How community organizations moderate the effect of armed conflict on migration in Nepal

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This study analyses micro-level variability in migration during armed conflict in Nepal. The analysis is based on a multi-dimensional model of individual out-migration that examines the economic, social, and political consequences of conflict and how community organizations condition the experience of these consequences and systematically alter migration patterns. Detailed data on violent events and individual behaviour during the Maoist insurrection in Nepal and multi-level event-history analysis were used to test the model. The results indicate that community organizations reduced the effect of conflict on out-migration by providing resources that helped people cope with danger, as well as with the economic, social, and political consequences of the conflict. The evidence suggests that the conflict caused the population to be systematically redistributed in a way that will probably affect its future socio-demographic composition—the extent of the redistribution depending on the resources available in each community.

Introduction

This paper describes an analytical study of variation in migration patterns during a period of armed conflict in Nepal. The specific focus of the paper is the role of community organizations as one factor that drove this variation by influencing whether individuals migrated away from the areas of the conflict. The conceptual model used, which is described below, is based on a socio-ecological perspective that highlights the social, economic, and political consequences of armed conflict in addition to the physical danger. It calls for consideration of the resources that help people to cope with these consequences for their daily lives. As an example, community organizations or resources that support daily living in the community of origin can help to mitigate the consequences of armed conflict and thereby decrease the likelihood of migration. The empirical analysis addressed specific hypotheses about the impact of community organizations, such as markets, health centres, and micro-credit groups, on the relationship between conflict and migration during the recent Maoist insurrection in Nepal.

There is a large and growing body of literature documenting increases in migration during periods of generalized violence, genocide, and human rights abuses (Stanley 1987; Schmeidl 1997; Apodaca 1998; Davenport et al. 2003; Moore and Shellman 2004; Melander and Oberg 2006). This work has been integral to tracking the flow of migrants around the world and developing early warnings of mass population movements. It has also informed refugee and support programmes for displaced persons. Yet scholars still argue that the literature on forced migration is under-theorized and poorly addresses some important issues, such as the composition of migrant flows (Black 2001; Castles 2003; Bakewell 2007). Theorists suggest that in seeking to identify the characteristics of those who do and do not migrate away from conflict, we need to take account of several broad sociological principles (Richmond 1988, 1994; Van Hear 1998; Black 2001; Castles 2003; Turton 2003; Bakewell 2007). The first consideration is that there are rarely cases where migration is truly forced or truly voluntary; most situations lie somewhere in between, where people are faced with both some compulsion and some room for choice at the same time. The second consideration is that people exposed to armed conflict are active agents and their behavioural decisions are complex, requiring complex models of the migration decision.

I developed a model that uses these principles and existing migration theory and is directed at advancing our understanding of the composition of migration flows during armed conflict. The model incorporates the socio-ecological perspective, which is an important tool for understanding systematic variation in how people both experience and respond to conflict. In addition to migration, this perspective and the general model are also relevant for understanding patterns of change in other demographic behaviours, such as marriage and fertility, in response to armed conflict and other periods of crisis.

I used the recent Maoist insurrection in Nepal to test this model of migration decision-making during conflict. My analysis was able to make use of records of violent events, a prospective panel survey of individuals, and information on the communities within which they lived. With these data I was able to investigate relationships between conflict, community organizations, and migration. The survey of individuals from Nepal spanned the entire period of conflict and provided monthly records of individuals' migrations, thereby allowing violent events each month to be precisely related to migrations. Community surveys provided information on access to resources, including markets, health centres, farmers' cooperatives, and mills.

Theoretical framework

The foundation of much migration theory is the push–pull framework, which conceptualizes migration as a result of potential migrants comparing desirable elements of possible destinations (pull factors) with undesirable elements of their current residence (push factors). When push or pull factors become stronger, people become more likely to migrate. Neo-classical economics and new economics theories of migration are loosely based on the push–pull theory, and explain how economic factors at both the origin and potential destinations affect migration decisions (Sjaastad 1962; Todaro 1969; Stark and Bloom 1985; Taylor 1987; Todaro and Maruszko 1987; Massey et al. 1993). In addition to providing strong empirical support for these theories when applied during periods of relative peace (Massey et al. 1987, 1993, 1998; Shrestha 1989; Massey and Espinosa 1997), several studies have shown that economic factors have been important predictors of migration during periods of generalized violence (Schultz 1971; Stanley 1987; Jones 1989; Morrison and May 1994; Lundquist and Massey

2005; Engel and Ibanez 2007; Czaika and Kis-Katos 2009; Bohra-Mishra and Massey 2011).

Theory from studies on forced migration follows a similar reasoning. The dominant threat-based model assumes that during armed conflict, potential migrants base their decision to migrate on perceived threats to their personal security. When the perceived threat increases beyond an acceptable level, people will migrate. In other words, perceived danger is a push factor that increases the motivation to migrate. This model too has been supported by strong and consistent evidence (Stanley 1987; Schmeidl 1997; Apodaca 1998; Davenport et al. 2003; Moore and Shellman 2004; Melander and Oberg 2006). However, the threat-based model concentrates on physical threat as the principal, if not sole, motivation for migration during conflict. It does not address the complex decisions people must make to safeguard their lives, livelihoods, and future well-being, and does not help to explain the composition of migration streams.

The study presented here is based on a multidimensional model of the migration decision that adds to the existing threat-based model. It incorporates a broader social–ecological understanding of how people are differentially affected by conflict in ways that lead to variable migration responses. A diagram of this model is shown in Figure 1. The categories along the top of the diagram show the general pathway through which conflict can affect migration decisions. The categories include the conflict, its various consequences, the different resources that affect vulnerability to the consequences of conflict, and finally responsive behaviours, such as migration. Below the categories is an example of a path diagram that shows some possible factors within each step of the pathway and how they influence the relationship between conflict and migration. The main premises of this model are: (i) that armed conflict can have economic, social, and political consequences for civilian lives and livelihoods, in addition to posing a physical threat; (ii) that these consequences can affect the motivation to migrate, independently of physical threat; and (iii) that access to resources can mitigate a person's vulnerability to these consequences and so moderate the relationship between conflict, its consequences, and the decision to migrate.

Each of these premises is described in further detail in the sub-sections below.

The model is not intended to replace existing theories of migration and forced migration. In fact, it is based on the classic push–pull reasoning and recognizes that economic characteristics and social
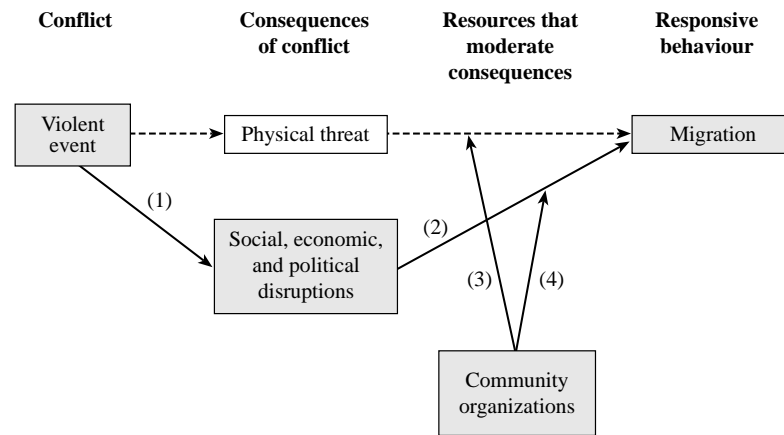
Figure 1 Conceptual framework incorporating a socio-ecological perspective to examine migration decisions during a period of armed conflict

capital remain important factors in explaining migration during conflict. However, given the drastic social and economic effects of conflict on individuals, my model seeks to address the additional pathways through which these factors affect migration.

The social, economic, and political consequences of conflict

Although physical threat is undoubtedly an important motivation to migrate away from conflict, it is only one of many ways in which conflict affects individuals and families. They are also affected by a variety of harmful social, economic, and political consequences both during and after conflict or violent events. This is shown in pathway '1' in Figure 1. Thus, in seeking to understand how people respond to conflict, we need to examine all the effects on their lives that condition the context within which they make migration decisions.

Armed conflict can disrupt livelihoods. It can limit people's ability to work and farm. It can disrupt access to markets, and increase commodity prices and taxes (Collier 1999; Gebre 2002; Bundervoet and Verwimp 2005; Mack 2005; Verpoorten 2005; Justino 2006). Civilians also often face destruction of personal property including homes, farms, and other assets (Justino 2006; Shemyakina 2006). Social and political life can also be disrupted by conflict. Research has shown that it can affect children's schooling, access to health services, and marriage and childbearing (Lindstrom and Berhanu 1999; Agadjanian and Prata 2002; Caldwell 2004; Mack 2005; Justino 2006; Shemyakina 2006; Heuveline and Poch 2007; Williams et al. 2012). The vast social upheaval of armed conflict can also lead to change in social relationships and leadership hierarchies.

The second premise of my model is that these economic, social, and political consequences can affect the motivation to migrate, as represented by pathway '2' in Figure 1. The view that social, economic, and political factors affect migration during periods of relative peace has a firm theoretical base in both the new economics of migration theory and neo-classical theories of migration, and is supported by consistent empirical evidence (Stark and Bloom 1985; Massey 1990; Stark and Taylor 1991; Massey and Espinosa 1997; Massey et al. 1998; Massey et al. 2010; Van Wey 2005). There is also evidence that economic, social, and political factors can motivate people to migrate during periods of armed conflict. The evidence is from both ethnographic and statistical studies in such disparate areas as Somalia, Colombia, Nicaragua, and Indonesia (Lundquist and Massey 2005; Engel and Ibanez 2007; Czaika and Kis-Katos 2009; Lindley 2010). Furthermore, anecdotal evidence about the conflict in Nepal suggests that, in many cases, violence alone was not a sufficient motivation for migration, and that the decision to migrate was actually precipitated by food insecurity caused by disruptions to farming and trade (Seddon and Adhikari 2003).

Community organizations that mitigate the consequences of conflict

The third premise of my model is that access to resources can mitigate vulnerability to the consequences of conflict and thereby moderate the relationship between conflict, consequences, and migration. In other words, not all people will experience the consequences of conflict in the same way. Those who have access to resources that

support daily life, such as the resources available from community organizations, will experience the danger and social and economic consequences of conflict to a lesser extent than those who do not have that access. This is represented by pathway '3' in Figure 1. The concept of vulnerability has a long tradition in sociology and in the study of natural disasters and other crises (Klinenberg 2002; Wisner et al. 2004; Browning et al. 2006). In the case of natural disasters, social vulnerability is defined as, 'the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard' (Wisner et al. 2004, p. 11).

Extending this discussion to migration, if danger and the social and economic consequences of armed conflict motivate migration, we can expect that protection from these consequences will moderate the effect of conflict on migration. In particular, those who are more vulnerable to, and less able to cope with, resist, and recover from armed conflict, will experience the consequences to a greater extent and will therefore be more likely to migrate away as an alternative strategy to cope with conflict. This is path '4' in Figure 1.

In addition to the various individual and household characteristics that reduce vulnerability to the social, economic, and political consequences of conflict, community organizations may also do so. Evidence shows that those community organizations which provide social support and a forum for developing strong social relationships can help people adapt and cope with the social and psychological consequences of conflict and crises (Creamer et al. 1993; Hobfoll and Lilly 1993; Norris and Kaniasty 1996; Carr et al. 1997; Jenkins 1997; Kwon et al. 2001; Galea et al. 2002; Tracy et al. 2008). Similarly, organizations that provide economic support can help people cope better with the economic consequences of conflict. For example, in the event that an individual or family suffers economic setbacks through destruction of their home, farm, or business during armed conflict, community organizations such as farmers' cooperatives can provide small loans or a ready source of reciprocal labour to rebuild what was destroyed. Finally, organizations that provide health services can also moderate the impact of conflict on migration, by treating injuries sustained from violence and thus help people recover from the physical consequences of conflict.

The pathways described above refer specifically to community organizations and other resources that mitigate the consequences of armed conflict. There are other mechanisms through which different kinds of resources could influence migration in different or even opposite directions. For example, because wealth could finance a move, we would expect its possession to increase, not decrease, the likelihood of migration. This can be contrasted with micro-credit facilities, which provide access to capital, but capital that must be used where people live and is not transportable.

In summary, by providing support for daily living at the place of residence, community organizations may reduce vulnerability to conflict by fostering resilience and helping people cope with the significant social and economic consequences of generalized violence. People with access to these organizations probably experience the consequences of conflict to a lesser extent than those without access and thereby will be less likely to adopt migration as a coping strategy to deal with conflict. This suggests the following hypothesis: *People with access to community organizations that provide support for daily living will be less likely to migrate during armed conflict than people without such access.* The remainder of this paper is devoted to describing my tests of this hypothesis in Nepal, seen as initial assessments of the value of the model I have presented.

Context

The study investigated the effects of the Maoist insurrection in the Chitwan Valley of south-central Nepal over the period 1996–2006. This conflict provides an excellent example for a test of my hypothesis because it occurred in a setting reasonably comparable to those of many of the ongoing conflicts around the world today. It took place in an area which, in its generally poor living conditions and reliance on subsistence agriculture, is similar to rural areas in many countries of South Asia and sub-Saharan Africa. Like 84 per cent of other conflicts occurring in 2006, Nepal's was categorized as 'intrastate' and 'minor' (Harbom and Wallensteen 2007). It was also typical of many other contemporary conflicts in the following respects: the fighting was between a government and a non-governmental rebel group; because the parties to the conflict used guerrilla tactics and there was no official frontline, the daily lives of civilians were disrupted; and the violence was accompanied by considerable political and economic instability.
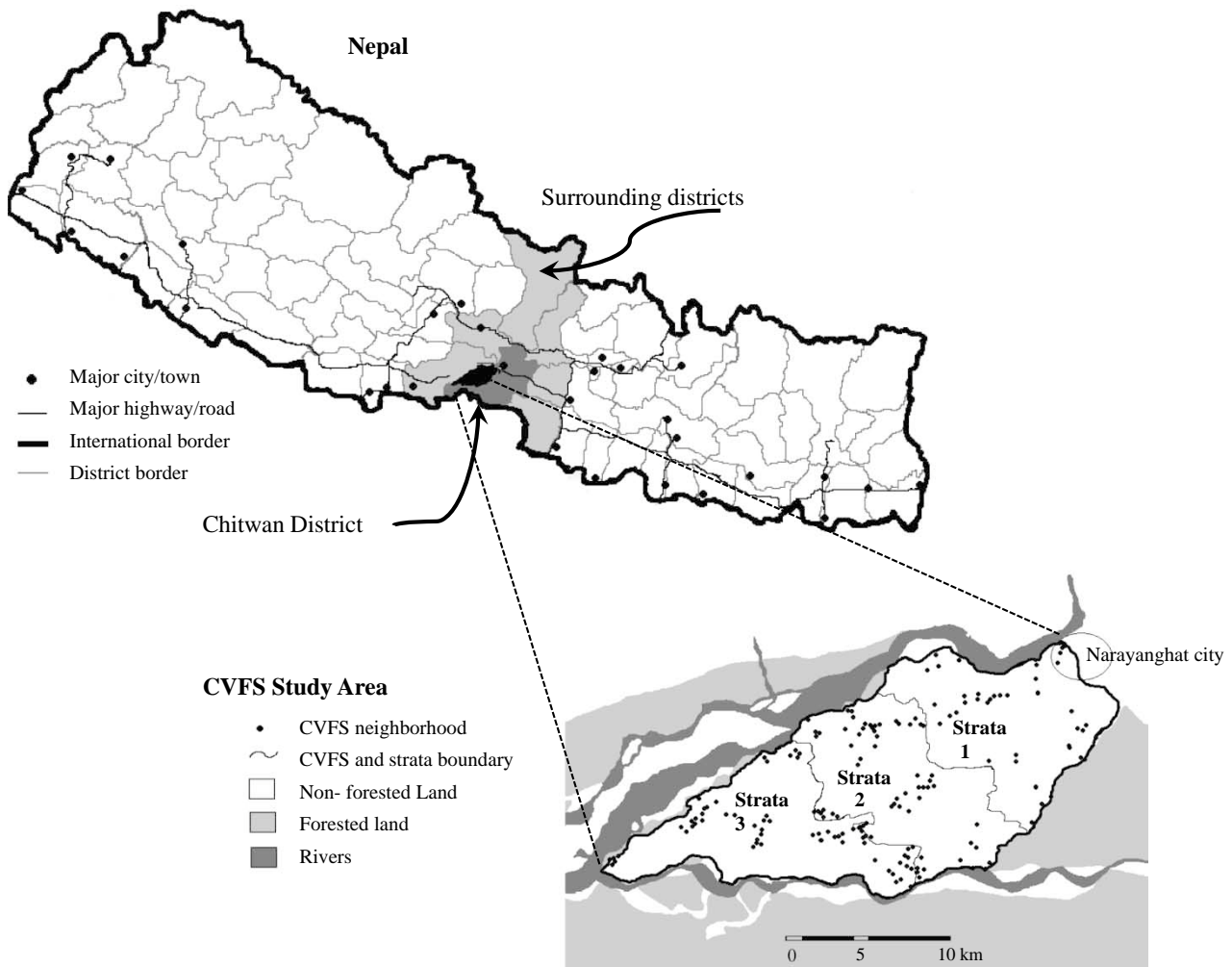
The conflict in Nepal

The conflict in Nepal began in 1996 when the Communist Party of Nepal (Maoist) declared a 'People's War', with the aim of unseating the monarchy and installing a democratic republic. The early stages of the conflict were restricted to several mid-western districts and aimed at damaging government installations. From mid-2000, the Maoists expanded their campaign nationwide. The Nepalese government responded in 2001 by creating a special armed police force to fight the Maoists, and this marked the start of the nationwide conflict. Serious peace talks commenced in June 2006 and in November of that year the government and Maoists signed a comprehensive peace agreement declaring an end to the conflict. During the conflict, civilians were routinely caught up in firefights and bomb blasts. They also suffered torture, extra-judicial killings, abductions, arrests without warrant, house raids, forced conscription, billeting, extortion, and

general strikes that disrupted economic and social activity across the country (Hutt 2004; Pettigrew 2004; SATP 2006b).

The Chitwan Valley of Nepal

A map of the study area, showing the sample neighbourhoods used in the Chitwan Valley Family Study and geographic features is shown in Figure 2. The valley is flat, fertile, and dominated by agriculture. There is one large city, Narayanghat, and the rest of Chitwan's population, like most Nepalese, live in small, rural villages. Most villages are connected to other villages and larger roads by paths or dirt roads.

Historically, there has been much migration from Chitwan to other areas of Nepal and India. The two countries share an open border, and because there are no restrictions on cross-border travel, international migration to India is no more difficult than

Figure 2 Map of Nepal and Chitwan Valley Family Study area
Source: Chitwan Valley Family Study.

migration to other areas within Nepal. Before the conflict, much of the migration was seasonal and for the purpose of obtaining work as a means of supplementing regular farm and household incomes (Thieme and Wyss 2005; Kollmair et al. 2006). Because of the short-term nature of migration from Chitwan, most migrants moved alone and remitted large amounts of money to other family members who stayed at home to care for children, land, and livestock (Gill 2003; Thieme and Wyss 2005; Kollmair et al. 2006). It was relatively rare for whole households to move together. These patterns are still common: between 1997 and 2006, 63 per cent of adults in the Chitwan Valley Family Study (described in detail below) migrated at least once, but only 27 per cent of households migrated.

Migration patterns in Chitwan during the pre-conflict period were particularly dependent on sex and age. Historically, men were much more likely to migrate, usually to obtain work. However, the gender gap in migration has decreased, with more women migrating in recent decades. This is probably because more women have had access to higher education and have participated in the non-family paid workforce in increasing numbers (Williams 2009). As in most countries around the world, age is also a key factor in migration from Chitwan. Before and during the conflict, migration rates were highest for those in their 20s, and progressively lower after the age of 30 (Bohra and Massey 2009; Williams 2009; Bohra-Mishra and Massey 2011).

Data and measures

The study covered a period of almost 9 years: starting in 1997, 3 years before the outbreak of nation-wide violence, and continuing throughout the insurrection until its end in January 2006. It therefore provided an unusual opportunity to compare migration patterns during the period of armed conflict with those during a previous period of relative peace.

Three kinds of data were used: survey data on individuals, survey data on communities, and data on violent events entailed in the conflict. The data on violent events came from the South Asia Terrorism Portal (SATP), a non-governmental organization that compiles records of all violent events in Nepal. Survey data on individuals and communities were provided by the Chitwan Valley Family Study (CVFS), a large-scale, multidisciplinary study of the western part of the Chitwan Valley of Nepal. It was designed to investigate the impact of macro-level socio-economic changes on individual behaviour.

The several data sets provided by the CVFS included individual interviews and life-history calendars collected in 1996. A prospective demographic event register, updated monthly from 1997, was the source of migration data. Because they provided prospective information on a representative sample of everyone at risk of migration, these data were well suited to my purpose of studying the composition of migrant streams, and preferable to survey data on migrants at destinations such as refugee or camps for displaced persons. In fact, the scarcity of representative samples at the original place of residence is most likely to be the main reason why there has been so little empirical research on the composition of migrant streams during armed conflict.

Response rates in the CVFS were exceptional: 97 per cent of the original sample for the individual interviews and life-history calendars. The prospective demographic event registry suffered some attrition, but the response rate was still high, at 94 per cent in 2006.

The demographic register included 151 neighbourhoods, selected using a two-stage systematic sampling procedure, with equal probability of selection. First, the study area was divided into three distinct strata (see Figure 2), based on the distance to the city of Narayanghat, the sole urban area within Chitwan, in the north-east. Strata 1 included the city, and strata 2 and 3 were progressively more rural and of lower population density. Second, a random sample of neighbourhoods was selected from each stratum. Within each selected neighbourhood, every individual aged 15–59 within every household was interviewed. For further details of the sampling strategy and the CVFS, see Barber et al. 1997 and Axinn et al. 1999. For my study, the sample was restricted to those aged between 18 and 59 years at the beginning of the study in June 1997. This restriction excluded those likely to have been too old to be living independently or too young to do so and who might still have been enrolled in school. The total sample comprised 3,353 people.

As with any study of armed conflict, there is a possibility that excessive conflict-related mortality in the sample could have biased my results, particularly if mortality was selective of people who were more or less likely to migrate. In fact, although there was a high level of violence in Chitwan, the vast majority of violent acts resulted in physical and mental injury, and imprisonment, rather than death. There were only 200 conflict-related deaths in the Chitwan district during the period of this study (INSEC

2011), out of the 472,000 or so residents. It is unlikely, therefore, that many of the 3,353 respondents from the CVFS in my study experienced conflict-related deaths.

Measures of violence

Violence was measured by the occurrence of a specific, easily determined, and threatening type of event—a major gun battle. Major gun battles were defined as large events that involved many people, multiple fatalities, and were likely to be known about by the general population, as opposed to smaller events of gun violence between two or three people. The SATP provided records of the date and district of each such battle in Nepal from November 2001, and the details were corroborated by CVFS staff resident in Chitwan throughout the entire period of the study. Chitwan residents' perception of threat was taken as extending over Chitwan itself and the six neighbouring districts (Nawalparasi, Tanahu, Gorkha, Dhading, Makwanpur, and Parsa), and the number of major gun battles per month in this area was used in the study. The districts are small. The combined area of the seven districts is approximately the same as that of Connecticut, one of the smallest US states.

Because SATP records start only in November 2001, the monthly number of major gun battles was taken as zero between the start of the study in June 1997 and November 2001. News reports and research show that the conflict was pursued at a very low intensity before 2001, and CVFS staff reported that there were few violent events before 2002. Assuming the number of monthly gun battles to be zero is both likely to be realistic and more likely to underestimate than overestimate any effect of gun battles on migration.

Migration

Migration was measured using the CVFS prospective demographic event register, which records the residence every month of each individual in the sample. Migration was defined as an individual's absence of 1 month or more from their residence in 1996, a definition used successfully in previous research (Williams 2009; Massey et al. 2010). The fact that it includes both temporary and permanent migration is important in the study of conflict, since the durations of migration can vary significantly. By this definition, 63 per cent of the sample population migrated at least once during the 104 months of the study. Table 1 gives some demographic background and migration information, based on the variables used in the study.

Theory and evidence indicate that previous migration experience is a strong predictor of migration (Findley 1987; Massey and Espinosa 1997). For this reason, several measures of past migration experience were used to control for migration-specific human capital: whether the respondent had ever migrated before 1997; the number of times migrated since 1997; length of time away on their most recent migration; and length of time lived in the respondent's Chitwan neighbourhood since returning from the most recent migration.

Community organizations

Information on community organizations was obtained from the CVFS neighbourhood history calendars prepared in 2006. These used archival, ethnographic, and structured interview methods (Axinn et al. 1997) to establish a detailed history of the key services and organizations in each neighbourhood. This provided data for all variables referring to community organizations for each year of the period under study, a particularly important feature since violence can (and in a few cases did) cause some organizations to close down.

The community organizations included markets, health centres, farmers' cooperatives, and mills. Police posts were also used as a control in all models. Markets were defined as any place with two or more adjacent shops or stalls that sold goods. Markets provide economic opportunities for people to buy and sell produce and other goods, and can also serve as informal meeting places where strong community relationships can be maintained and fostered. Health centres were defined as any facility that provided health care, including health posts, centres, and hospitals. As well as health care, these centres often provided educational and community outreach programmes. Farmers' cooperatives and mills enabled small farmers to process and market grain, milk, and other farm produce. Many cooperatives also had micro-credit functions and provided small loans to members in times of need. Thus, cooperatives and mills provided economic support as well as a forum for developing social relationships.

For each of these organizations, the CVFS neighbourhood history calendar recorded the distance in walking time from each neighbourhood to the nearest service provider. These travel times were

Table 1 Descriptive statistics of the sample used for the study of migration during armed conflict in the Chitwan Valley, 1997–2006

Characteristic	Range	Mean/median	Std. dev.
Unit of measure = month $N=104$			
Conflict			
Number of gun battles per month	(0–4)	0.19/0	0.62
Unit of measure = community $N=151$			
Community organizations in 1997			
Market within 5 minutes' walk	(0, 1)	0.50	0.50
Cooperative within 10 minutes' walk	(0, 1)	0.09	0.29
Mill within 5 minutes' walk	(0, 1)	0.42	0.49
Health centre within 10 minutes' walk	(0, 1)	0.42	0.49
Police post within 10 minutes' walk	(0, 1)	0.07	0.25
Unit of measure = person $N=3,353$			
Individual characteristics in 1997			
(N = 3,353)			
Sex (female)	(0, 1)	0.53	0.50
Age	(18–59)	35.26	11.53
Marital status			
Never married	(0, 1)	0.12	0.32
Married, living with spouse	(0, 1)	0.68	0.47
Married, not living with spouse	(0, 1)	0.15	0.36
Divorced, separated, widowed	(0, 1)	0.05	0.21
Ethnicity			
Brahmin/Chhetri	(0, 1)	0.47	0.50
Dalit	(0, 1)	0.10	0.30
Hill Indigenous	(0, 1)	0.15	0.36
Terai Indigenous	(0, 1)	0.21	0.41
Newar	(0, 1)	0.06	0.24
Migration experience			
Ever migrated during study period	(0, 1)	0.63	0.48
Ever migrated before 1997	(0, 1)	0.26	0.44
Number of migrations since 1997	(0–18)	1.39	2.12
Months away on last migration	(0–107)	5.33	12.16
Months back since last migration	(0–107)	65.49	44.16
Number of children	(0–16)	3.17	2.53
Educational attainment	(0–16)	4.01	4.48
Wage or salary job	(0, 1)	0.45	0.50
Amount of land owned (acres)	(0–17)	2.06	2.44
Distance to Narayanghat	(0–18)	8.68	4.05

Source: Chitwan Valley Family Study.

coded as dichotomous variables. *Markets* and *Mills* were coded '1' if a neighbourhood was within 5 minutes' walk of a market or mill, and '0' if it was further away. For farmers' cooperatives, health centres, and police posts, a distance of 10 minutes' walk was used as the corresponding criterion. Tests showed that these access times were better discriminators than others, such as 5, 10, and 20 minutes' walk away. Other research in this study area has shown that dichotomous variables of 5 and 10 minutes' walk to markets are significant predictors of getting married, educational attainment, and use of contraception (Axinn and Yabiku 2001; Beutel and Axinn 2002; Yabiku 2004). In addition to the evidence that these particular access times were important, they are also

conceptually plausible. People who use or supply markets and mills often need to transport large quantities of goods (produce and grain, respectively) to and from the market or mill. Health centres and farmers' cooperatives involve smaller loads. Thus, it is understandable that people would be willing to travel further with lighter loads, and shorter distances to services which involve heavier loads.

Individual demographic characteristics

In order to estimate accurately the effects of violence and the presence of community organizations on migration and reduce the risk of confounding the relationships of interest, a variety of

individual-level and household-level characteristics were included in the models. These variables included: age; sex; ethnicity; marital status; children; education; work outside the home; land ownership; and distance to the nearest urban area. Previous studies have shown that migration patterns are dependent on these characteristics in Nepal and other countries (Harris and Todaro 1970; Stark and Bloom 1985; Massey 1990; Pedraza 1991; Stark and Taylor 1991; Donato 1993; Shrestha et al. 1993; Massey and Espinosa 1997; VanWey 2005; Williams 2009; Massey et al. 2010).

As well as the variable for sex, and whether a respondent was working outside the home in 1996, dichotomous variables were also used for each of the five main ethnic groups in the study area and for each marital status. Continuous variables were used for the following: age; number of children ever born and aged 15 years or younger at interview; years of education; urban proximity (distance to the urban area of Narayanghat); and the amount of land owned. Because the distribution of land ownership was skewed, the natural log of land ownership was used.

Time-varying variables were used whenever the data were available. Marital status and number of children were taken from the demographic event register and were therefore time varying, as was age. Land ownership was obtained from surveys undertaken in 1996 and 2001. Land ownership reported in 1996 was assumed to hold for the period 1997–2000, and land ownership reported in 2001 for the period 2001–06. The values measured in 1996 were used for all other variables for individuals, including sex, work outside the home, ethnicity, and educational attainment.

In order to control for the seasonal pattern of migration in the Chitwan Valley, a series of eleven dichotomous variables, one for each month of the year (with June used as the reference month), were included in all the models. In addition, it was necessary to control for the selection effect of migration from the start of the survey, and any other sources of time-dependent variation during the study period, including other conflict-related events, economic instability, and changes in cultural norms and attitudes. For this purpose, a fixed-effects method was used with nine dichotomous variables, to account for the particular effects of each year of the study. This strategy, which is relatively conservative, controlled for any other exogenous change over time, increasing the chance that the observed effects over time were due to variations in the number of gun battles.

Analytic strategy

Discrete-time event-history models were used to predict out-migration from the Chitwan Valley. The unit of exposure to risk was a person-month. The models tested the monthly hazard of migration from the Chitwan Valley neighbourhood from June 1997, contingent upon major gun battles and access to community organizations. Gun battles were lagged by 1 month to ensure that the migration occurred after the event. The moderating effects of community organizations on the conflict–migration relationship were assessed by the interactions of each community measure with the number of gun battles per month.

All models used the logistic regression equation as follows:

$$\ln\left(\frac{p}{1-p}\right) = \alpha + \sum (B_k)(X_k) \qquad (1)$$

where p is the probability of migrating out of the Chitwan neighbourhood; $p/(1-p)$ is the odds of migrating; a is a constant term; B_k is the effect of the kth independent variable; and X_k is the value of these independent variables. Multi-level modelling techniques were used to adjust for autocorrelation that could otherwise have resulted from the clustering of sample respondents at the neighbourhood level (Barber et al. 2000). This strategy has been successfully used with these data and similar measures (Axinn and Barber 2001; Yabiku 2004; Brauner-Otto et al. 2007).

The models analysed any migration, including first and higher-order migrations. To do this I created a data set that excluded migrants for the time they were away from their neighbourhood of origin. When migrants returned to their original neighbourhood, they were again included in the data set. As noted above, an extensive set of measures was used to control for any past experience of migration. However, these data were potentially subject to selection bias resulting from the overrepresentation of those migrants who returned quickly, compared with those who returned after longer periods, or did not return at all. To test for this possible bias, the same models were applied to first migrations only. The results indicated that there was no difference in the migration patterns between first migrations and all migrations.

As with all analyses of neighbourhood-level effects on individual behaviour, these analyses faced problems that could jeopardize the validity of results. The most important issues were the possible

selective migration into specific neighbourhoods, and possible endogenous influences on the neighbourhood characteristics (or the non-random placement of neighbourhood organizations). The detailed CVFS data allowed these issues to be addressed and their effects assessed.

Models were tested using a fixed-effects strategy for neighbourhoods. This involved using a dichotomous indicator for each neighbourhood to control for neighbourhood-specific effects, a relatively conservative strategy that isolates the effects of community organizations by controlling for all other ecological differences between neighbourhoods. Estimates from these fixed-effects models produced results that were substantively equivalent to models without fixed effects.

Some community organizations, such as cooperatives, health centres, and police posts had usually been founded by an outside source, while others, such as mills and markets, were more likely to have been set up by the community itself. Model results for both types of organization were similar, suggesting that there were no significant differences between them in moderating reactions to violent events.

In the analysis of neighbourhood effects, I was concerned that the location of gun battles might have been spatially correlated with the density of community organizations. If this had been the case, the locations of gun battles would have been a spurious factor that would have jeopardized the validity of the results on the relationship between community organizations and migration. Ideally, spatial correlations between gun battles and density of community organizations would have been estimated, but the SATP data were accurate only at the district level and so could not provide locations of gun battles with sufficient precision. However, reports and records from non-governmental human rights organizations and the news media indicated that gun battles had been either at police posts and army barracks (in instances where the Maoists attacked government forces), or randomly distributed throughout the countryside and neighbourhoods (INSEC 2004, 2006; SATP 2006a, b). There was no indication that gun battles had been concentrated in either more or less remote areas or in areas with more or fewer community organizations (besides police posts). The non-random location of many gun battles at police posts could have affected the results, if the location of police posts had been highly correlated with the location of markets, mills, cooperatives, and health centres. This possibility was tested using CVFS data on access to police

posts. The results showed weak correlations between the locations of police posts and community organizations. Furthermore, access to police posts was controlled for in all models. Models that included an interaction term for gun battles and police posts were also tested. The results from models that did and did not control for police posts and interactions with police posts were almost identical. In addition, the presence of police posts did not significantly affect migration in any model. These tests provided reasonably strong evidence that the location of gun battles did not jeopardize the validity of results.

Results

Demographic characteristics and migration

As shown in Table 2, several demographic variables have a strong influence on migration. The odds ratio of 0.72 for women indicates that they were about 30 per cent less likely to migrate than men at any time. The odds ratio for age, 0.97, suggests that an individual was about 3 per cent less likely to migrate with each additional year of age, starting from age 18. These results are consistent with evidence from around the world that young adults and men are the most likely to migrate (Massey and Espinosa 1997; Massey et al. 1998; VanWey 2005).

Results also indicate that having migrated previously is another strong predictor of migration. Respondents who had migrated before 1997 were 40 per cent more likely to migrate during the study period. Each additional migration during the study period increased the likelihood of a subsequent migration by another 44 per cent. Finally, each additional month spent away from Chitwan on the previous migration, increased the likelihood of a subsequent migration by 3 per cent. These results are similar to those from studies in Mexico, and support existing theories of migration that identify experience of migration and connections with others who have experienced it as important determinants of migration (Massey et al. 1987, 1993; Massey and Espinosa 1997).

Violence and migration

Gun battles had a strong effect on migration. The odds ratio of 1.09 shown in Table 2 for major gun battles indicates that in a month following a single gun battle, there was a 9 per cent increase in the likelihood of migration. In a month following two

Table 2 Predictors of migration from Chitwan Valley, 1997–2006. Logistic regression estimates (odds ratios) from discrete-time hazard models

Model 1	Odds ratio	Z-statistic
Conflict		
Major gun battles	1.09**	(2.59)
Community organizations		
Market	0.94	(1.02)
Farmers' cooperative	1.14	(1.19)
Mill	1.02	(0.34)
Health centre	1.06^	(1.32)
Police post	1.13	(0.88)
Individual characteristics		
Sex (female)	0.72***	(9.08)
Age	0.97***	(13.18)
Marital status		
Never married	1.02	(0.34)
Married, living with spouse	Reference	
Married, not living with spouse	1.23***	(5.20)
Divorced, separated, or widowed	1.63***	(7.05)
Ethnicity		
Brahmin/Chhetri	Reference	
Dalit	1.12*	(1.74)
Hill Indigenous	1.11*	(1.92)
Terai Indigenous	0.87*	(2.15)
Newar	0.87*	(2.01)
Migration experience		
Ever migrated before 1997	1.44***	(11.16)
Number of migrations since 1997	1.40***	(46.29)
Months away on last migration	1.03***	(7.59)
Months back since last migration	1.00^	(1.57)
Number of children	0.97***	(3.21)
Educational attainment	1.04***	(8.71)
Wage or salary job	1.16***	(4.88)
Amount of land owned	0.98^	(1.60)
Distance to Narayanghat	1.01*	(1.65)
Months of the year		
January	0.99	(0.19)
February	1.00	(0.02)
March	1.09	(1.25)
April	0.98	(0.27)
May	1.06	(0.83)
June	Reference	
July	0.75***	(4.15)
August	1.18**	(2.63)
September	1.18**	(2.71)
October	0.73***	(4.53)
November	0.99	(0.10)
December	0.99	(0.14)
Years		
1997	Reference	
1998	0.96	(0.72)
1999	0.75***	(4.20)
2000	0.70***	(4.44)
2001	0.67***	(4.11)
2002	0.54***	(5.29)
2003	0.45***	(6.19)

Table 2 (*Continued*)

Model 1	Odds ratio	Z-statistic
2004	0.23***	(9.49)
2005–Jan. 2006	0.34***	(6.43)
Residual	0.9612	
Neighbourhood-level error variance	0.1070	
−2 res log likelihood	1,852,885	

Notes:
(1) No. of observations (person-months) = 258,333.
(2) Community organizations were coded as accessible if they were within the following walking distance times from the community: markets and mills—5 minutes; farmers' cooperatives, health centres, and police posts—10 minutes.
Statistical significance: ^p <0.10; *p <0.05; **p < 0.01; ***p <0.001 (one-tailed tests).
Source: As for Table 1.

gun battles, there was a 19 per cent increase, and following four gun battles, a 41 per cent increase. These effects are as predicted by the threat-based model and are consistent with evidence from other studies of migration during conflict (Schmeidl 1997; Davenport et al. 2003; Moore and Shellman 2004; Lundquist and Massey 2005; Melander and Oberg 2006).

Conflict, community organizations, and migration

Models 2–5 (presented in Table 3) show the moderating effects of community organizations on the relationship between conflict and migration. Each of these models includes variables for the major gun battles, the community organizations, and an interaction variable. The results indicate that all of the community organizations moderated the relationship between conflict and migration, and some had marginally significant direct effects on the likelihood of migration.

Model 2 (see Table 3) includes an interaction term for gun battles and markets. The odds ratio for access to a market, 0.95, is not statistically significant. For gun battles, as expected, it is positive, 1.16, and highly statistically significant. The odds ratio for gun battles is an estimate of the effect of gun battles on migration for people without access to markets. The interaction term for gun battles and markets, which shows the moderating effect of markets on the gun battles–migration relationship, is negative and statistically significant, with an odds ratio of 0.88. This means that while the effect of gun battles on migration was positive for people without access

Table 3 Influence of community organizations as moderators of effects on gun battles on migration from Chitwan Valley during 1997–2006. Logistic regression estimates (odds ratios) from discrete-time hazard models

	Model 2 Market	Model 3 Farmers' cooperative	Model 4 Mill	Model 5 Health centre
Interactions				
Gun battles * market	0.88*			
	(2.19)			
Gun battles * farmers' cooperative		0.73**		
		(2.36)		
Gun battles * mill			0.79***	
			(3.92)	
Gun battles * health centre				0.89*
				(2.17)
Conflict				
Gun battles (no. per month)	1.16***	1.11***	1.20***	1.16***
	(3.50)	(3.16)	(4.66)	(3.49)
Organization				
Market	0.95	0.93	0.93	0.93
	(0.83)	(0.98)	(1.01)	(1.01)
Farmers' cooperative	1.14	1.17^	1.14	1.14
	(1.19)	(1.31)	(1.09)	(1.11)
Mill	1.02	1.02	1.05	1.02
	(0.39)	(0.35)	(0.87)	(0.40)
Health centre	1.06^	1.06^	1.06^	1.08^
	(1.35)	(1.37)	(1.36)	(1.63)
Police post	1.13	1.13	1.13	1.13
	(0.87)	(0.88)	(0.85)	(0.86)
Residual	0.9597	0.9587	0.9584	0.9611
Neighbourhood-level error variance	0.1070	0.1073	0.1070	0.1070
−2 res log likelihood	1,852,695	1,852,395	1,852,653	1,852,933

Notes:
(1) Results are odds ratios; corresponding Z-statistics are given in parentheses.
(2) No. of observations (person-months) = 258,333.
(2) All control variables used, but results not shown. Control variables in these models comprise sex, age, marital status, ethnicity, migration experience, number of children, educational attainment, work experience, land owned, distance to Narayanghat, years, and months of the year.
(4) Community organizations were coded as accessible if they were within the following walking distance times from the community: markets and mills—5 minutes; farmers' cooperatives, health centres, and police posts—10 minutes.
Statistical significance: ^p <0.10; *p <0.05; **p <0.01; ***p <0.001 (one-tailed tests).
*Source*: As for Table 1.

to markets, it was less positive for those with such access.

Figure 3 shows this result graphically. It displays the predicted probability of migration by number of gun battles, for people with and without access to markets. These predicted probabilities were calculated for the 'average' man and woman, using the mean values (shown in Table 1) for each independent variable, and an arbitrary date of February 2004. For example, the 'average' person was 35 years old, married, had three children, etc. As can be seen from Figure 3, for men and women with access to markets, the probability of migration increases slightly with increasing numbers of gun battles per month. For men and women without access to markets, the probability of migration increases much more rapidly. The difference in the probability of migration between those with and without access to markets, shown by the solid and dotted lines, respectively, reveals the moderating effect of markets. It is notable that this difference is very small (about 0.5 per cent) when there are no gun battles, but increases with the number of gun battles per month. Thus, after four gun battles per month, an 'average' woman without access to a market is almost 6 per cent more likely to migrate than an 'average' woman with access to a market. The difference in migration probabilities after four gun battles for an 'average' man is about 7.5 per cent.

The interactions between the other community organizations (health centres, farmers' cooperatives, and mills) and gun battles produce similar results, as
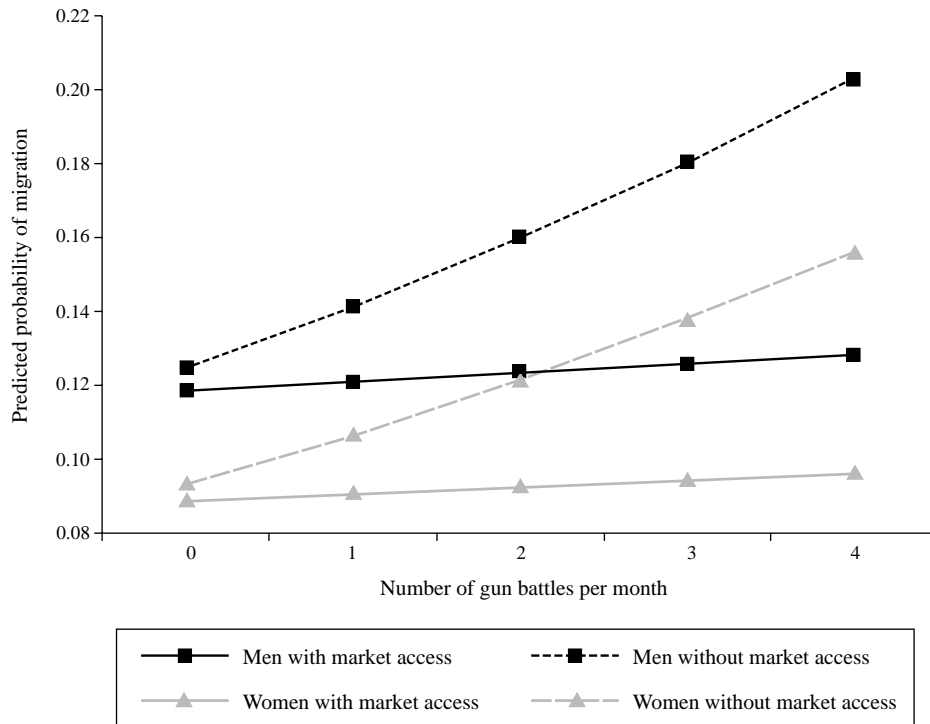
Figure 3 Predicted probability of migration after gun battles for 'average' men and women, comparing those with and without access to markets. Chitwan Valley, 1997–2006
Source: Regression results from Model 2 (Table 3).

shown in Models 3–6. Independent of the main effect of these organizations on migration, the interactions between gun battles and these organizations are negative and statistically significant. These results show that everyone was more likely to migrate after a gun battle, but that those with access to a health centre, cooperative, or mill were less likely to do so than those without access. In other words, access to these community organizations appears to have dampened the effect of gun battles on migration, and supports the argument that economic, social, and health support provided by community organizations helps individuals cope with physical threat and the economic and social consequences of gun battles.

Conclusion

Previous research on forced migration has shown that periods of armed conflict increase migration on an aggregate level away from an area of conflict, but has not adequately addressed the facts that armed conflict is rarely a single event and that migrants experience conflict in different ways. The purpose of my study was the empirical evaluation in Nepal of a conceptual model that adds to theories of migration and forced migration and that could provide initial

insight into existing micro-level variability in migration during armed conflict. This model uses a socioecological approach that requires analysis of the full range of consequences of armed conflict for people's lives and livelihoods, and of how these consequences interact with the broader context within which people live and make migration decisions. The analyses show that community resources (such as markets, health centres, cooperatives, and mills) systematically decreased the propensity of individuals in the Chitwan Valley to migrate in response to violent events. The results suggest that community organizations have this effect by increasing the individual's and household's ability to cope with the economic and social consequences of conflict. For example, in times of economic insecurity caused by conflict, farmers' cooperatives and mills can provide small loans and access to food banks, as well as continued opportunities to process and sell farm produce, thus enabling people to rebuild or maintain their livelihoods without migrating. Markets and health centres also provide forums for developing strong social ties that can encourage resilience and assist in coping during periods of conflict. Thus, community organizations are key factors that reduce vulnerability to the variety of the consequences of armed conflict. These results and the underlying theoretical connection between

community disadvantage (or comparative advantage) and resiliency and coping during periods of disaster are similar to those from recent studies in a number of areas that have investigated the impact of community organizations on vulnerability. They find that community organizations and support have impacts on mental illness after terrorist events and on mortality and migration after natural disasters (Klinenberg 2002; Norris et al. 2002; Ahern et al. 2004; Browning et al. 2006; Myers et al. 2008; Tracy et al. 2008).

To date, the study of the causes of conflict-induced migration has been greatly restricted by the availability of data. In many cases, the only data available are either in aggregate form at the country level, or are those collected at migrant destinations, such as camps for refugees or displaced persons, which contain only selected groups of the entire migrant population. These data limitations have hampered the ability to detect and understand systematic micro-level variation and selection in migration rates. The analyses presented here demonstrate that recording individual-level information on potential migrants at their place of origin can substantially advance the study both of conflict-induced migration and of other consequences of conflict for individuals, families, and communities.

While the results in this study relate specifically to Nepal, the conceptual model and supportive evidence should contribute to an understanding of the effects of conflict on individuals' lives and migration in other parts of the world. The conflict that occurred in Nepal is similar to many around the world today, and living conditions in the country and the role of community-based organizations in providing small-scale support are similar to those in many other non-industrialized countries. Thus while the relationships between specific measures in this study might have few exact parallels in other settings, the broad conclusions relating different levels of violence, the social and economic consequences of violence, community-level social and economic support, and migration decisions are highly relevant to understanding human behaviour during armed conflicts around the world.

In more general terms, the findings from this study and those from research on natural disasters strongly suggest that community organizations act as a source of stability, and help people maintain their patterns of daily living. In doing so they partially counteract the effect of armed conflict or other types of macro-level upheaval caused by natural disasters, economic crises, and changes in government, as sources of change. Thus, this study has broad implications for understanding processes of social change and sources of stability during contexts of disaster and upheaval that routinely affect human societies around the world.

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