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by
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Abstract

We conduct an econometric analysis of the economic and social factors which contributed to the spread of violent conflict in Nepal. We find that conflict intensity is significantly higher in places with greater poverty and lower levels of economic development. Violence is higher in locations that favor insurgents, such as mountains and forests. We find weaker evidence that caste divisions in society are correlated with the intensity of civil conflict, while linguistic diversity has little impact.

Keywords: violent conflict, poverty, social polarization

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1 Introduction

Since 1945, more than 70 civil wars have occurred around the world, resulting in approximately 20 million deaths and displacing more than 67 million people.[1] Understanding the causes of the onset and continuation of such conflicts is therefore of great importance, and the analysis of the determinants of civil conflict has been the subject of a recent and growing literature in economics.[2] There have been several cross-country studies of the proximate correlates of civil war: Collier and Hoeffler (2004) and Fearon and Laitin (2003) both find that poorer countries face a greater risk of civil conflict. Miguel et al. (2004) use instrumental variable analysis to corroborate this view that lower economic growth leads to more conflict. However, this finding is subject to varying interpretations: while Collier and Hoeffler (2004) interpret poverty as proxying for the opportunity cost of rebel recruitment, Fearon and Laitin (2003) emphasize the lack of state capacity in poor countries. These studies also differ in their findings on the impact of other factors: Collier and Hoeffler find that civil conflicts are more likely in countries which are dominated by one ethnic group and which have a larger stock of easily expropriated primary commodities, while the other two studies find no impact of ethnic divisions or primary commodities on the likelihood of conflict.

The results from cross-country studies are subject to the caveat that civil conflict in one country might have very different causes and characteristics than conflict in another.[3] Further, the data on civil conflicts and other variables may not be strictly comparable across countries (Sambanis, 2004). There have been a few within-country studies of civil conflict. Barron et al. (2004) examine village-level conflicts in Indonesia, while Deininger (2004) examines the causes and consequences of civil strife in Uganda. However, both these studies focus on a local level of conflict and construct measures of conflict based on subjective interviews. They do not study organized conflict like insurgencies or civil wars, and hence are not strictly comparable to the cross-country studies. The set of case studies in Collier and Sambanis (2005)

[1] Collier and Sambanis (2005) pp xiii.

[2] See Humphreys (2003) for a review of this literature.

[3] Sambanis (2001) analyses ethnic and non-ethnic conflicts separately and finds that they have somewhat different causes.

Table 1: Summary statistics

	Observations	Mean	s.d.	Minimum	Maximum
Total number of deaths (Feb 1996-Dec 2004)	75	150.33	143.69	0	810
Number killed by the state	75	97.11	104.69	0	652
Number killed by the Maoists	75	53.22	45.87	0	250
Year-by-year deaths					
Total number of deaths 1999	75	11.79	15.26	0	91
Total number of deaths 2002	75	62.07	84.73	0	480
Total number of deaths 2003	75	24.84	19.49	0	108
Total number of deaths 2004	75	36.49	33.56	0	214
Measures of conflict intensity					
Number of deaths per 1000 district population	75	0.83	0.91	0.00	5.21
Number killed by state per 1000 population	75	0.56	0.68	0.00	4.19
Number killed by Maoists per 1000 population	75	0.27	0.26	0.00	1.28
Dummy for more than 100 killed	75	0.56	0.50	0.00	1.00
Dummy for more than 150 killed	75	0.33	0.47	0.00	1.00
Number of abductions per 1000 district population	75	2.03	3.51	0.00	17.98
Geography					
Maximum elevation ('000 meters)	75	4.08	2.71	0.19	8.85
Proportion of forested area	75	0.39	0.19	0.04	0.98
Rainfall ('000 ml)	75	1.53	0.57	0.50	3.88
Development					
Poverty Rate (proportion below poverty line)	72	0.42	0.23	0.00	0.92
Infant Mortality Rate (deaths per 1000 births)	75	93.85	32.00	32.00	201.00
Literacy 1991 (%)	75	38.03	11.02	19.60	70.10
Male-female literacy difference 1991 (%)	75	30.74	6.64	-1.10	49.30
Infrastructure					
Road length per sq km (1990)	75	0.09	0.18	0.00	1.11
Post offices per 1000 population (1992)	75	0.16	0.17	0.04	1.15
Schools per 1000 population (1994)	75	1.35	0.76	0.44	4.85
Banks per 1000 population (1994)	75	0.03	0.02	0.01	0.19
Health posts per 1000 population (1994)	75	0.30	0.29	0.00	2.24
Change in road length (1990-1997)	75	0.07	0.12	-0.01	0.67
Change in number of post offices (1992-1999)	75	31.89	25.48	2.47	141.68
Caste and language diversity					
Caste Fractionalization	75	0.79	0.10	0.41	0.93
Caste polarization	75	0.53	0.14	0.24	0.78
Proportion of advantaged castes	75	0.41	0.22	0.04	0.85
High Caste Dominance (dummy)	75	0.40	0.49	0.00	1.00
Linguistic fractionalization	75	0.42	0.24	0.01	0.79
Linguistic polarization	75	0.59	0.28	0.03	0.93
Proportion speaking Nepali	75	0.59	0.29	0.05	0.99

All summary statistics are for district-level data.
See Data Appendix for sources and descriptions of all variables.

Table 3 : Correlates of conflict-related deaths

	Dependent variable = Conflict-related deaths per 1000 population									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Elevation	0.086***	0.072***	0.067***	0.063***	0.071***	0.062***	0.057**	0.041	0.035	0.061**
	(0.022)	(0.020)	(0.023)	(0.022)	(0.020)	(0.023)	(0.021)	(0.028)	(0.025)	(0.029)
Proportion of forested area	1.372***	1.074***	1.040***	0.993***	1.049***	0.948***	0.981***	0.829**	0.881**	1.033**
	(0.330)	(0.287)	(0.300)	(0.308)	(0.309)	(0.327)	(0.324)	(0.394)	(0.406)	(0.394)
Poverty rate 1995-96		1.005***	0.966***	0.967***	0.954***					0.444
		(0.328)	(0.293)	(0.308)	(0.299)					(0.364)
Literacy rate 1991						-0.024***	-0.023***			-0.019**
						(0.006)	(0.006)			(0.008)
Road length per sq km								-0.939**	-0.783**	0.010
								(0.365)	(0.295)	(0.287)
Proportion of advantaged castes			0.161			0.747*		0.893*		0.431
			(0.341)			(0.388)		(0.487)		(0.614)
Caste polarization				0.378			0.996**		1.266**	0.284
				(0.399)			(0.470)		(0.604)	(0.596)
Linguistic polarization					-0.083					0.149
					(0.302)					(0.266)
Observations	73	70	70	70	70	73	73	73	73	70
R-squared	0.25	0.40	0.41	0.41	0.40	0.44	0.42	0.33	0.31	0.46

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Regressions are based on district level data.
All regressions exclude the districts of Rolpa and Rukum.
See Data Appendix for sources and descriptions of all variables.

Table 5: Onset and continuation of conflict

Estimation	Probit		Probit		OLS		OLS		Tobit			
Dependent variable	Dummy for more than 100 deaths		Dummy for more than 150 deaths		Log(#deaths)		Abductions per 1000 population		#deaths per 1000 population		Log(#deaths)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Elevation	0.126*	0.140**	0.101	0.116	0.107***	0.125***	0.145	0.098	0.095***	0.098***	0.056	0.089**
	(0.069)	(0.068)	(0.081)	(0.085)	(0.034)	(0.033)	(0.149)	(0.137)	(0.031)	(0.031)	(0.036)	(0.036)
Proportion of forested area	3.628***	4.221***	4.568***	5.110***	2.058***	1.968***	2.157	3.220	1.514***	1.595***	1.761***	1.961***
	(1.224)	(1.345)	(1.248)	(1.377)	(0.448)	(0.416)	(2.328)	(2.010)	(0.465)	(0.436)	(0.486)	(0.472)
Poverty rate 1995-96	1.506**		1.737**		1.030***		3.700		0.950***		0.841**	
	(0.717)		(0.865)		(0.350)		(2.275)		(0.335)		(0.355)	
Literacy rate 1991		-0.049***		-0.049***		-0.032***		-0.089**		-0.031***		-0.031***
		(0.016)		(0.017)		(0.006)		(0.037)		(0.007)		(0.008)
Caste polarization	-4.130**	-4.171**	-0.409	-0.448	-0.253	0.992	6.057**	7.004**	0.562	1.044	-0.756	-0.145
	(1.776)	(1.904)	(1.801)	(1.737)	(0.783)	(0.733)	(2.874)	(3.114)	(0.700)	(0.661)	(0.775)	(0.762)
Log (population)					0.752***	1.021***					0.244	0.465**
					(0.207)	(0.175)					(0.187)	(0.182)
Observations	70	73	70	73	70	73	70	73	70	73	70	73
R-squared					0.57	0.68	0.23	0.24				

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
All regressions exclude the districts of Rolpa and Rukum.
See Data Appendix for sources and descriptions of all variables.
Columns (1)-(4) report results from probit regressions. Columns (5)-(8) report OLS regressions.
Columns (9)-(10) report tobit regressions, with cutoff of greater than 0.25 deaths per 1000 population.
Columns (11)-(12) report tobit regressions, with cutoff of greater than 100 deaths.

Appendix Table A1 : Robustness using different measures of underdevelopment and infrastructure

	Dependent variable = Deaths per 1000 population						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Elevation	0.052**	0.084***	0.064**	0.075***	0.068***	0.038	0.032
	(0.023)	(0.031)	(0.025)	(0.025)	(0.023)	(0.025)	(0.024)
Proportion of forested area	0.823**	1.044***	1.152***	1.001***	0.835**	0.978**	0.869**
	(0.361)	(0.345)	(0.343)	(0.377)	(0.364)	(0.372)	(0.401)
Infant mortality rate	0.008***						
	(0.003)						
Schools per 1000 population (1994)		-0.139					
		(0.122)					
Health posts per 1000 population (1994)			-0.028				
			(0.297)				
Post offices per 1000 population (1992)				-0.510			
				(0.345)			
Banks per 1000 population (1994)					-7.379***		
					(2.560)		
Change in road length (1990-1997)						-1.232***	
						(0.374)	
Change in number of post offices (1992-1999)							-0.007***
							(0.002)
Caste polarization	0.292	1.112*	0.909*	1.060*	1.098**	1.159**	1.113**
	(0.422)	(0.590)	(0.528)	(0.572)	(0.546)	(0.558)	(0.547)
Observations	73	73	73	73	73	73	73
R-squared	0.37	0.29	0.28	0.29	0.33	0.32	0.34

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Regressions are based on district level data, excluding the districts of Rolpa and Rukum.
See Data Appendix for sources and descriptions of all variables.

Appendix Table A3: Other robustness checks

	Dependent variable = Normalized number of deaths									
	Additional control variables						Without 4 most urbanized districts		Spatial error model	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Elevation	0.066***	0.058**	0.064***	0.057**	0.063***	0.057**	0.063**	0.062**	0.061***	0.046**
	(0.023)	(0.022)	(0.023)	(0.022)	(0.022)	(0.022)	(0.025)	(0.024)	(0.022)	(0.020)
Proportion of forested area	1.068***	1.057***	0.846***	0.869**	0.991***	0.932***	0.961***	1.034***	0.970***	0.919***
	(0.318)	(0.328)	(0.308)	(0.342)	(0.316)	(0.350)	(0.348)	(0.370)	(0.300)	(0.324)
Poverty rate 1995-96	1.000***		0.889***		0.858***		0.883***		0.828*	
	(0.311)		(0.308)		(0.319)		(0.329)		(0.432)	
Literacy rate 1991		-0.023***		-0.021***		-0.021***		-0.024***		-0.022***
		(0.006)		(0.006)		(0.005)		(0.007)		(0.004)
Caste polarization	0.576	1.147**	0.215	0.784	0.314	0.817*	0.496	0.881	0.387	1.252*
	(0.465)	(0.543)	(0.407)	(0.475)	(0.397)	(0.462)	(0.514)	(0.555)	(0.445)	(0.667)
Male-female literacy difference	-0.011	-0.009								
	(0.011)	(0.010)								
Distance from Rolpa & Rukum			-0.006	-0.006						
			(0.004)	(0.004)						
Distance from Kathmandu					0.000	0.001				
					(0.001)	(0.000)				
Observations	70	73	70	73	70	73	66	69	70	73
R-squared	0.42	0.43	0.42	0.44	0.41	0.44	0.39	0.40	0.41	0.42

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Regressions are based on district level data, excluding the districts of Rolpa and Rukum.
See Data Appendix for sources and descriptions of all variables.
Columns (5) and (6) exclude the districts of Kathmandu, Lalitpur, Bhaktapur and Kaski.

Figure 1: Number of conflict-related deaths

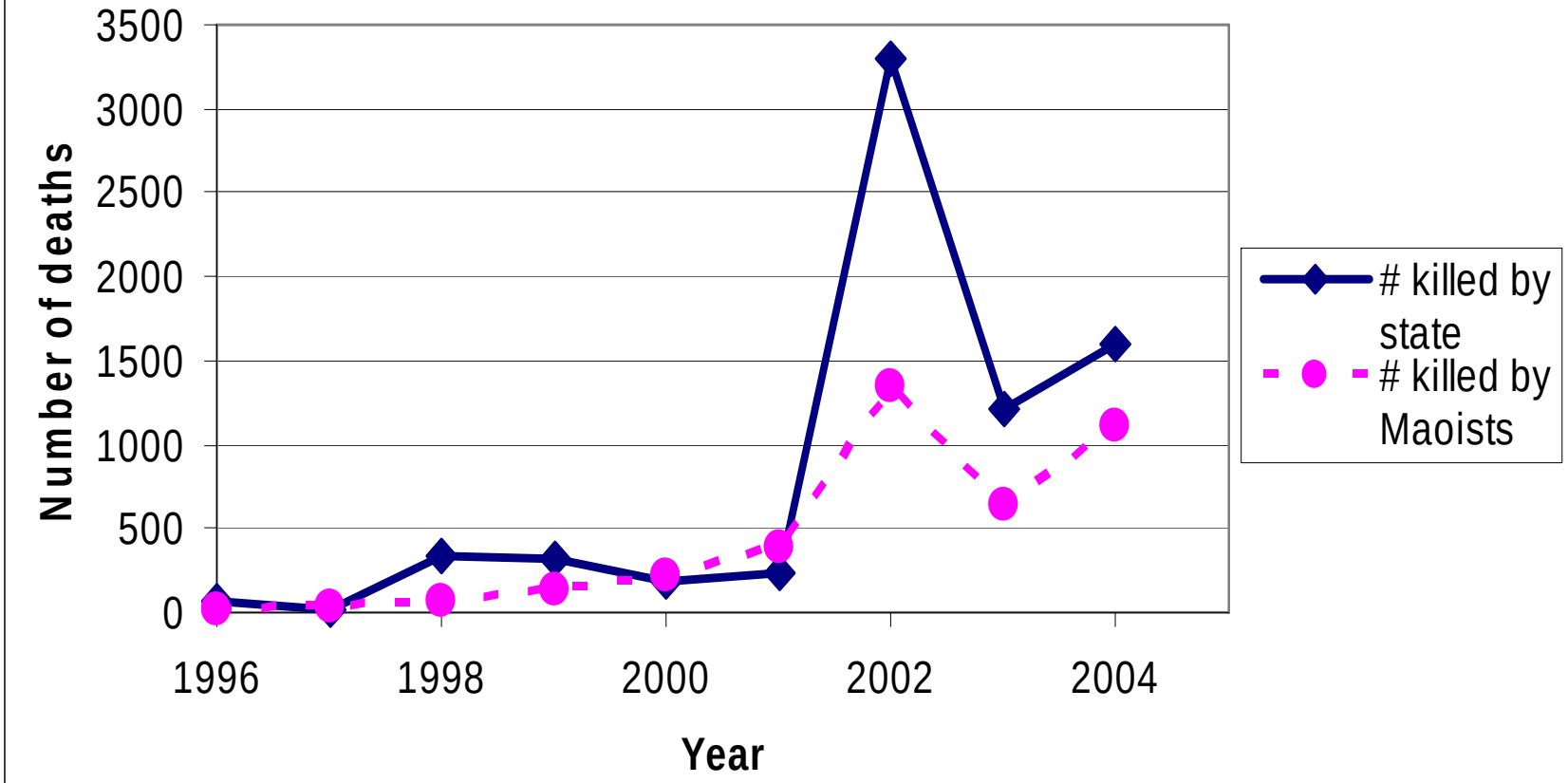

Figure 3: Geographical spread of conflict over time

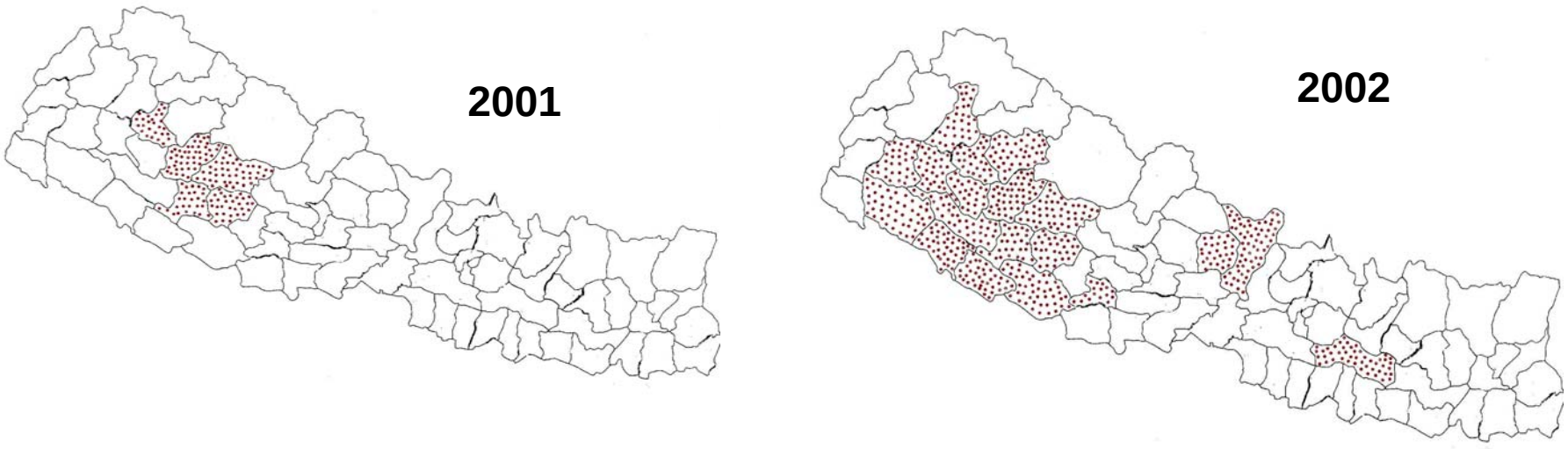

Figure 4B: Evolution of State-caused deaths by poverty quartile