Extended Abstract for PAA 2010 Annual Meeting
16 September 2009

Title

The Role of Political Conflict in the Rapid Fertility Decline in Nepal

Authors

David Hotchkiss, Mai Do, Paul Hutchinson (Department of International Health and Development, School of Public Health and Tropical Medicine, Tulane University, New Orleans, Louisiana USA); Simone Silva (Department of Economics, Murray State University, Murray, Kentucky USA)

Background: In recent years, Nepal has experienced an unprecedented fertility decline. According to the 2006 Demographic and Health Survey (DHS), the Total Fertility Rate (TFR) was 3.1 births per women in 2006, 20 percent lower than the TFR of 4.1 in 2001 and 33 percent lower than the TFR of 4.6 in 1996 (Ministry of Health 2007). According to Bongaarts in a recent study of the fertility transition in 29 Asian, African and Latin American countries, the pace of fertility decline has been more rapid in Nepal than in any other country (Bongaarts 2008).

Nepal's fertility decline appears to have accelerated during a period characterized by political instability and violent conflict. From 1996 to 2006, Nepal experienced the so-called "People's War", a conflict between Maoist insurgents and government forces that claimed more than thirteen thousand lives. The main objectives of the insurgents were to abolish the monarchy, establish a people's republic and elect a Constituent Assembly to draft a new constitution for the country. In addition to claiming thousands of lives, the conflict inflicted inestimable damage to private and public infrastructure and compromised the delivery of social services in remote areas and caused internal displacement, particularly in rural areas (Government of Nepal 2006). There was considerable variation in the intensity of the conflict across Nepal. Nearly 5,000 people were killed in the Western Region while casualties were much lower, around 1,600 people, in the Far Western Region. As reported by Do and Iyer (2009), previous studies attribute the conflict to a number of root causes including a) exclusion of lower castes, b) landlessness, and c) poverty and underdevelopment. Results from a within-country empirical analysis of the correlates of conflict intensity in Nepal by suggest that conflict intensity was significantly higher in poorer districts and in geographic locations that favor insurgents, such as mountains and forests Do and Iyer (2009).

A previous study of the fertility decline based on 2001 and 2006 DHS data suggests that changes in a number of proximate determinants were responsible for the decline, including increases in the use of modern contraceptive methods and reductions in the marriage rate, ideal family size, and coital frequency due to family separation and out migration of husbands to work outside the country (Karki and Krishna 2008). However, underlying socio-economic forces influence the proximate determinants of fertility and changes in these factors may have been ultimately responsible for the decline. During the period of conflict, Nepal experienced rapid economic progress that led to improvements in living standards. A World Bank-sponsored poverty assessment based on nationally-representative household survey data suggests that, between 1995-96 and 2003-04, the incidence of poverty declined from 42 to 31 percent, and that the progress was driven by growth in per capita consumption expenditure and income, which in turn was caused by increases in remittances, higher agricultural wages, increased connectivity, urbanization

and a decline in the dependency ratio. Moreover, the availability of schools, health care facilities and shops also witnessed large improvements during the period, particularly in rural areas.

Objectives: The purpose of the study is to investigate the role of political conflict on marital fertility and on two intermediate determinants of fertility, modern contraceptive use and the presence of the husband in the household, among rural women in Nepal. The hypotheses to be tested are the intensity of the conflict was a) inversely related to fertility levels, b) inversely related to modern contraceptive use, and c) positively related to spousal separation, after controlling for individual-, household-, and community-level factors.

Theoretical Focus: There are a number of reasons why political conflict may influence fertility levels. Neo-classical microeconomic theory suggests that couples will delay births in response to sudden declines in income, increases in relative wages for women that influence the opportunity costs of children, and/or increased uncertainty about future income streams. Crises can also influence couples' fertility decisions through migration of household members in order to avoid the physical dangers of conflict and to seek out better income-generating activities. Separation of couples due to labor migration, as well as through the conscription of married men, may decrease the exposure of women to sexual activity and change the level of household income. Psychological stress and declines in nutritional status that result from crises can also be associated with reduced fecundity and the frequency of intercourse.

Data and Research Methods: The data for the study come from the 2003-04 Nepal Living Standards Survey (NLSS), which includes information on key determinants of fertility not available in the DHS. The NLSS consists of 1) a nationally representative household survey of 4,008 households that includes questions on fertility, contraceptive use, spousal separation, and underlying socio-economic determinants, including household consumption and expenditures, sources and levels of income, educational attainment, and other factors, and 2) a linked community survey that includes information on the health care and family planning supply environment and other community characteristics of the environment faced by households. The data are supplemented by district-level information on the intensity of the conflict in Nepal, as measured by the number of people killed by the Maoists and by the state in the conflict. These data were compiled by Do and Iyer (2006) based on information from the annual Human Rights Yearbooks published the Informal Sector Service Center, a Nepalese non-government organization.

Multivariate modeling techniques are used to assess the influence of the intensity of the conflict on fertility, contraceptive use and spousal separation. For fertility, both reduced form and structural models are estimated. The reduced form models are used to assess the "total effect" of conflict intensity on fertility, while the structural models are used to distinguish between direct and indirect effects (via contraceptive use and spousal separation).

In the reduced form model, we estimate an ordered probit model of the number of children ever born as a function of the intensity of the crises and other exogenous variables, including the physical availability of family planning services, regional location, migration, expenditure per capita, educational attainment and caste/ethnicity. In this model, a score is estimated as a linear function of the independent variables and a set of cut-off points. The probability of observing a given parity level corresponds to the probability that the estimated linear function, plus random error, is within the range of the cut-off points.

In the structural model, we estimate an ordered probit model of the number of children ever born as a function of the two measures of the proximate determinants in our data set, modern contraceptive use and the presence of the husband in the household, and the other independent variables listed above. Because contraceptive use and the presence of the husband in the household are potentially endogenous to fertility, tests of endogeneity will be performed. Probit models will be used to estimate the determinants of modern contraceptive use and husband's presence at home, which are measured with binary indicators.

To test for endogeneity, instrumental variables that identify these outcomes but not fertility will be required (i.e. physical availability of family planning services, wages and commodity prices, all of which are included in the community survey). If these outcomes are found to be exogenous to fertility, their actual reported values can be used to predict fertility. However, if they are endogenous, their estimated values obtained from their equations will be used in the final equation that predicts fertility levels. The probit models will also be used to test the hypotheses of the influence of the crisis on contraceptive use and spousal separation.

Findings: To date, we have estimated reduced-form models based on data from the NLSS household and community surveys.

To assess the influence of household expenditure per capita and other socio-economic factors at the household- and community-levels, multivariate models of the determinants of children ever born and current modern contraceptive use were estimated for the total sample, and separately by urban/rural status. The results, which are presented in Tables 1 and 2, indicate that expenditure per capita, as well as many other determinants, were found to be significantly associated with fertility levels and modern contraceptive method use, after controlling for other factors. For example, in the ordered probit model of the number of children ever born, factors that emerged as statistically significant were the number of children ever born included age, educational attainment, ethnicity and caste, and expenditure per capita. In the contraceptive use logit model estimation, in addition to these same factors, the economic development region and the ecological zone in which the woman resides were found to be statistically significant.

Next steps for moving forward with the research include: 1) obtaining from the World Bank the data set on the intensity of the conflict, 2) merging the conflict intensity data with the NLSS data, 3) conducting tests for the endogeneity of contraceptive use and spousal separation, and 4) estimating reduced form and structural models with alternative specifications.

Table 1: Ordered probit model results on the determinants of children ever born among women 15 to 49 years of age in Nepal, 2003-04

	Total		Rural		Urban	
Variable	**Parameter***	**Z**	**Parameter***	**Z**	**Parameter***	**Z**
Age of women (reference group = 15-19 years)						
20-24 years	**2.763**	24.580	**2.606**	21.080	**3.352**	11.560
25-29 years	**4.398**	35.800	**4.220**	30.500	**4.994**	16.830
30-34 years	**5.489**	41.180	**5.312**	34.550	**6.070**	19.980
35-39 years	**6.065**	41.810	**5.888**	34.950	**6.740**	20.460
40-44 years	**6.490**	41.300	**6.359**	35.060	**7.135**	20.000
45-49 years	**7.017**	41.460	**6.873**	35.000	**7.706**	20.340
Educational attainment (reference = no education)						
Primary	**-0.371**	-4.230	**-0.400**	-3.570	-0.299	-1.960
Secondary	**-1.134**	-12.50	**-1.108**	-7.960	**-1.110**	-8.040
Ethnicity/caste (reference = minorities)						
Upper caste	**-0.485**	-3.290	**-0.466**	-2.830	**-0.905**	-2.700
Middle caste	**-0.331**	-2.100	**-0.312**	-1.830	-0.617	-1.590
Dalits	**-0.573**	-3.660	**-0.569**	-3.350	**-0.843**	-2.190
Newar	**-1.009**	-6.000	**-0.609**	-2.940	**-1.479**	-4.250
Hill Janajati	**-0.774**	-5.110	**-0.732**	-4.330	**-1.245**	-3.630
Terai Janati	**-0.332**	-2.160	-0.187	-1.140	**-1.056**	-2.540
Expenditure per capita quintile (reference group = poorest quintile)						
Quintile 2	**-0.318**	-3.330	**-0.292**	-2.990	**-0.579**	-1.600
Quintile 3	**-0.702**	-7.260	**-0.678**	-6.690	**-1.129**	-3.570
Quintile 4	**-0.846**	-8.700	**-0.797**	-7.660	**-1.438**	-4.540
Quintile 5	**-1.406**	-12.42	**-1.176**	-9.020	**-2.058**	-6.700
Distance to closest health facility (reference group = 10 minutes or less)						
11 - 30 minutes	-0.112	-1.600	**-0.190**	-2.150	0.045	0.370
31 - 60 minutes	0.106	1.200	0.040	0.400	0.138	0.700
60 minutes or more	-0.037	-0.380	-0.126	-1.200	0.270	0.960
Economic development region (reference group = Far-West)						
East	**-0.529**	-4.550	**-0.559**	-4.260	**-0.620**	-2.260
Central	-0.093	-0.850	-0.033	-0.270	-0.210	-0.780
West	-0.024	-0.210	-0.146	-1.100	0.137	0.490
Mid-West	-0.080	-0.660	-0.169	-1.290	0.203	0.640
Ecological zone (reference group = Mountain)						
Hill	-0.034	-0.320	0.079	0.720	**-1.403**	-3.550
Terai	-0.011	-0.100	-0.048	-0.400	**-1.141**	-2.980
Rural	0.113	1.520				
N	5203		3644		1559	

Wald chi2	2877.81	2052.04	835.77
Prob>chi2	0	0	0
Pseudo R2	0.2605	0.2488	0.2887

***** Coefficients in **bold font** are significant at the 10% level or lower

Table 2: Logit model results on the determinants of current use of modern contraceptive methods among currently married women 15 to 49 years of age in Nepal, 2003-04

	Total		Rural		Urban	
Variable	**Parameter***	**Z**	**Parameter***	**Z**	**Parameter***	**Z**
Age of women (reference group = 15-19 years)						
20-24 years	**0.643**	3.450	**0.603**	2.830	**0.734**	1.770
25-29 years	**1.365**	7.500	**1.502**	7.330	**1.118**	2.720
30-34 years	**1.864**	10.140	**1.878**	9.090	**1.932**	4.600
35-39 years	**2.051**	11.000	**2.005**	9.490	**2.242**	5.300
40-44 years	**1.669**	8.720	**1.816**	8.380	**1.495**	3.510
45-49 years	**1.393**	7.040	**1.215**	5.290	**1.917**	4.300
Educational attainment (reference = no education)						
Primary	**0.266**	2.140	0.262	1.600	0.285	1.450
Secondary	0.141	1.070	**0.469**	2.290	0.080	0.450
Ethnicity/caste (reference = minorities)						
Upper caste	**1.257**	6.400	**1.367**	5.910	**1.042**	2.560
Middle caste	**0.525**	2.520	**0.510**	2.130	0.645	1.420
Dalits	**0.956**	4.600	**1.007**	4.210	**0.893**	1.980
Newar	**1.416**	6.290	**1.653**	5.740	**1.140**	2.680
Hill Janajati	**0.992**	4.860	**1.078**	4.490	**0.776**	1.850
Terai Janati	**1.358**	6.430	**1.440**	6.080	**0.945**	1.820
Expenditure per capita quintile (reference group = poorest quintile)						
Quintile 2	**0.367**	2.770	**0.406**	2.880	-0.057	-0.130
Quintile 3	**0.363**	2.760	**0.323**	2.260	0.297	0.740
Quintile 4	**0.654**	5.000	**0.662**	4.610	0.238	0.620
Quintile 5	**0.642**	4.440	**0.842**	5.040	0.056	0.150
Distance to closest health facility (reference group = 10 minutes or less)						
11 - 30 minutes	0.073	0.800	0.095	0.810	-0.023	-0.150
31 - 60 minutes	-0.106	-0.920	-0.091	-0.670	-0.331	-1.320
60 minutes or more	**-0.295**	-2.330	**-0.226**	-1.600	**-0.751**	-1.750
Economic development region (reference group = Far-West)						
East	-0.237	-1.490	-0.299	-1.610	-0.029	-0.090
Central	0.113	0.750	0.079	0.450	0.296	0.950
West	**-0.355**	-2.170	**-0.474**	-2.470	-0.108	-0.330
Mid-West	-0.262	-1.590	**-0.310**	-1.670	-0.177	-0.470
Ecological zone (reference group = Mountain)						
Hill	**0.383**	2.700	**0.401**	2.680	-0.463	-0.760
Terai	**0.611**	4.100	**0.722**	4.440	-0.495	-0.820
Rural	**-0.274**	-2.820				
Constant	**-3.467**	-10.200	**-3.924**	-10.670	**-1.960**	-2.150

N	3892	2819	1073
Wald chi2	484.55	316.43	108.64
Prob>chi2	0	0	0
Pseudo R2	0.1152	0.1083	0.0824

* Coefficients in bold font are significant at the 10% level or lower

Selected References:

Bongaarts, John. 2008. Fertility Transitions in Developing Countries: Progress or Stagnation? Studies in Family Planning 39 (2).

Central Bureau of Statistics. 2006. Resilience amidst Conflict: An Assessment of Poverty in Nepal, 1995-96 and 200304.

Do, Quy-Toan, and Lakshmi Iyer. 2009. Geography, Poverty and Conflict in Nepal. Working Paper 07-065, Harvard Business School.

Joshi, Priyadarshani. 2005. Linking fertility outcomes to women's education and autonomy: Testing the theories on Nepal DHS data. Princeton University.

Karki, Yagya B. and Radha Krishna. 2008. Factors Responsible for the Rapid Decline of Fertility in Nepal – An Interpretation: Further Analysis of the 2006 Demographic and Health Survey. Calverton, Maryland, USA: Macro International Inc.

Ministry of Health, New Era, and ORC Macro (2002) *Nepal Demographic and Health Survey 2001.* Calverton, Maryland: Family Health Survey Division, Ministry of Health, New Era, and ORC Macro.

World Bank (2009) Nepal 2003-04 Living Standards Survey, viewed 5 August 2009, <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:21369856~menuPK:4196952~pagePK:64168445~piPK:64168309~theSitePK:3358997~isCURL:Y~isCURL:Y,00.html>