostility or antagonism among the groups, and therefore captures a different dimension of inequality than does the Gini index. This antagonism is a potent source of social tensions that can break down norms and institutions that may have existed for generations, abiding by which had provided peaceful co-existence. The Esteban-Ray polarization measure (for a village) is essentially a mapping of the distribution of consumption spending by families in the village into a value. The higher this value, the greater is the degree of polarization. The polarization index is measured for a specific village as (Esteban and Ray 1994):

$$POLARIZATION(\alpha) = K\sum_{i=1}^{L_i}\ \sum_{j=1}^{N_j}\pi_i^{1+\alpha}\pi_j \mid y_i - y_j \mid, \qquad [15]$$

where $| y_i - y_j |$ is the size of absolute difference in the consumption expenditure of households *i* and *j*, π_k is the k^{th} household's proportional weight[16] and L_k is the number of households sampled from k^{th} village. *K* is a positive constant. In [15] α measures the intensity of group

[15] Axiomatically, their measure purports to satisfy all three conditions: First, the joining of two neighboring probability masses into one mass exacerbates polarization in the presence of another separately identifiable point mass. Second, given three point masses (or partitions), moving a point mass closer away from the center towards an extreme value, however small the move, increases polarization. Third, given two point masses (or partitions), breaking the more centrist point mass equally into two and distributing them at two opposite more extreme points increases polarization.

[16] Since we use the census sample that includes only one in eight households, we construct the household's proportional weight using information about population size of each village and the size of the census-sampled households.

identification, or what Esteban and Ray (1994) term the "degree of polarization sensitivity". It ranges in value between 0 to 1.6. If α=0 and *K*=1, then *POLARIZATION*(0) approximates Gini.[17] The larger the value of α, the greater is the departure of the inequality measure from polarization. We employ the kernel estimation method in Duclos, Esteban and Ray (2004) in order to construct three Esteban-Ray polarization measures at the village level, corresponding to α = 0, 1 and 1.5. They are termed $POLARIZATION_0$, $POLARIZATION_1$ and $POLARIZATION_{1.5}$ respectively.[18]

The poverty measure we construct is the Foster-Greer-Thorbecke (FGT) poverty-gap index for the year 1995-96. It measures the percentage of households (in a village) below the poverty line as:

$$POVERTY = \frac{1}{n}\sum_{i \in L_p}^{q} \left(\frac{z - y_i}{z}\right)^{\gamma} \qquad [16]$$

---

[17] As Montalvo and Reynal-Querol (2005) show, the Gini index is given by

$$GINI = \sum_{i=1}^{L_i} \sum_{j=1}^{N_j} \pi_i \pi_j \mid y_i - y_j \mid,$$

[18] The continuous time counterpart of [15] is given by (Duclos, Esteban and Ray 2004):

$$P_\alpha(f) \equiv \iint f(x)^{1+\alpha} f(y) \mid y - x \mid dydx,$$

where $f(.)$ is the density function of the distribution. They also show that for every distribution function *F* with associated density *f* and mean μ, [16] can be written as

$$P_\alpha(F) = \int_y f(y)^\alpha a(y) dF(y),$$

where $a(y) \equiv \mu + y(2F(y) - 1) - 2\int_{-\infty}^{y} xdF(x)$. Using a random sample of *n* (iid) observations $\{y_i\}$ drawn from *F(y)* and ordered so that $y_1 \le y_2 \le ....y_n$, Duclos, Esteban and Ray (2004) numerically estimate $P_\alpha(F)$ as:

$$P_\alpha(\hat{F}) = n^{-1}\sum_{i=1}^{n} \hat{f}(y_i)^\alpha \hat{a}(y_i)$$

where y_i refers to the data on the i^{th} observations. In this equation, $\hat{f}(y_i)^\alpha$ is estimated nonparametrically using kernel estimation procedures, and $\hat{a}(y_i) = \hat{\mu} + y_i(n^{-1}(2i-1) - 1) - n^{-1}(2\sum_{j=1}^{i-1} y_j + y_i)$, where $\hat{\mu}$ is the sample mean.

where z defines a household's poverty expenditure threshold,[19] y_i is household i's expenditure, n is the number of households, and L_p is the set of households (n and L_p vary across villages) below the poverty line. $\gamma > 0$ is a poverty aversion parameter. With $\gamma = 0$ [16] simply measures the proportion of households below the poverty line or the "headcount" index. With $\gamma = 1$ [16] measures the average poverty-gap index or the average shortfall of household expenditure from the poverty line.

Finally, we measure the presence and strength of social capital from information contained in the community-level surveys in the NLSS. In the rural sub-sample of the NLSS, five different types of network groups are reported at the community level: forest user groups, farmer groups, water management associations, women in development groups, and credit groups.[20] For each group four characteristics were recorded: (i) years in operation, (ii) proportion of households involved in a particular group, (iii) percentage of women members in a group, and (iv) the average number of meetings per year. Together, they cover four important dimensions of social capital in village communities. We compute a composite social capital measure for each group that aggregates across the four social capital dimensions. Since the social capital index is computed from the rural sub-sample of NLSS that draws survey information from less than 274 villages across Nepal, we do not have the social capital information for all villages. Rather than lose a significant proportion of our village sample, we choose to compute instead the district-level social capital index, which is then replicated at the village level.

[19] We adopted the poverty line of *Rs*. 4404 that was estimated by Nepal's Central Bureau of Statistics at 1995/96 constant price (CBS 2005).
[20] One additional social network category, 'Others', is also reported in the data set, but as several categories of social networks are lumped together to create this categories, we drop it from empirical analysis.

The social capital variables are constructed for each of the five networking groups as in Nepal, Bohara and Berrens (2007). For example, the social capital contributed by the farmer group is defined as:

$$FARMERGRP_i = \sum_{n=1}^{4} \frac{X_{ni} - \min_i \{X_{nj}\}}{max_i \{x_{nj}\} - \min_i \{X_{nj}\}}, \qquad [17]$$

where *n* indexes the four dimensions of social capital described above and *i* indexes the district. $FARMERGRP_i$ is thus a unit-free index that combines the age, participation, reach, and intensity of the activity of farmer group networks in district *i*. We use equal weights for each of these characteristics of the network categories in the absence of any *a priori* assumption.

Control variables employed at the village level are: percentage of farmers in the population (*FARMER*), average years of schooling (*EDUCATION*), percentage of people whose primary language is Nepali (*NEPALI*), and binary indicators for whether the village is in a rural (*RURAL*) area and ecologically mountainous or hilly (*MOUNTAIN*, *HILLS*). Population density (*DENSITY*) is at the district level. The data for these variables are from 2001. The poverty measures in [16] for different values of γ are highly correlated in our sample, and so we use the headcount measure ($\gamma = 0$) in the econometric analysis.

3.3. Methodology

Since the dependent variable, *CONFLICT*, is an event-count, we employ count data methods. We use the Negative Binomial (NB) model which is well-suited to model over-dispersed count data. A likelihood ratio test (Greene 2000) indicates that the NB model is preferable to the Poisson model in our case.

Villages within any district are likely to share the characteristics of their district and be relatively heterogeneous from villages in other districts. An important feature of Nepal data is that villages are relatively homogeneously clustered according to the district to which they belong. The districts of Nepal are heterogeneous in their socio-economic characteristics, ethnic composition, political representation, cultural landscape and government programs. For this reason, we employ a hierarchical regression method in which the villages are modeled as being nested within districts.[21] The alternative method of aggregating data to the district level is unattractive because we lose the rich variation in the data at the village level. In sum, we estimate a hierarchical Negative Binomial model. We estimate a two-level model which is accomplished by random effects specification.[22, 23] The model we estimate is

[21] The basic hierarchical (multilevel) regression model (as in Goldstein 1995, Hox 2002) is given by: $Y_{ij} = \gamma_{00} + \gamma_{p0} X_{pij} + \gamma_{0q} Z_{qj} + u_{0j} + e_{ij}$, where Y_{ij} is the dependent variable, X_{pij} are the p explanatory variables at the village level, Z_{qj} are the q explanatory variables at the district level, γ_{00} is the intercept, γ_{p0} and γ_{0q} are the slopes, u_{0j} and e_{ij} are the residuals at the district level and the village level. The model is generally called the variance component model as it allows decomposing the intercept variance into different components for each hierarchical level. Here we are assuming that the regression intercept varies across the districts, but the slopes do not vary. If the slope also varies for village level variables, then the above model can be written as: $Y_{ij} = \gamma_{00} + \gamma_{p0} X_{pij} + \gamma_{0q} Z_{qj} + u_{pj} X_{pij} + u_{0j} + e_{ij}$. This model is called the random coefficient model where u_{pj} are the district level residuals of the slopes of the village level explanatory variables X_{pij}. As the dependent variable is an event count, we use the negative binomial (NB) estimation method.

[22] One option is to include district-fixed effects for the 74 districts. With fixed-effects each village in a district would be treated as a repeated experiment of an essentially homogeneous entity in the district. But this would not necessarily be true since villages in a district may have considerable unobserved heterogeneity that is not captured by the measured variables.

[23] Given that the measures of inequality and poverty are obtained from the micro-level estimates, these measures may include significant amount of measurement errors. One way of dealing with such errors is to use Bayesian estimation method. So, we also apply Bayesian Markov Chain Monte Carlo (MCMC) procedure, in which we combine *prior* distribution with the likelihood of the data to produce a *posterior* distribution. In this case, with the large number of random draws from the posterior we approximate the true shape of the distribution of the parameters. Such a simulated posterior distribution is used to calculate the point estimates and standard errors. As the point estimates from MCMC and the estimates reported here are not significantly different, the MCMC results are not included here.

$$CONFLICT_{ij} = \beta_1 INEQUALITY_{ij} + \beta_2 SOCIALCAPITAL_i + \beta_3 GOVTGRANT_{ij}$$

$$+ POVERTY_{ij} + X_{ij}B + Z_iD + u_i + \varepsilon_{ij}, \qquad [18]$$

where the $CONFLICT_{ij}$ is the number of deaths inflicted by Maoists in village *j*, which is nested in district *i*. The issue variable for testing Hypothesis 1, *INEQUALITY*, is measured, respectively as *GINI* and the three variants of *POLARIZATION*. These measures are strongly correlated and including them together induces multi-collinearity. We thus estimate their effects separately. The issue variables for Hypotheses 2 and 3 are *SOCIALCAPITAL*, *GOVTGRANT*, and *POVERTY*. All issue variables are measured at the village level, with the exception of *SOCIALCAPITAL* which is measured at the district level. The vector X_{ij} includes control variables measured at the village level, while the vector Z_i includes controls measured at the district level. u_i is the district-effect, which is modeled as a random effect and presumed to be uncorrelated with the regressors. ε_{ij} is the village level error term which is assumed to be (conditionally) identically and independently distributed across observations.

4. Empirical Results

4.1. Basics

Table 1 presents descriptive statistics of the variables used in the empirical analysis across 3857 villages. The dependent variable is the number of people killed by Maoist (*KILLINGS*) over the eight-year period (1996-2003). The *KILLINGS* data are compiled from INSEC's Nepal Human Rights yearbooks for those years. The per-village average over the eight-year period is 0.68, or a total of 2623 killings across villages. The main issue variable, inequality, is measured using three distinct variables: *GINI*, and two polarization measures

($POLARIZATION_1$ and $POLARIZATION_{1.5}$). The population-weighted averages, though not reported here, are not greatly different. For $\alpha = 1$, *GINI* and *POLARIZATION* have a sample correlation equal to 0.47. But the correlation of *GINI* with $POLARIZATION_{1.5}$ drops to 0.18. As Esteban and Ray (1994) conjecture, in our sample the polarization and Gini indices measure fundamentally different aspects of inequality. While *GINI* measures the distribution of consumption spending in a continuous setting, *POLARIZATION* measures consumption distances within a community. In our sample, even when the Gini is relatively small, wealth distances appear to be significant.

The issue variable social capital is measured by a group of unit-free indices. They quantify the coverage and intensity of five types of network groups: farmer group (*FARMERGRP*), water user groups (*WATERUSERGRP*), forest user groups (*FORESTUSERGRP*), groups receiving micro-credit (*CREDITGRP*), and women groups (*WOMENGRP*).

The mean for the issue variable *GOVTGRANT* indicates that the mean grant is 43.21 Rupees per person per year. Although only $0.70 in 1996 dollars, owing to the widespread poverty this is not a trivial amount in rural Nepal. The sample mean of 0.44 for the variable *POVERTY* (poverty headcount) indicates that approximately 44% of the population lives below poverty line.[24]

The remaining variables are the control variables for our analysis. The statistics indicate that Nepal is an economically, geographically and ethnically diverse country. The village population is largely rural and just half of them speak Nepali as their primary language. The

[24] The population-weighted average is not greatly different.

average level of education is low, and people suffer from long spells of unemployment. Per capita income in the sample is approximately Rupees 9240 or
$145 in 1996 dollars. The geography variables indicate that 13% of our sample comes from the mountainous northern part of Nepal, and 52% comes from the hilly middle part of the Nepal.The the remaining 36% comes from the wooded Terai in the lower part of the country.

4.2. Testing H1

Table 2 presents our first set of results from a two-level hierarchical Negative Binomial model. Hypothesis 1 predicts a positive relationship between inequality and violent conflict measured by *KILLINGS*. Regardless of how we measure inequality, the results show a strong association between inequality and the number of Maoist killings as predicted by the theory.

The coefficient of 6.33 measures by what percentage the number of killings increases with a unit change in the Gini coefficient. The reported estimates are from the log-link function and can be interpreted as estimates from a log-linear model. Therefore, an increase in *GINI* of 0.1 is associated with a 63.3%, increase in killings by Maoists. The 0.1 change in the Gini is approximately the amount by which the Gini for Nepal has changed for the last eight years (1996 – 2004, CBS 2005). Evaluated at the sample mean, the 63% increases in killings translate into a total (across all villages) of 1652 additional deaths over an eight-year period. When *POLARIZATION* is measured with α=1, a 0.10 increase in polarization leads to a 121.6% increase in Maoist killings, or a total of 3189 more deaths over an eight-year period. When *POLARIZATION* is measured using α=1.5, an increase of 0.10 in this measure is associated with an increase in Maoist killings by 57.9% or 1518 over an eight-year span. The quantitative

implications of these estimates are, therefore, considerable regardless of the measure of inequality used.

4.3. Testing H2

Social capital is the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to recurrent activities (Ostrom 1990). Our measures of village level social capital may or may not have a connection with trust in central government (Putnam 2000), but they are fundamentally tied to civic participation and governance at the village level. Village networks may enhance the presence of central government where it is effective, but more likely, they emerge as mechanisms of self-governance where government institutions have failed repeatedly. Social capital in Nepal takes the form of investment in social relations motivated by market returns (as in Lin 2001), and social capital creates a set of informal values and norms within villages that encourages members of the village to cooperate (as in Fukuyama 1995).

We measure social capital contributed by five user-groups. Members join these groups because they perceive economic and social benefits from subscribing to the norms developed within the group. If cooperation among group members is reinforced by actual improvements in social outcomes, market outcomes, and conflict-mitigation, then the groups are long-lived. These five user groups are long-lived. Lam's (1998) study of 150 irrigation systems in Nepal documents the effectiveness of farmer groups and water-user groups in solving common-resource pool problems. Irrigation systems governed by the farmers are in better condition and deliver more water at the end of the system, thus enhancing farm productivity, than systems governed by the Nepal Department of Irrigation. Ostrom (1992) models the mechanisms of why this result is consistent with the idea of social capital manifest in collective action by water user

groups. Varughese and Ostrom (2001) study 18 forest-user groups in Nepal. They find that those groups that are able to overcome group heterogeneity (distance from the forests, wealth and ethnicity) and organize for collective action have above-average forest stocks and improving trends in forest conditions. Those that fail to organize experience worsening forest conditions. Finally, women groups are motivated by increasing the social status of women and also increasing economic opportunities, and credit groups allow access to credit by lowering the risk to lenders of non-payment by individuals in the group. Norms developed in credit groups empowers groups of individuals and make it costly for individuals to default.

Does social capital in Nepalese villages have valuable spillover effects in deterring violent conflict? Table 2 supports this view. The presence of strong farmer groups and women groups appear to deter Maoist killings. The quantitative implications are significant. In the first model, for example, as increase in the farmer group index of 0.10 (a one standard deviation change) is associated with a 25.5% reduction in Maoist killings. This result applies approximately across the three models reported in Table 2. An increase in the women group index of 0.27 (one standard deviation change) is associated with a 16.2% decline in Maoist killings. These are additive. Thus, villages in which both networks are active may be expected to have 41.7% fewer Maoist killings than a village in which neither network exists. While credit groups and water-user groups may serve an economic purpose, they do not appear to have any beneficial spillover effects on violence.

The coefficient of the forest group is positive, and that is contrary to the *a priori* expectation (*H2*), which deserves explanation. There are alternative candidate explanations. In order to reverse the deforestation that took place after the nationalization of forests in 1957, the Nepalese government began a policy in the late 1970s to decentralize forest resources by

encouraging the formation of forest user-groups which would self-govern this common- resource pool. Agrawal and Ostrom's (2001) comparative study of forestry decentralization in India and Nepal concludes that in Nepal, "….despite claiming participatory decentralization, the forestry program has devolved such limited property rights that it can scarcely be classified as a case of decentralization" (p. 503). User groups can only claim to have somewhat attenuated use of access rights. Further, they have no managerial discretion or exclusive use rights, and constitutional choice authority is retained by the government. In other words, our measure of social capital does not capture the more complex structure of disincentives under which user groups must operate. Conflicts have thus aggravated not only between user groups and the government but also between the user groups and the Maoists.[25]

To the extent that user groups have improved the conditions of forests (Nepal *et al*. 2007), the positive coefficient requires a different explanation. In villages without forest-user groups, deforestation has forced the emigration of the ablest, making them home to the poorest. If villages with forest user groups are pro-government or anti-Maoists on average while villages without such groups are pro-Maoist, then this political preference (not captured by other variables) causes the positive coefficient on this variable. The poorer villages (those without forest-user groups) then are refuges for the rebels, but not the territory over which Maoist carried out violent activities.

Women's groups do appear to be effective in thwarting violent conflict. A growing number of the new members of the Maoist rebel groups have been women. The existence of women's groups may discourage their participation in violence by offering alternative avenues

[25] Despite the fact that the property rights are not properly allocated in favor of the forest user groups, the community forests have become a good source of income for the villagers, and given the lawlessness in the rural Nepal during the MPW, it created a conflict between the villagers and the Maoists about sharing the forest income.

for them to voice their frustrations or by enabling them to use the network to solve their problems. Taking up the gun then becomes the final, and possibly distant, resort. Farmer and women groups therefore appear to perform the function of real democratic institutions – developing widely accepted social norms that enable peaceful solutions to problems. Thus, Hypothesis 2 is supported by the negative signs on these two coefficients.[26] It appears that this hypothesis is not supported by the social network related to forest user groups. We present an alternative way of looking at the role of social capital in reducing the violent conflict when we discuss the non-linearity issue using interactive terms.

4.4. Testing H3

The two government policy variables, *GOVTGRANTS* and *POVERTY*, are both estimated with the predicted signs in Hypotheses 3a and 3b. An increase in per capita government grants by 0.56 (56 Rupees, or one standard deviation increase) is associated with a 32% decrease in Maoist killings, or 839 fewer deaths over an eight-year period. This estimate implies that these 839 lives could have been saved by increasing spending by less than $0.10 per Nepalese per year! A decrease in the poverty headcount by 18 percentage points (one standard deviation) is associated with a substantive impact on the number of Maoist killings. Across all three models, that magnitude of decline in poverty would reduce Maoist killings by 55% or by 1500 over an eight-year period.[27] Thus, a policy that combines government grants with additional transfers targeted at reducing poverty can potentially solve much of the problem for which the Maoists are blamed. The results produce the message that a focused strategy of negotiating with Maoists on

[26] Though insignificant, the coefficients of *WATERUSERGRP* and *CREDITGRP* are also negative.
[27] Do and Iyar (2007) estimates 23-25 conflict related deaths due to 10 percentage points increase in the district level poverty rate. This estimate predicts about 1875 conflict related deaths nationwide which differs from the estimate that is reported here due to the difference in the unit of analysis (district vs. village) and the differences in the incremental poverty used for the analysis (10 vs. 18 percentage points).

only these two aspects of government policy may not merely bring them to the table, but may convince Maoists to call off their violence. Of course, poverty reduction is a slow and expensive process. Perhaps there is a role for international agencies not only as donors, but in ensuring that government funds find their way to the intended beneficiaries so that the transfers achieve their goals.

Many of the control variables are statistically significant. The negative sign on population density indicates that Maoist killings occur in less dense areas. Population density also serves to control for scale effects. The higher the proportion of the population that speaks Nepali as the primary language, the greater is the number of Maoist killings. Rural areas experience fewer killings. The upper regions of Nepal consisting of mountainous and hilly areas experience more killings than the lower (Terai) region.

Among the variables we use as controls, *INCOME* has a more direct link with the theory. While the theoretical model abstracts from differences in the level of income, Milante (2004) posits that being extremely poor puts violence beyond the economic means of the people. Provoking widespread unrest requires the purchase of weaponry and the ability to carry out the conflict over a long time period. This may be beyond the means of some villages. Theoretically, the optimal is a corner solution due to a "privation constraint". Then very low income villages would have low level of violence. Such an association between income and violence is affirmed by the positive coefficient on *INCOME*. A simpler mechanism may be at work, especially if the privation constraint is overcome by inter-village Maoist networks. While the Maoist movement may have its source in these impoverished villages, they export violence from areas where their voice is heard the loudest to high-income villages. According to the first model, an increase in income of 3460 Rupees (one standard deviation) is associated with an increase of 1468 Maoist

killings over an eight-year span. The third model indicates that a similar increase in income is associated with more than 2000 additional killings over an eight-year period.

Interestingly, the *ETHNICITY* variable has a significant and positive association with Maoist violence, indicating that people whose mother tongue is Nepali are relatively more victimized than other ethnic groups. This result is consistent with the Maoist organizational strategy of attracting ethnic population towards their movements by promising separate states for those ethnic groups if their movement succeeds. Such promise of creating different states within a proposed federal system based on language and ethnicity became very attractive during the MPW, and even after the end of MPW, several ethnic groups are now demanding a federal structure based on language/ethnicity.

4.5. Non-Linearity

Milante (2004) posits a possibly non-linear relationship between inequality (and income) and violence, an idea we now explore. Specifically, we estimate two sets of interaction coefficients: the first set is the interaction of inequality variables with social capital. They answer the question of whether social capital ameliorates the impact of inequality in Maoist killings. The second is the interaction of inequality variables with (mean) income. It answers the question of whether an increase in income ameliorates or worsens the impact of inequality on Maoist killings.

Table 3 provides partial answers. Estimates on the issue variables are reported for two models, one that uses *GINI* to measure inequality and another that uses $POLARIZATION_{1.5}$. In the former, the income-interaction effects indicate that higher mean-village income is associated with lower marginal impact of inequality on Maoist violence. That is, as the level of village

income rises, it dampens the impact that inequality has on violence. One reason for this finding is an obvious one. The more (less) affluent village is more (less) able to protect itself against Maoist violence by convincing the government to divert the services of the army and the police to their region and/or purchase protection privately by donating money to the Maoists. A less obvious reason is that the same Gini coefficient in high and low-income villages translates into a better standard of living for all residents in the high-income village relative to the low-income villages.[28] Thus, the impact of inequality on the intensity of violence is less in high-income villages. Beyond a certain threshold level of income, inequality has no influence on violence. It is in areas where inequality is large and the average income is low where Maoist violence is at its worst. This finding indicates that when the income level of the villagers goes up, the opportunity cost of violent activities would go up for a given level of inequality, resulting in a reduced level of violent activities.

A fundamental difference between our two measures of inequality is that measuring inequality by $POLARIZATION_{1.5}$ leads to the opposite inference. The positive sign on the interaction of $POLARIZATION_{1.5}$ and *INCOME* indicates that higher (mean) income in fact exacerbates the marginal impact of polarization on Maoist violence. The same level of $POLARIZATION_{1.5}$ in high and low-income villages does not necessarily translate into a higher standard of living for all residents in the high-income village relative to the low-income village. This distinguishes the impact of polarization on conflict from the impact of the Gini. If there is a causal connection between inequality and conflict (we explore this further below), growth without redistribution that adequately decreases polarization (not merely the Gini), will have

[28] In the sample, *GINI* and *INCOME* have a correlation of 0.50. In contrast, $POLARIZATION_{1.5}$ has a small negative correlation with *INCOME*.

little impact on reducing killings by Maoists. Thus, a high economic growth rate is not only desirable but extremely essential for the long run solution to the ongoing violent conflicts in Nepal.

The model with the Gini coefficient shows that the interaction of *GINI* with social capital measures has no noticeable influence on the marginal impact of inequality on Maoist violence. On the other hand, the model with polarization indicates that activities of forest groups do ameliorate the impact of increased polarization on Maoist killings. The cross-partial coefficient of -33.07 is economically significant, indicating that a one-standard deviation increase in *FORESTGRP* (=0.21) ameliorates the impact of a one-standard deviation increase in *POLARIZATION* (=0.03) on Maoist killings by 546 deaths over an eight-year period. Thus, while income growth reverses the deleterious impact of a deteriorating Gini, it takes a specific type of social capital (forest groups) to reverse the deleterious impact of worsening polarization.

4.6. Endogenity

So far, we have presumed the inequality measures to be exogenous. Arguably, they are since *GINI* and *POLARIZATION* move slowly over time. It is possible, however, that shocks to the error term, for instance due to a sudden outbreak of violence in a region, are correlated with similar movements in these variables. If there is significant out-migration of, say, wealthy landlords or high-income families in response to sudden outbursts of violence, then they are negatively correlated with the error term, and their coefficient estimates are downward biased. In order to instrument for possible endogenity of *GINI* and $POLARIZATION_{1.5}$ we construct four instruments using data from the 1984 Nepal statistics. They are: log of the number of students in school in the district, percentage of the district's population with secondary-level education, log

of the district's land area, and percentage of the district land area under paddy cultivation. Arguably, these are exogenous. The first-stage F-statistic for the four instruments in the *GINI* is 19.48 and in the $POLARIZATION_{1.5}$ equation is 7.40, thus indicating that the four variables do not suffer from a weak instrument problem (Stock and Watson 1997). Having instrumented for endogenity, the theory allows use to make causal inferences. The results from the second-stage estimation of the two-level hierarchical negative binomial model are reported in Table 3.4. As surmised, the uninstrumented models understate the impact of inequality on violent conflict. The estimate of 32.55 on *GINI* indicates that an increase of 0.026 in *GINI* (a one standard deviation change in the instrumented Gini) causes an 85% increase in Maoist killing, or a total of 2219 additional deaths over an eight-year period. The estimate of 50.88 on $POLARIZATION_{1.5}$ indicates that a 0.011 increase in $POLARIZATION_{1.5}$ (a one-standard deviation change) causes an increase of 56% in Maoist killings, or 1468 more deaths over an eight-year period. These estimates are substantially larger than their uninstrumented counterparts in Table 2.

Of interest are the interaction terms in Table 5. *INCOME* is no longer statistically significant in the model with *GINI*, but their interaction is negative and statistically significant, just as in the uninstrumented case, indicating that an increase in income ameliorates the marginal impact of the Gini on Maoist killings. In contrast, if inequality is measured by $POLARIZATION_{1.5}$, an increase in income no longer exacerbates the marginal impact of polarization on Maoist killings. There are two significant differences between the uninstrumented results in Table 3 from those in Table 5. The interactions of *POLARIZATION* with credit groups and women groups are statistically significant and economically large positive coefficients. While credit groups alleviate Maoist killings (coefficient of -2.66), the greater is $POLARIZATION_{1.5}$ credit groups are less effective in ameliorating the impact of polarization on

violence (positive coefficient on interaction term). The positive coefficient on the interaction of $POLARIZATION_{1.5}$ with women groups is somewhat of a puzzle. While women groups themselves are not necessarily influential in lowering the number of killings, the presence of women groups actually heightens or exacerbates the marginal influence of polarization on Maoist violence.

Have women groups in highly polarized villages redefined themselves as Maoist activists? If so, this disturbing phenomenon deserves further study. There is evidence of increasing participation of women in Maoist groups.[29] This appears to be a most pernicious impact of increased polarization. A group that heretofore tried to achieve more equality by contributing social capital is now driven to achieve the same goal by any means possible.

5. Conclusion

Combining rational choice theory with micro-level sub-national data from Nepal that facilitates controls for heterogeneous cross-country and international factors, we analyze the association between inequality and violent conflict. Along with the traditional measures of inequality, the *GINI* index, we also construct and use the recently developed polarization indices advanced by Esteban and Ray (1994, 1999) to explain the violent conflict. Using negative binomial count data models with test and correction for endogenity, results from multi-level analysis are robust and highly significant irrespective of the measure of inequality (*GINI* or *POLARIZATION*) used for the analysis, indicating that distributional outcomes do matter significantly when it comes to the violent conflict. However, inequality or polarization is not the only source of the violent conflict. As discussed in this paper, poor institutions, such as weak

[29] It is reported that in the Maoist organization about 50% of cadres at the local level and 30% of the soldiers are women (SATP n.d.).

rule of law, weak enforcement of property rights, and dearth of social capital, can help to propagate the conflict. Our empirical results find support to the hypothesis that social capital generates valuable spillover effects in the form of shared value, norms, self-governance and understandings among the villagers that encourages the community members to cooperate among themselves that helps deterring the violent conflict.

Another important finding of our research is that transfer of resources from the central to the local governments can play vital role in lowering the violence as it may provide the sense of hope, connectedness and opportunity to the local people. In the backdrop of widespread poverty in the villages of Nepal, we also find a significant positive association between level of poverty and the intensity of the violence. The policy implications of these findings are that government policies towards balancing the unintended inequality combined with grants and targeted transfers for reducing poverty can potentially solve much of the problems for which the Maoists are blamed. Such policies can deliver expected outcomes provided that the transferred funds find their way to the intended beneficiaries. International agencies, local institutions, Non-Governmental Organizations (NGOs), and civil society can play meaningful roles by developing a productive partnership to achieve such objectives in the light of widespread perceptions that corruption is rampant in the government offices and such corruption also engenders poverty.[30] Motivating such partnership towards promoting social networks in the local communities would provide an added bonus for creating lasting peace as we find that social capital helps to inhibit the violence by promoting understandings among the community members.

A question that our paper brings up is why other unequal countries have not witnessed the widespread violence seen in Nepal. A case in point is India, where violent conflict between

[30] The Transparency International corruption perception index (CPI) for Nepal is 2.5 in 2006. The index value below 3 is considered as an indication of rampant corruption. For detail, visit http://www.transparency.org/news_room/latest_news/press_releases/2006/en_2006_11_06_cpi_2006

the government and Maoist organizations has occurred, but locally and sporadically. A hypothesis is that effective redistribution by the federal government from wealthier states to poorer ones, has prevented inequality from growing worse and avoided conflict. Further research into this issue should be rewarding for a number of reasons. If this hypothesis is valid, it is not only consistent with our findings but would exemplify the kind of center-state institutions Nepal needs in its transition to democracy in order to solve this thorny problem. It would also indicate to emerging countries which have not seen this scale of violence that they should pay greater attention to widening inequality and deepening polarization in their society that might threaten their growing prosperity.

References

Agrawal, Arun, and Elinor Ostrom, "Collective Action, Property Rights, and Decentralization in Resource Use in India and Nepal," *Politics & Society* 29 (2001), 585-514.

Abadie, Alberto, and Gardeazabal, Javier, "The Economic Costs of Conflict: A Case Study of the Basque Country," *The American Economic Review* 93 (2003), 113-132.

Akerlof, George A., Kranton, Rachel E., "Economics and Identity," *The Quarterly Journal of Economics* 115 (2000), 715-753.

Alesina, Alberto, and Angeletos, George-Marios, "Fairness and Redistribution," *The American Economic Review* 95 (2005), 960-980.

Black, Duncan, "On the Rational of Group Decision-making,' *Journal of Political Economy* 56 (1948), 23-34.

Bohara, Alok K, Mitchell, Neil J, and Nepal, Mani, "Opportunity, Democracy and the Exchange of Political Violence: A Subnational Analysis of Conflict in Nepal," *Journal of Conflict Resolution* 50 (2006), 108-128.

Cameron, A. C., and Trivedi, P. K., *Regression Analysis of Count Data*. Econometric Society, Monograph No. 30 (Cambridge: Cambridge University Press, 1998).

CBS (Central Bureau of Statistics), *Nepal Living Standards Survey (NLSS) 2003/04: Statistical Report*, Vol. I and II (Kathmandu: CBS, 2004).

CBS (Central Bureau of Statistics), *Summary Results on Poverty Analysis from Nepal Living Standards Survey*, 2003/04 (Kathmandu: CBS, 2005).

Collier, Paul, "Rebellion as a Quasi-Criminal Activity." *The Journal of Conflict Resolution* 44 (2000), 839-853.

Deaton, Angus, *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*, The World Bank (Baltimore: The John Hopkins University Press, 2000).

Do, Quy-Toan, and Iyer, Lakshmi. "Poverty, Social Divisions and Conflict in Nepal," Working paper 07-065 (2007).

Duclos, Jean-Yves, and Arrar, Abdelkrim, *Poverty and Equity: Measurement, Policy and Estimation with DAD*, Unpublished Manuscript, Laval University (2005).

Duclos, Jean-Yves, Esteban, John, and Ray, Debraj, "Polarization: Concepts, Measurement, Estimation," *Econometrica* 72 (2004), 1737-1772.

Easterly, William, "Can institutions resolve ethnic conflict?" *Economic Development and Cultural Change* 49 (2001), 687-706.

Elbers, Chris, Lanjouw, Jean O., and Lanjouw, Peter, "Micro-Level Estimation of Poverty and Inequality," *Econometrica* 71 (2003): 355-364.

Esteban, Joan, and Ray, Debraj, "On the Measurement of Polarization," *Econometrica* 62 (1994), 819-851.

Esteban, Joan, and Ray, Debraj, "Conflict and Distribution," *Journal of Economic Theory* 87 (1999), 379-415.

Fukuyama, Francis, *Trust: The Social Virtues and the Creation of Prosperity (*NY: The Free Press, 1995).

Ganguly, Sumit and Brian Shoup, "Nepal: Between Dictatorship and Anarchy," *Journal of Democracy* 16 (2005), 129-43.

Ghosh, M., and Rao, J. N. K., "Small Area Estimation: An Appraisal," *Statistical Science* 9 (1994), 55-93.

Granovetter, Mark, and Charles Tilly, "Inequality and Labor Processes," In *Handbook of Sociology* (Newbury park, CA: Sage Publications, 1988, pp 175-221).
Greene, William H., *Econometric Analysis, 4/ed* (Upper Saddle River, New Jersey: Prentice Hall, 2000).
Gurung, D. B. (ed.), *Nepal Tomorrow Voices and Visions: Selected Essays on Nepal* (Kathmandu: Koselee Prakashan, 2003).
Gurr, Ted Robert, *Why Men Rebel* (Princeton University Press, 1970).

Gurr, Ted Robert (ed.), *Handbook of Political Conflict* (The Free Press, 1980).

Keefer, Philip, and Knack, Stephen, "Polarization, Politics and Property Rights: Links between Inequality and Growth," *Public Choice* 111 (2002), 127-154.
Kelly, Morgan, "Inequality and Crime," *The Review of Economics and Statistics* 82(2000), 530-539.
Krueger, Alan B., and Maleckova, Jitka, "Education, Poverty and Terrorism: Is There a Causal Connection?" *The Journal of Economic Perspectives* 17(2003), 119-144.
Lam, Wai Fung, *Governing Irrigation Systems in Nepal: Institutions, Infrastructure, and Collection Actions* (Oakland, Calif.: ICS Press, 1998).
Lichbach, Mark Irving, "An Evaluation of 'Does Economic Inequality Breed Political Conflict?' Studies." *World Politics* 41 (1989), 431-470.
Lin, Nan, *Social Capital: A Theory of Social Structure and Action* (NY: Cambridge University Press, 2001).
MacCulloch, Robert, "The Impact of Income on the Taste for Revolt." *American Journal of Political Science* 48 (2004), 830-848.
Mahat, Ram Sharan, *In Defense of Democracy: Dynamics and Fault Lines of Nepal's Political Economy* (New Delhi: Adroit Publishers, 2005).
Miguel, Edward, Shanker Satyanath, and Ernest Sergenti, "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy* 112 (2004), 725-53.
Milante, Gary, "The Non-Monotonic Relationship between Inequality and Conflict," *Working Paper* (2004), University of California, Irvine.
Montalvo, Jose G., and Reynal-Querol, Marta, "Ethnic Polarization, Potential Conflict, and Civil Wars," *The American Economic Review* (2005), 796-816.
Mueller, Dennis C., *Public Choice III* (Cambridge: Cambridge University Press, 2003).
Mueller, Edward N., "Income Inequality, Regime Repressiveness and Political Violence," *American Sociological Review* 50 (1985), 47-61.
Mueller, Edward N., and Seligson, Mitchell A., "Inequality and Insurgency," *American Political Science Review* 83 (1987), 577-586.
Murshed, S. Mansoob, and Gates, Scott, "Spatial–Horizontal Inequality and the Maoist Insurgency in Nepal." *Review of Development Economics* 9 (2005), 121-134.
Nepal, Mani, and Bohara, Alok K., "Micro-Level Estimation and Decomposition of Poverty and Inequality in Nepal," *Working Paper* (2006), Nepal Study Center, University of New Mexico.
Nepal, Mani, Bohara, Alok K, and Berrens, Robert P., "Investigating the Impact of Social Networks on Household Forest Conservation Effort in Rural Nepal," *Land Economics* 83(2007), Forthcoming.

Ostrom, Elinor, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York: Cambridge University Press, 1990).
Putnam, Robert D., *Bowling Alone: The Collapse and Rival of American Community* (New York: Simon & Schuster, 2000).
Reynal-Querol, Marta, "Ethnicity, Political System, and Civil Wars," *Journal of Conflict Resolution* 46(2002), 29-54.
Selbin, Eric, "No Other Way Out: States and Revolutionary Movements, 1945-1991." *The American Political Science Review* 96 (2002), 660-661.
Sigelman, Lee and Simpson, Miles, "A Cross-National Test of the Linkage between Economic Inequality and Political Violence." *The Journal of Conflict Resolution* 21 (1977), 105-128.
Teibout, Charles M., "A Pure Theory of Local Public Expenditures," *Journal of Political Economy* 64 (1956), 416-424.
Varughese, George, and Ostrom, Elinor, "The contested Role of Heterogeneoty in Collective Action: Some Evidence from Community Forestry in Nepal," *World Development* 29 (2001), 747-765.
Wang, T. Y., Dixon, William J., Muller, Edward N., and Seligson, Mitchell A. 1993. "Inequality and Political Violence Revisited," *The American Political Science Review* 87(1993), 979-994.
Weede, Erich, "Some New Evidence on Correlated of Political Violence: Income Inequality, Regime Repressiveness, and Economic Development." *European Sociological Review* 51 (1987), 97-108.
Weede, Erich, "Income Inequality and Political Violence Reconsidered." *American Sociological Review* 50 (1986), 438-441.
Williams, Kirk R. and Michael Timberlake, "Structured Inequality, Conflict, and Control: A Cross-National Test of the Threat Hypothesis." *Social Force* 63 (1984), 414-432.
Williamson, Jeffrey G., and Peter H. Lindert, *American Inequality: A Macroeconomic History* (New York: Academic Press, 1980).
Zhang, X., and Kanbur, Ravi, "What Difference Do Polarization Measures Make? An Application to China," *The Journal of Development Studies* 37 (2001), 85-98.

Table 1: Variable's Definition and Basic Statistics (N= 3857)

VARIABLE	Definition	Mean	Std. Dev.
KILLINGS	No. of people killed by the Maoists in the villages (1996−2003)	0.68	3.72
GINI	Consumption GINI Index	0.24	0.04
POLARIZATION (α=1)	Polarization Index when α = 1 (see Section 3)	0.15	0.01
POLARIZATION (α=1.5)	Polarization Index when α = 1.5	0.17	0.03
SOCIALCAPITAL	Social network index	1.25	0.61
FARMERGRP	Network index of farmers	0.04	0.10
WATERUSERGRP	Network index of water user group	0.06	0.12
FORESTUSERGRP	Network index of forest user group	0.10	0.21
CREDITGRP	Network index of credit user group	0.02	0.08
WOMENGRP	Network index of women	0.12	0.27
GOVTGRANT	Per capita grant (Rupees 100) [district level]	0.43	0.56
POVERTY	% below poverty line	0.44	0.18
POPDENSITY	Population POPDENSITY 100 persons per sq km	2.93	3.66
FARMER	% farmers	0.34	0.14
EDUCATION	Average years of schooling in each village (VDC)	3.61	1.09
RURAL	1 if rural, 0 otherwise	0.98	0.12
MOUNTAIN	1 if Mountain, 0 otherwise	0.13	0.33
HILL	1 if Hills, 0 otherwise	0.52	0.50
TERAI	1 if Terai, 0 otherwise	0.36	0.48
ETHNICITY	Percentage of people who speak Nepali as primary language	0.51	0.38
EMPLOYMENT	Mean months of employment	5.60	1.35
INCOME	Mean income (Rupees '000)	9.24	3.46

Notes:

1. Data Sources:
    a. KILLINGS compiled from Informal Sector Service Center (INSEC): Nepal Human Rights Year Books (1996−2004).
    b. GINI, POL_0, POL_1, $POL_{1.5}$, POVERTY, INCOME, SOCIALCAPITAL constructed from data obtained from Central Bureau of Statistics, 1996 Nepal Living Standards Survey (NLSS), and Nepal Population Census 2001; Variables measured using survey−to−census imputation.
    c. POPDENSITY, FARMER, EDUCATION, RURAL, MOUNTAIN, HILL, TERAI, ETHNICTY, EMPLOYMENT obtained from Nepal Population Census 2001, Central Bureau of Statistics, Kathmandu. Variables measured in 2001.
2. All variables measured at the village level except GOVTGRANT, SOCIALCAPITAL, FARMERGRP, WATERUSERGRP, CREDITGRP, CREDITGRP, and WOMENGRP which are at the district level and replicated at the village level.

Table 2: Conflict and (i) Inequality, (ii) Social Capital, and (iii) Government Policy
Dependent Variable: Number of persons killed by Maoists
Estimates from 2−level Hierarchical Negative Binomial Model

		GINI	POL (α=1)	POL (α=1.5)
INEQUALITY	GINI	6.33*** (1.98)	-	-
	POLARIZATION(α=1)	-	12.16*** (6.24)	-
	POLARIZATION(α=1.5)			5.79*** (2.16)
SOCIAL CAPITAL	FARMERGRP	−2.55*** (1.06)	−2.72*** (1.05)	−2.69*** (1.04)
	WATERUSERGRP	−0.80 (0.91)	−0.70 (0.90)	−0.76 (0.89)
	FORESTUSERGRP	0.87 (0.56)	0.91 (0.55)	0.93 (0.55)
	CREDITGRP	−0.37 (1.11)	−0.18 (1.10)	−0.16 (1.09)
	WOMENGRP	−0.60** (0.35)	−0.55* (0.34)	−0.51* (0.34)
GOVT. POLICY	GRANT	−0.57*** (0.23)	−0.54*** (0.23)	−0.56*** (0.23)
	POVERTY	3.07*** (0.85)	3.19*** (0.85)	3.10*** (0.85)
	INCOME	0.11*** (0.04)	0.14*** (0.04)	0.15*** (0.04)
	EDUCATION	0.02 (0.09)	0.05 (0.09)	0.06 (0.09)
	EMPLOYMENT	−0.02 (0.07)	−0.004 (0.07)	0.004 (0.07)
	FARMER	−0.33 (0.95)	−0.35 (0.95)	−0.25 (0.95)
	POPDENSITY	−0.11*** (0.03)	−0.12*** (0.03)	−0.12*** (0.03)
	ETHNICITY	0.72*** (0.29)	0.78*** (0.29)	0.75*** (0.29)
	RURAL	−2.03*** (0.57)	−2.18*** (0.57)	−2.07*** (0.57)
	MOUNTAIN	0.83** (0.42)	0.76** (0.42)	0.73** (0.41)
	HILL	0.62** (0.31)	0.60** (0.31)	0.56** (0.30)
	CONSTANT	0.83 (0.61)	1.02 (0.61)	0.93 (0.61)
	σ^2_i	0.18 (0.09)	0.16 (0.08)	0.15 (0.08)
	N	3857	3857	3857

Notes: 1. Standard errors in parentheses; ***, **, * indicate statistical significance at 1%, 5% and 10% respectively. For issue variables (Inequality, Social Capital, Government Policy) statistical significance is based on one−tailed tests as per hypotheses H1−H3. For all other variables, statistical significance is based on two−tailed tests.

2. Estimates are from the underlying log−link function and therefore to be interpreted as coefficients from a log−linear model.

Table 3: Models with Interactions of GINI and POL with (i) Income and (ii) Social Capital
Dependent Variable: Number of persons killed by Maoists
Estimates from 2−level Hierarchical Negative Binomial Model

		GINI	POL (α=1.5)
INEQ	GINI	6.43*** (2.15)	-
	POLARIZATION (α=1.5)	-	4.60* (2.84)
SOCIAL CAPITAL	FARMERGRP	−2.61*** (1.03)	−2.47*** (1.02)
	WATERUSERGRP	−0.41 (0.89)	−0.50 (0.87)
	FORESTUSERGRP	0.85 (0.54)	0.60 (0.54)
	CREDITGRP	−0.44 (1.10)	−0.11 (1.07)
	WOMENGRP	−0.50* (0.35)	−0.51* (0.33)
INTERACTIONS	INCOME	0.16*** (0.05)	0.19*** (0.04)
	INEQ*INCOME	−0.96** (0.50)	1.85** (0.74)
	INEQ*FARMERGRP	−2.24 (19.06)	17.74 (26.34)
	INEQ*WATERGRP	−21.50 (18.83)	−1.10 (23.95)
	INEQ*FORESTGRP	13.93 (11.19)	−33.07** (15.88)
	INEQ*CREDITGRP	−9.93 (21.45)	1.80 (23.63)
	INEQ*WOMENGRP	−5.74 (6.30)	7.03 (9.42)

Notes
1. See notes to Table 1.
2. All other variables in Table 2 also included but not reported. Their coefficients are qualitatively similar.

Table 4: Models with Instrumented GINI and POLARIZATION
Dependent Variable: Number of persons killed by Maoists
Estimates from two−stage 2−level Hierarchical Negative Binomial Model

		GINI	POL (α=1)	POL (α=1.5)
INEQUALITY	GINI	32.55** (15.26)	-	-
	POLARIZATION (α=1)	-	165.04** (94.27)	-
	POLARIZATION (α=1.5)	-	-	50.88** (29.34)
SOCIAL CAPITAL	FARMERGRP	−2.38*** (1.00)	−2.72*** (1.01)	−1.96** (1.11)
	WATERUSERGRP	−1.75** (0.97)	−1.93** (1.14)	−1.86* (1.15)
	FORESTUSERGRP	1.29 (0.58)	1.25 (0.59)	0.90 (0.54)
	CREDITGRP	−1.77* (1.23)	−0.74 (1.12)	−0.08 (1.07)
	WOMENGRP	−0.73** (0.33)	−0.42 (0.35)	−0.25 (0.40)
GOVT. POLICY	GRANT	−0.72*** (0.24)	−0.79*** (0.27)	−0.87*** (0.30)
	POVERTY	3.42*** (0.84)	2.69*** (0.90)	1.23 (1.48)
	INCOME	−0.05 (0.10)	0.07 (0.06)	0.18*** (0.05)
	EDUCATION	0.02 (0.09)	0.02 (0.09)	0.01 (0.09)
	EMPLOYMENT	−0.02 (0.07)	−0.12 (0.11)	−0.13 (0.11)
	FARMER	1.71 (1.42)	2.54 (2.12)	1.44 (1.62)
	POPDENSITY	−0.03 (0.05)	−0.06 (0.05)	−0.12 (0.03)
	ETHNICITY	0.30 (0.39)	0.98*** (0.30)	0.90*** (0.30)
	RURAL	−1.16 (0.76)	−1.22 (0.83)	−0.65 (1.09)
	MOUNTAIN	1.37*** (0.50)	1.08*** (0.46)	0.45 (0.44
	HILL	1.04*** (0.38)	1.10*** (0.43)	0.52* (0.30)
	CONSTANT	−0.36 (0.940	−0.24 (1.00)	−0.41 (1.08)
	σ^2_i	0.12 (0.07)	0.11 (0.07)	0.12 (0.08)
	N	3857	3857	3857

Note:
1. Standard errors in parentheses; ***, **, * indicate statistical significance at 1%, 5% and 10% respectively.

Table 5: Models with Instrumented GINI and POLARIZATION and their interactions
Dependent Variable: Number of persons killed by Maoists
Estimates from two−stage 2−level Hierarchical Negative Binomial Model

		GINI	POL (α=1.5)
INEQ	GINI	30.39** (14.78)	-
	POLARIZATION (α=1.5)	-	63.29*** (26.52)
SOCIAL CAPITAL	FARMERGRP	−2.26*** (0.96)	−2.51*** (1.10)
	WATERUSERGRP	−1.31* (0.94)	−1.74** (1.04)
	FORESTUSERGRP	1.18 (0.57)	1.12 (0.53)
	CREDITGRP	−2.00* (1.35)	−2.66** (1.27)
	WOMENGRP	−0.75** (0.34)	0.43 (0.41)
INTERACTIONS	INCOME	0.07 (0.11)	0.23*** (0.05)
	INEQ*INCOME	−1.45*** (0.55)	1.54 (1.93)
	INEQ*FARMERGRP	3.31 (29.84)	−67.79 (99.48)
	INEQ*WATERGRP	-	101.84 (78.91)
	INEQ*FORESTGRP	−3.52 (17.61)	−17.06 (51.32)
	INEQ*CREDITGRP	−1.65 (39.00)	306.09** (136.51)
	INEQ*WOMENGRP	-	104.24*** (32.67)

Notes:
1. See notes to Table 1.
2. All other variables in Table 4 also included but not reported. Their coefficients are qualitatively similar.
3. INEQ in the interactions refers to the instrumented GINI or OLARIZATION.
4. Including GINI*WATERGRP and GINI*WOMENGRP cause the Hessian to be near-singular and so are dropped from the first model.