Policy Research Working Paper 5745

War and Women's Work

Evidence from the Conflict in Nepal

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The World Bank
Poverty Reduction and Economic Management Network
Gender and Development Unit
August 2011

Policy Research Working Paper 5745

Abstract

This paper examines how Nepal's 1996–2006 civil conflict affected women's decisions to engage in employment. Using three waves of the Nepal Demographic and Health Survey, the authors employ a difference-in-difference approach to identify the impact of war on women's employment decisions. The results indicate that as a result of the Maoist-led insurgency, women's employment probabilities were substantially higher in 2001 and 2006 relative to the outbreak of war in 1996. These employment results also hold for self-employment decisions, and they hold for smaller sub-samples that condition on husband's migration status and women's status as widows or household heads. Numerous robustness checks of the difference-in-difference estimates based on alternative empirical methods provide compelling evidence that women's likelihood of employment increased as a consequence of the conflict.

This paper is a product of the Gender and Development Unit, Poverty Reduction and Economic Management Network, with generous funding from the Government of Norway. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at nmenon@brandeis.edu and yrodgers@rci.rutgers.edu .

War and Women's Work: Evidence from the Conflict in Nepal

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JEL Codes: O15, J22, R23

Keywords: conflict, added worker effect, Nepal, instrumental variables, female labor supply, migration.

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I. Introduction

Nepal's civil war, which started in 1996, resulted from a movement by Maoist insurgents to take advantage of the growing dissatisfaction among the people, especially those living in rural areas, with the lack of economic reforms they had expected from a new democratically-elected government. Beginning in the western region, the conflict engulfed a large part of the country in a relatively short period of time. The conflict ended in 2006 when, following a prolonged state of emergency and absolute power by the monarch, the Maoist party succeeded in brokering a peace agreement that led to a new constitution and the establishment of a people's republic. During this ten-year period, the conflict led to immense suffering in terms of thousands of deaths and injuries. It also caused major economic disruption and placed tremendous hardships on the local population. These devastating consequences have led experts to rank Nepal's "People's War" as one of the most intense civil conflicts in the world in recent times (Murshed and Gates 2005).

The goal of this research is to examine how civil war in Nepal affected women's decisions about participating in market work. In particular, women may join the labor force in an "added worker" effect as they try to compensate for declines in household income caused by losses in their husbands' earnings due to war-related disruptions, departures, injuries, or deaths. Evidence from a number of industrialized countries suggests that the added worker effect was strong during the World Wars and the Great Depression, but it has become less important over time as women's status in the labor market improved (e.g. Finegan and Margo 1994; Prieto-Rodriguez and Rodriguez-Gutierrez 2003). However, much of the improvement in women's status is limited to the labor markets of more developed economies. A small but growing number of studies for developing countries point to a substantial added worker effect, especially during

financial crises (e.g. Parker and Skoufias 2004). In such times, households in developing countries cope with declines in income by sending household members to seek employment in paid work (Jones *et al*. 2009). Furthermore, cross-country evidence indicates that women's labor supply, particularly in Asia and Latin America, is counter-cyclical. That is, women engage in more employment and self-employment when aggregate income falls (Bhalotra and Umana-Aponte 2010).

Nepal's decade-long conflict is likely to have had an impact on women's employment probabilities because of disruptions to family life. Not only did the conflict cause widespread mortality, especially among men, it also led to an increase in family separation rates and in disability rates among husbands. Thus women may have had to work more as they took on the role of sole bread-winners in their family. Another channel through which conflict may have induced greater labor force participation for women is through displacement of men in the household. As noted in Seddon and Adhikari (2003), mainly men left home on a temporary basis seeking work and security. It was not common for entire families to move as women often remained behind to look after land. Hence conflict may have induced additional work for women through different channels.

This study employs a difference-in-difference approach to identify the impact of war on women's employment decisions using data from the Nepal Demographic and Health Survey from 1996, 2001, and 2006. These data are used to test the hypothesis that with the displacement of male workers as a result of the Maoist insurgency, women's employment decisions exhibited an added worker effect. We find strong evidence that as compared to 1996, the year in which conflict started in Nepal, women's employment probabilities are significantly higher in 2001 and 2006 as a result of the conflict. These trends are evident in patterns of self-employment work as

well. These employment results for women also hold in regressions that condition on husband's migration status and women's status as widows or household heads. The results are interpreted as evidence of a labor supply rather than a labor demand effect. In particular, women responded more to the need to work in order to support their households than they responded to the creation of new economic opportunities that may have arisen during the war. The analysis includes various robustness checks of the difference-in-difference estimates and demonstrates that even with the use of alternative empirical methods, there is substantial evidence that women's likelihood of employment increased as a consequence of the conflict.

II. Conflict Background and Socioeconomic Context

Nepal's civil war erupted in 1996 when members of the Communist Nepal-Maoist party struck a police station in Rolpa, a district in the western region of Nepal. The motivation behind the attack and the subsequent ten years of insurgency had several origins (Deraniyagala 2005; Murshed and Gates 2005; Sharma 2006). Anger by members of lower castes and lower-status ethnic groups against the elite for long periods of landlessness and deprivation helped to instigate and fuel the conflict. Other sources of the insurgency included overall poverty and the lack of economic development, as well as dissatisfaction against the government for targeting Maoist activists. Regardless of the exact source, the Maoist party used the discontent to further their objectives of weakening and eliminating the monarchy. From 1996 onwards, the Maoists used a variety of tactics to achieve their goals. Primary among these were attacks on army bases, police posts, government officials, and banks. At the height of the conflict, the Maoists controlled most rural areas of the country. In 2006 when the conflict ended, a new Constituent Assembly was established, and a new Interim Constitution was adopted in 2007. In 2008, Nepal became a

Republic, the Maoists held the majority of seats in the new Constituent Assembly, and their leader was elected the first Prime Minister.

Nepal's geographical terrain served as an important determinant of the intensity and likelihood of civil war violence. Since government forces outnumbered the insurgents, insurgent forces depended on mountainous and forested terrain to help them hide and maneuver. Economic development also played a role since the Maoists could find greater support for their cause among the poor and disenfranchised. These arguments are supported in Do and Iyer (2010) who find conflict-related deaths were substantially higher in districts with higher poverty, and in districts characterized by higher elevation and forest coverage. Their results indicate that geographic conditions explain approximately 25 percent of the variation across districts in conflict intensity, with the pre-1996 rate of poverty at the district level also serving as a positive predictor of conflict intensity. The relationship between the intensity of violence and Nepal's geography and terrain is also supported in Bohara *et al*. (2006).

The civil war entailed enormous social costs. The death toll reached over 13,300, with about two-thirds of those deaths being caused by government forces and the remaining one-third caused by Maoist insurgents (INSEC 2010). As shown in Panel A of Figure (1), the conflict-related deaths increased sharply in 2002, an escalation that coincided with Prime Minister's announcement of a state of emergency and his mobilization of the Royal Nepal Army to combat the insurgents. In addition, the drawn-out conflict caused substantial destruction to the country's infrastructure as well as the postponement of new projects. This crippling of the country's infrastructure not only restricted access to education and health systems, it also stifled economic growth and development. Panel B of Figure (1) shows that the conflict tended to be more intense in the mid-western and far-western regions of the country.

Insert Figure 1 Here

Furthermore, existing migration rates increased to some extent as a consequence of the civil war (MHP/NE/MI 2007). This migration caused numerous married couples to live apart for extended periods. Our calculations based on the Nepal DHS data indicate that during the conflict period, the proportion of women whose husbands had migrated grew over time, as did the proportion of women who reported themselves as their household's head. As shown in Panel A of Figure 2, 16 percent of all ever-married women reported that their husbands had migrated in 1996; this proportion had risen by about ten percentage points by the end of the conflict period. Another 5 percent of all ever-married women reported the loss of their husbands due to death, divorce, or separation; this proportion did not change much during the conflict period. Closely related, Panel B of Figure 2 shows that the proportion of women who reported themselves as the household head more than doubled during the conflict period from seven percent to 15 percent. While most of this increase occurred due to the migration of husbands, some growth also occurred due to the death, divorce, separation, and incapacitation of husbands.

Insert Figure 2 Here

Hence the data show that over time, family separation rates increased, and conflict-induced mortality of men combined with substantial male migration left a growing proportion of women to manage their households. Nepal is certainly not alone in experiencing this dynamic - conflict in other countries has also spurred the disintegration of families through recruitment from armed groups, forced migration, abductions, and death of family members.[1] Moreover, conflict also imposes economic shocks and curtails development at the macroeconomic level. On average, civil wars cause a reduction in GDP per capita growth of 2.2 percent per year (Collier 1999). Evidence specific to Nepal indicates that declining development expenditures stemming

from conflict have strong negative effects on GDP growth (Ra and Singh 2005). In particular, for a 4.2% decline in development expenditures, Nepal is forecast to have lost about 1.7% of annual growth in GDP between the 2005-2009 fiscal years. That said, the decline in GDP growth is likely to be an underestimate as other factors such as destruction of infrastructure, disruption of activities, lower private investment, and displacement of people are not taken into account in the specifications. Such effects are incorporated in our estimations through the inclusion of controls for region and year.

Nepal's civil war also resulted in a disproportional increase in consumption by households with relatively more land, with the landless or those with extremely small amount of land suffering from relative deprivation. Such increases in inequality help to explain the rise in Maoist recruitment activities, since such activities were relatively more pronounced in districts where inequality had increased significantly (Macours, 2010). We control for the effects of poverty and inequality in our models.

Existing literature is not conclusive that a greater proportion of Nepalese women did in fact enter the labor force as a result of the conflict-induced changes in household composition and income. Assessment results reported in the World Bank (2004) indicate that the absence of husbands and their income led to a dramatic increase in women's household and farm work burdens, but the findings do not specify whether this increased work burden coincided with higher rates of employment. The income effect from remittances sent home by migrant husbands could have acted as a disincentive for women to become employed. Also, the departure of a spouse who contributed to household farm production may have put more pressure on women to increase their hours of work in subsistence farming. Both of these arguments help to explain Lokshin and Glinskaya's (2009) finding of an inverse relationship between men's migration and

women's market work participation in Nepal in 2004. Further evidence in Menon (2009) indicates that given the dominance of agriculture as the main source of employment, and the fact that agriculture is subject to the variability of rainfall, households in rural Nepal strive to diversify their sources of income by investing in off-farm work such as non-agricultural wage or self-employment. Since non-agricultural wage employment tends to be dominated by men and is relatively less attractive for women in rural Nepal, the added worker effect in this context may have manifested itself in the guise of more self-employment being undertaken by women. In order to account for effects on self-employment that may differ from overall employment, this study estimates impacts separately for self-employment.

III. Grouping of Districts into Conflict and Non-Conflict Sub-Regions

Our research design centers on the idea that regions in Nepal characterized by greater forest coverage, higher elevations, more rainfall, and fewer roads were more conducive to guerilla activity and conflict. Following the strategy developed in Angrist and Kugler (2008) and in order to avoid feedback effects, we classified regions based on geography from a time period that precedes the conflict (1994). Geographical measures from a pre-conflict time period were used as instruments to approximate conflict intensity from 1996 to 2006. In a "first stage" procedure, we tested the predictive power of these instruments in explaining conflict intensity where conflict intensity was measured by the total number of casualties due to state and Maoist action from 1996 to 2006.[2]

Note that the Nepal employment and conflict data are based on a geographical coding scheme that divides Nepal into 75 districts, which are further classified into five regions (Eastern, Central, Western, Mid-Western, and Far-Western) and three categories of physical terrain (Mountain, Hill, and Terai grasslands). In order to facilitate parameter estimation in the

subsequent regressions, we aggregated the 75 districts into 15 sub-regions (the five regions interacted with the three types of terrain). More specifically, we took this step in order to reduce the number of regional parameters in the estimation of the labor supply equation, which controls for region-specific effects using regional fixed effects. If we were to use district level aggregation, we would have (over and above the other coefficients in the model) 75 such district-level parameters versus the 15 sub-regional parameters that we currently have. Since the districts are aggregated up to the sub-region level, all the information contained at the district level is still reflected in the sub-regional coefficients.

Conflict measures cannot be used directly in the estimations since they are likely to be co-determined with other variables that might affect women's employment. For example, sub-regions with higher rates of poverty also had more intense conflict (Do and Iyer 2010). We hypothesize that geographical measures from a pre-conflict time period provide the exogenous variation required to identify the effect of conflict on women's work. To test this hypothesis, we used the conflict and geographical indicators from Do and Iyer (2010), supplemented with additional geographical and weather data on Nepal from Sharma and Subedy (1994). In the first stage, the number of state-caused and Maoist-caused deaths from 1996 to 2006 was regressed on four indicators of geographical status and two indicators of weather status from 1994, a pre-conflict year. Indicators of geographical status include the proportion of a sub-region that is forested, altitude of the sub-region as a proxy for mountainous/hilly territory, the number of major rivers in a sub-region normalized by area, and the total length of the road network normalized by the area of the sub-region in 1994. Indicators of weather-related status include average annual rainfall normalized by area of the sub-region and average temperature of the sub-region. As noted above, all indicators cover time periods that preceded the conflict (1994). The

geographical and weather related indicators were originally at the district level. These district indicators were aggregated to sub-region means using sampling weights provided in the Nepal DHS.

The first stage results reported in Table 1 indicate a strong correlation between conflict-induced casualties and the proportion of a sub-region that is forested in 1994. This conclusion holds for when state-caused casualties and Maoist-caused casualties are measured separately and when they are combined. In regressions that include all six geographical and weather indicators, the coefficient on 1994 forest coverage is statistically significant. Forest cover remains significant when it is used as the only instrument in linear or binary form. The empirical results in Table 1 confirm the theoretical intuition provided above for the correlation between 1994 forest cover and the number of conflict-induced casualties, thus validating our choice of this variable as an instrument.[3]

To be able to implement a difference-in-difference methodology similar to that in Angrist and Kugler (2008), we converted forest coverage into a 0-1 indicator where geographical sub-regions with forest-coverage exceeding the 75th percentile value were classified as "more-forested", and sub-regions with forest-coverage below the 75th percentile were classified as "less-forested." Since Nepal in general is quite heavily forested, a higher than average benchmark (such as the 75th percentile value) was required to indicate regions that have relatively more cover. Note that the first stage results are robust to transforming the dependent variable (total conflict-induced casualties) from levels into growth rates over time. Furthermore, our use of a categorical functional form for the first stage (as opposed to a linear functional form) is re-affirmed by a test that plots growth rates in casualties against a linear measure of forest cover in 1994. This test indicated that the relationship between growth rates and 1994 forest cover is not

particularly linear; thus, a non-linear 0-1 form of the instrument was more appropriate in the first stage.

Insert Table 1 Here

Before discussing the data and results, it is helpful to present the strengths and weaknesses of the difference-in-difference methodology employed in this study. This method is appropriate when there are before-and-after time periods and two groups: one that is subject to the treatment, and another which is subject to all the other influences on the treatment group except the actual treatment itself. Of course, assignment into the treatment and control groups should not be systematically pre-determined. This research design is useful because it replicates a natural experiment in which one can isolate the effect of the treatment by comparing outcomes between the two groups over the two time periods. Since individuals in the treatment group are compared to individuals in the control group, and since the groups are comparable except for the fact that one receives the treatment while the other does not, the difference-in-difference methodology allows the researcher to ascertain the unbiased effect of the treatment alone. This methodology also affords confidence that the effect measured is not contaminated by omitted variables and/or unobservable effects specific to either group.

As noted in Meyer (1995), the validity of the difference-in-difference method rests on demonstrating that the treatment and control groups had a similar distribution in outcomes in the before time-period. We implement this test before using the difference-in-difference method to evaluate the impact of the conflict on women's employment probabilities. In the context of our study, the "treatment" is conflict, and although women in general may work more when husbands have migrated or when they are heads of their households because husbands are disabled, the application of the difference-in-difference method allows us to measure how much

of the increase in women's labor force participation (over and above that which is generally true in similar circumstances) is due to conflict alone.

IV. Conflict and Women's Employment

Data and Descriptive Statistics

This study's employment data come from the Nepal Demographic and Health Survey, a large nationally-representative sample of women aged 15-49 and the members of their households. We used the three most recently-available waves of the Standard DHS for Nepal: 1996, 2001, and 2006. These waves correspond with the beginning, middle, and end of the civil war. The DHS surveys provide detailed information on the variables we required including woman's employment status, education, age, marital status, region and terrain of residence, religion, and ethnicity; her husband's education and his presence in the household; and indicators of household composition, household access to electricity, and household amenities. Our working sample retains all ever-married women aged 15-49 with measured values for employment status and for the other indicators in the empirical analysis, leaving us with approximately 25,700 observations in the pooled sample. Note that the indicator for whether or not a woman is employed includes employment for cash earnings, in-kind payments, and non-remunerated work; the data do not allow us to separate these types of work. Among the employed women in the pooled data, a large proportion worked either for themselves or for their family (about 21,800 observations). We classified such women as self-employed and estimated separate regressions for the decision to be self-employed.[4]

Sample statistics in Table 2 indicate that a very high proportion of women in Nepal were employed throughout the period, and especially in 2001, when 83 percent of women were employed in some sort of job, paid or unpaid. Table 2 further indicates that over time, a growing

proportion of women lived without their husbands either due to the husband's migration or due to death, divorce, or separation. By 2006, almost one third of ever-married women lived without their husbands present in the household. The majority of women had no education in all three years, although this proportion declined sharply over the ten-year period from 80 percent to 63 percent. Among other indicators, the vast majority of the sample lived in rural areas, with a greater tendency to live in Terai grasslands as opposed to the mountains and hills. Socioeconomic status indicators show some improvements during the 10 year period, with more households having access to electricity and household amenities such as improved flooring, radio, and television. Finally, the bulk of the sample claimed Hinduism as their religion, with substantial diversity in ethnic groups.

Insert Table 2 Here

As demonstrated in Appendix Table 1, which reports the weighted percentages of the top five occupations for employed women across the period of analysis, the vast majority of women worked in agricultural self-employment with the proportion of women engaged in this occupation peaking during the height of the conflict in 2001.[5] A very small percentage of employed women (1.7 percent in conflict-affected areas) worked in professional, technical, and managerial jobs at the height of the conflict, but this occupational category did not appear in the top five in 1996. This result provides some evidence that women in conflict-affected areas entered the labor market in greater numbers to supplement income.

As noted above, the difference-in-difference methodology is appropriate in cases where the treatment and control samples are comparable in measured characteristics in the pre-treatment time period. In order to ascertain that this comparability holds in the Nepal context, we calculated means of the individual and household indicators at the sub-region level for 1996 and

then compared the sub-region means across the more-forested (conflict) and less-forested (non-conflict) classification. Recall that in the empirical approach, the "treatment" is conflict intensity as proxied by forest coverage. Results in Table 3 indicate that when conflict began in 1996, the more- and less-forested sub-regions had very similar characteristics in terms of women's status, household socioeconomic status, and household composition.

Insert Table 3 Here

Women's Employment Decisions: Naïve Probit Estimates

The next step is to examine the likelihood of a woman engaging in employment, conditional on an indicator for conflict as well as the full set of personal and household characteristics. We begin by specifying a standard labor supply equation for ever-married women of the following form:

$$y_{ijt} = a + bS_{ijt} + cX_{ijt} + \mu_j + m_t + \vartheta_{ijt} \text{ --- (1)}$$

where *i* denotes a woman, *j* denotes a sub-region, and *t* denotes time. The dependent variable y_{ijt} is a dummy that takes on the value 1 if the woman is employed and 0 otherwise. The notation X_{ijt} is a set of individual and household characteristics that influence women's decisions to work and includes age, education, an indicator for more than two children of pre-school age within the home, and other indicators of quality of the dwelling of the household (such as having electricity and improved flooring).[6] The vector S_{ijt} is a catch-all variable that indicates the effect of conflict-related measures over and above the variables in X_{ijt}. The variable includes a normalized measure of the number of conflict deaths from 1996 to 2006 first in of itself, then restricted to households in which the husband has migrated, and households in which the woman is widowed, divorced, separated, or the head of her household for a reason other than the husband's migration. Finally, μ_j is a sub-region specific effect that is common to all individuals,

m_t is a time specific effect that is common to all individuals, and ϑ_{ijt} is a woman-specific idiosyncratic error term.

Given the binary nature of the dependent variable, we used a probit model to estimate the standard labor supply model in equation (1). These estimates are referred to as "naïve probits" since they do not condition for the endogeneity of casualties, husband's migration status, or whether women are widowed, divorced, separated, or heads of households due to a reason other than husband's migration. The naïve probits were used as a benchmark against which to compare estimates from the difference-in-difference approach, which conditions on the endogeneity of the conflict-related variables, and thus allows us to estimate the causal effect of conflict on the likelihood of women's employment.

The naïve probit regression results are reported in Appendix Table 2. In all six columns, the conflict indicator is the number of conflict-related casualties by sub-region interacted with year dummies. In the table, 1996 is the excluded category – thus conflict interaction terms are measured with reference to the beginning of the civil war. Note that columns (3) and (4) depict effects specific to women in households with husbands who have migrated, while columns (5) and (6) depict effects specific to women who are widowed, separated, divorced, or designated as household heads because their husbands are incapacitated. All standard errors were corrected for clustering at the sub-region and year level.

The first column of Appendix Table 2 shows that as compared to when Nepal's civil war began, the probability of women's employment rose in sub-regions with greater conflict-related casualties in 2001 and 2006. The probability of self-employment in areas with more casualties was higher as well, although the coefficient in 2006 is measured with less precision. Focusing on the first two columns, older women were more likely to be employed, whereas some level of

schooling exerted significant negative effects on employment probabilities. In column (3) for women whose husbands have migrated, employment probabilities were significantly larger in sub-regions with higher civil-war mortality in 2001 and 2006. However, there are no discernible effects of the conflict variables on self-employment probabilities in column (4). Coefficients in columns (5) and (6) for women whose husbands are absent for reasons other than migration suggest that employment probabilities are larger for these women in conflict areas in 2006 as compared to 1996, whereas self-employment probabilities are relatively higher in conflict areas in 2001 as compared to 1996. In general, the naïve probits exhibit little precision for the marginal effects of age and education in this sub-group.

In closing, the naïve probits serve to provide a qualitative benchmark – it is the difference-in-difference results discussed next that allow us to evaluate the causal impacts of conflict on women's employment likelihoods.

Difference-in-Difference Approach

The naïve probit estimates suffer from the fact that S_{ijt} could be endogenous. To address this issue, we conducted a difference-in-difference approach that focuses on conflict-induced changes in women's employment as measured by the instrument for conflict. In implementing this approach, the standard labor supply equation for ever-married women was amended as follows:

$$y_{ijt} = d + \Sigma_s \alpha_{0s} F_{js} + fX_{ijt} + \mu_j + m_t + \varepsilon_{ijt} \text{ --- (2)}$$

Where subscripts are as before, and the dependent variable is the same binary variable as in equation (1) for whether the woman is employed. The notation X_{ijt} is the same set of exogenous individual and household characteristics, μ_j and m_t are the sub-region specific effect and the time specific effect, and ε_{ijt} is an idiosyncratic error term. The term of interest, $\Sigma_s \alpha_{0s} F_{js}$,

represents the difference-in-difference term; it is measured as a set of interactions of the dummy variables for the conflict years and the dummy variable for relative forest cover; our instrument. In the estimations, the coefficients on the interaction terms (once they are converted into marginal probabilities) are interpreted as the marginal effects of Nepal's conflict on the likelihood of women being employed.

This difference-in-difference equation was estimated using a set of probit models for the likelihood of employment. We ran models for the employment decision as well as the decision to become self-employed, and we ran models for the full sample and two sub-samples: women whose husbands had migrated, and women who were either widowed, separated, divorced, or living with an incapacitated husband. Table 4 reports the marginal probabilities. Column (1) indicates that women living in a conflict sub-region had an increased likelihood of becoming employed in 2001 and 2006, and the same is true of the decision to become self-employed. Both key terms in the first two columns for all women are positive and statistically significant at the .05 level or higher. The magnitudes of the coefficients indicate that compared to 1996, the probability of employment was 0.098 higher for women in conflict areas in 2001 and 0.095 higher in conflict areas in 2006. Thus, there is some decline in 2006 compared to 2001, which is consistent with the fact that conflict peaked in the 2001-2002 time period. Effects are similar for self-employment in column (2), although the magnitudes of the coefficients are smaller.

Insert Table 4 Here

Table 4 further shows very similar results for the employment decisions of women whose husbands have migrated, as well as for the employment decisions of women who manage their households due to other reasons. These results support the added worker effect; in particular, the hardship associated with civil war served as a strong incentive for women to engage in

employment. Interestingly, the coefficients on the conflict instruments in column (4) are measured with less precision, suggesting that women with husbands who had migrated were not more likely to be self-employed.[7] Combined with the significant coefficients for overall employment in column (3), this result may reflect the high start-up costs of self-employment activities.

In comparing the difference-in-difference estimates to the naïve probit estimates in Appendix Table 2, the naïve probits appear to overestimate the effects of conflict in 2001 on employment and self-employment, and underestimate the effects of conflict in 2006 on employment and self-employment. Consequently, the differential effects between 2001 and 2006 for employment and self-employment in the naïve probits are positively biased. In contrast, given the difference-in-difference approach and the specification tests conducted below, Table 4's estimates represent the true differential effects between these years for employment and self-employment for the full sample and the smaller sub-samples.

Robustness Checks

This closing section reports the results of various robustness checks for the main results. First, instead of using the forest coverage variable to directly instrument for conflict in the probit equations, we estimated marginal probabilities for the likelihood of employment using predicted values of conflict. This approach is consistent with a standard two-stage framework. This alternative set of estimations was conducted by constructing the predicted value for conflict in a first-stage regression, and then including the predicted value for conflict interacted with year dummies in a second stage regression. In the first stage, we regressed the total number of casualties on a linear version of the forest variable, and then generated a predicted value. This predicted value was converted into its categorical counter-part based on the 75th percentile

threshold. The categorical predicted variable was then interacted with year dummies and included in a second stage probit regression for employment likelihoods. A similar procedure was followed in an alternative set of first stage regressions which conditioned on forest coverage and other geographical variables, all in linear form.

The second-stage marginal probability results for the likelihood of employment are found in Table 5. The standard errors in this table are bootstrapped to adjust for use of first-stage predicted values in the second-stage. The conclusions closely mirror those described for the main difference-in-difference results. In particular, the likelihood of engaging in employment increased for women in conflict-intense areas in 2001 and 2006, as compared to 1996. Furthermore, conditional on being employed, women were also more likely to engage in self-employment if they lived in sub-regions with high levels of conflict.

Insert Table 5 Here

Another robustness check for the main results is to identify the impact of conflict on women's employment using instrumental variable regressions. This strategy was implemented by running a set of instrumental variable probit regressions for women's decisions to engage in employment and in self-employment. For each of these outcomes, we ran three models: the first model measured conflict as total mortality, the second model proxied for conflict as the proportion of husbands who had migrated at the year and sub-regional level, and the third model proxied for conflict as the proportion of women who managed their households due to death, divorce, separation, or incapacitation of their husbands at the year and sub-regional level. For each of these models, we instrumented for the conflict measure with the binary variable for more- or less-forest coverage interacted with a dummy variable that combined 2001 and 2006.[8]

These results, which are reported in Table 6, indicate that when conflict is measured by total casualties or is proxied by husband's migration status, civil war strife increased the likelihood of women engaging in employment and in self-employment. As shown in columns (1) and (2), the coefficients on the interaction terms for conflict are large, positive and statistically significant, supporting the hypothesis of an added worker effect for women in Nepal.

Insert Table 6 Here

The third check of the main difference-in-difference results was a set of linear two stage least squares (TSLS) estimates for the likelihood of employment at the sub-region level. This strategy first entailed transforming all the variables into sub-region averages by year. We then ran a set of TSLS regressions for employment using two alternative instruments for conflict: first, the linear version of forest coverage, and second, the binary version of forest coverage. In both cases the instrument was interacted with the conflict year dummies to capture differential effects over time. In keeping with the structure of the previous estimations, the TSLS regressions measured conflict in three different ways: total mortality due to state and Maoist violence, the proportion of women with husbands who had migrated, and the proportion of women managing without their husbands due to his death, divorce, separation, or incapacitation. Table 7 reports these results. Overall, the table shows further support for the hypothesis of an added worker effect, especially by the end of the conflict in 2006. The instrumented conflict variable interacted with the 2006 year dummy is positive and statistically significant in four of the six estimations reported. For the two instances when the coefficient on this interaction term is negative or imprecisely measured, conflict is measured as women whose husbands had migrated. The negative and significant coefficient suggests that at the aggregated sub-regional level, there is some limited evidence that remittances may have reduced women's likelihood of employment.

Insert Table 7 Here

The fourth check of our difference-in-difference approach tests the robustness of the exclusion restriction. That is, we need to ensure that forest cover has no independent effect on the dependent variable and affects women's employment only through its effect on conflict. It is possible that forest cover may be associated with poverty and other determinants of women's shadow wages, thus the exclusion restriction might be invalidated. In order to test the validity of the exclusion restriction, interactions of year and all variables from the first stage (from Table 1) were included in the main difference-in-difference model for employment. We also included a measure of district-level poverty from a pre-conflict time period (1995-1996) to this specification.[9] In keeping with the structure of Table 4, separate employment effects for women in households where the husband had migrated, and in households where women were widows or separated or heads of households due to the husband's incapacitation, were also estimated. If the exclusion restriction is violated, then the main results of the difference-in-difference model in Table 4 should disappear when we control for the additional variables.[10]

Upon re-estimating this modified version of the model, we found that the exclusion restriction is robust. The previous results continue to hold - if anything, marginal employment impacts for all women and for women whose husbands had migrated become larger and more significant. For widows, separated women, and women in households with disabled husbands, the 2006 results remain invariant. We lose some precision for the 2001 coefficients in this sub-group which, nonetheless, remain positive in sign.[11]

The final set of tests dealt with checking the robustness of the results to the inclusion of variables that may be correlated with biases arising from two sources: selection due to migration, and bias arising from omitted variables and serial correlation. Note that migration was already

well-entrenched, and the "remittance economy" of Nepal was well-established before the conflict began in 1996 (Seddon *et al*., 1998). Conflict, in of itself, did not cause migration to begin. It is true that civil war somewhat increased existing rates of displacement, but this increase occurred mainly in the far-western and mid-western regions of the country where the conflict tended to be more intense. Moreover, it was mainly men who migrated, leaving women, children, and the elderly behind to tend household land. Since we measure employment probabilities for women, the possibility of selection in the dependent variable is likely to be small. Finally, since our instrument (forest cover) picks up effects specific to regions from which migration may have occurred (these areas tend to be relatively heavily forested), any potential bias is likely to be conservative in terms of our estimates. If our estimates are influenced by migration, then given that remittances from male migrants are likely to reduce women's employment probabilities, correcting for selection bias should make our current results even stronger.

We also implemented two further controls for selection bias. First, selection bias would be evident if women whose husbands had migrated were systematically different in terms of their employment decisions as compared to women whose husbands had not migrated. To check for such a difference, we re-ran the above set of specifications for the sub-sample of women whose husbands did not migrate. Upon doing so, we found that the results are substantively the same as those in the full sample. Note that Table 4 reports results for the sub-sample of women whose husbands had migrated and again, the results are comparable to those in the full sample. In the second additional check for selection bias, we included husband's migration status directly among the control variables of equation (2).[12] Although this variable is statistically significant, the coefficients on our instruments remain positive and significant, indicating that our main results hold even with a control for husband's migration status.

Next, we considered separate effects for employment decisions that excluded self-employment and found the main results described earlier to be broadly consistent with this new specification as well. With the restriction to those who are non-self-employed, the marginal effects on our instruments remain positive in sign. However, we lose some precision in estimates given the small sample size. Finally to ensure that the results are not confounded by bias due to omitted variables and serial correlation, we included separate linear trends for each sub-region and found that if anything, our earlier results became even stronger.[13]

To summarize, the main difference-in-difference results in Table 4 indicate that women's employment probabilities increased substantially as a consequence of the conflict in Nepal. These estimates provide evidence for the existence of an added worker effect for Nepalese women. Additional robustness checks that used different empirical methodologies and alternative definitions of the conflict variable corroborated the main results. Hence these data offer strong empirical evidence that as a result of the decade-long civil strife in Nepal, women were more likely to work in order to support their households.

V. Conclusion and Implications

Consistent with the frequent observation that war is development in reverse, the civil war in Nepal entailed thousands of casualties and injuries, as well as the destruction of health and education infrastructure and stagnation of the economy. The economic repercussions of the war weakened the country's social fabric as households and communities struggled to survive. An important question raised by these changes is whether women were induced to engage in more employment (the added worker effect) as a consequence of conflict.

This study's difference-in-difference strategy uncovered a strong added worker effect during Nepal's civil war: women who lived in areas of Nepal with high conflict intensity were

likely to engage in more employment in relation to comparable women in regions of low conflict intensity. Similar trends are evident in the case of self-employment. The main results are robust to alternative measures of conflict intensity, sample composition, and estimation strategies. Note that aggregating the data to the sub-region level yielded some limited evidence for the idea that remittances discouraged women from engaging in employment.

It is useful to compare our estimates of the conflict-induced increases in women's employment and self-employment probabilities with increases in women's employment that might result from an economic shock such as the husband losing his job. Such a comparison allows us to judge the relative size of the conflict shock against that of an economic shock, and provides a benchmark against which to measure the importance of conflict effects. Estimates in the table of main results indicate that across all women, those with husbands who have migrated, and those who are widows, separated, divorced, or household heads due to husband's disability, employment probabilities are between 0.079 to 0.136 higher for women in conflict areas (comparing 2001 and 2006 to 1996, the year in which civil-strife began). In order to judge whether these effects are significantly different from the employment effects of an economic shock such as having a man in the house who is currently not working or has not worked in the last 12 months, we estimated counterparts of the main specifications, after replacing the instrument for conflict with indicators of whether a man in the home is currently not working or has not worked in the last year. This comparison is somewhat crude but is sufficient to provide a tentative threshold. Results indicate that across all categories of women, the indicator for husband's unemployment has no statistically significant effect on employment or self-employment probabilities. The sole exception is for the last group of women (widows, separated, divorced, and household heads) who show employment effects from having a man not currently

working similar in magnitude to those arising from conflict; however, these effects are only evident for 2006.

This benchmark comparison indicates that conflict had substantially different effects on women's work probabilities as compared to the effect of a local economic shock such as job loss for a man in the home. Whereas the economic shock of an unemployed man in the home produced little to no impact on women's employment decisions, the Nepalese conflict had strong, positive, and significant effects on women's employment and self-employment probabilities.

The results have important policy implications both for more immediate changes as well as longer-term strategies. In the aftermath of civil war, viable economic policies are required to address the concerns that originally contributed to instigating conflict. In the case of Nepal, such policies should be tailored towards reducing inequities between different factions. As noted in Ghani and Iyer (2010), aid agencies working in tandem with public institutions should concentrate on the quick creation of jobs and aim first to fulfill the short-term needs of the affected populations.

The results of this study suggest that job creation would be especially useful for women in the aftermath of the civil war. To the extent that the government can use macro-level and industrial policies to promote the industrial sector, our results indicate that women's incentives in terms of employment have changed and they would be particularly receptive to new opportunities in industry. Such jobs would, in turn, have the potential to reduce poverty as well as income inequality among the poor and among the overall population (Acharya 2008). Targeted use of microfinance to support and incentivize women would further aid in ensuring food security and economic welfare. Depending on the types of activities in which women

choose to engage, public provision of vocational training and dissemination of know-how on accounting and management practices would also be useful. Furthermore, public and non-governmental institutions could play key roles by providing subsidies that facilitate the purchase of new profit-enhancing technologies, and by offering support for the marketing and sale of products created by women-run businesses.

If supported with adequate enforcement of labor standards, well-paying jobs would contribute to women's ability to support their families with cash earnings, which could, in turn, improve women's sense of autonomy. That said, increased employment opportunities alone are not enough to assist women particularly in a country such as Nepal where society places a heavier premium on men's earnings potential as compared to women's earnings potential. This argument is supported with findings in Allendorf (2007) that husbands appear to prioritize their wives' education rather than their wives' ability to generate cash earnings in intra-household decision-making processes. Moreover, Yabiku (2005) finds that while the marriage market placed value on school enrollment for both men and women, working for others was seen as a desirable attribute only for men in the marriage market.

The emphasis on women's education in Nepal relates closely to the long-term ramifications of the added worker effect documented in this study. Women in Nepal work long hours on average. With the added pressure to sustain their families during times of conflict, an inordinately high burden of work would have been placed on the shoulders of Nepalese women. Beyond the negative effects of the added work burden on women themselves, it is conceivable that this responsibility had consequences for child-welfare. For example, if increased hours of work for mothers result in girl children being withdrawn from school to help with chores and child-care, the stock of educated women in future cohorts will contract. This decline in schooling

has important implications for women's relative labor market performance in future generations. Although it is outside the purview of this study to document patterns on child welfare and human capital formation, we draw attention to child schooling in order to outline spheres in which Nepal's public institutions can intervene now to counteract future adverse effects of a detrimental war that has already been so costly.

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Table 1. First Stage Results for Conflict Intensity, Nepal DHS, 1996-2006

	State-Caused Casualties			**Maoist-Caused Casualties**			**Total Casualties**		
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Intercept	2.505	-0.039	0.474***	1.039	0.083	0.286***	3.544	0.045	0.760***
	(1.553)	(0.263)	(0.124)	(0.753)	(0.117)	(0.057)	(2.267)	(0.375)	(0.179)
Forested	2.247***	1.700**	0.646**	0.873**	0.653**	0.217	3.120**	2.353**	0.863**
	(0.658)	(0.637)	(0.277)	(0.319)	(0.284)	(0.127)	(0.961)	(0.909)	(0.400)
Roads	-0.197			0.212			0.015		
	(1.648)			(0.799)			(2.406)		
Elevation	-0.126			-0.047			-0.173		
	(0.108)			(0.052)			(0.157)		
Rivers	0.747			20.021			20.768		
	(159.832)			(77.518)			(233.380)		
Temperature	-0.102			-0.035			-0.137		
	(0.070)			(0.034)			(0.102)		
Rain	-0.341			-0.315			-0.656		
	(0.627)			(0.304)			(0.915)		
R^2	0.699	0.354	0.295	0.609	0.288	0.184	0.678	0.340	0.264
F	11.67***	7.14**	5.44**	7.48**	5.27**	2.94	10.55**	6.70**	4.67**

Notes: DHS=Demographic and Health Survey. Weighted to national level with weights provided by the Nepal DHS in each year. Standard errors in parentheses. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. Model (1) includes each regressor measured as of 1994 as linear variables; Model (2) includes only forested in 1994 as a linear variable; and Model (3) includes only forested in 1994 as a binary variable. F-statistics reported in the table are the partial F-statistic values for the "Forested" variable. All regressions have 15 observations at the sub-region level.
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Table 2. Women's Status and Household Factors, Nepal DHS, 1996-2006

	1996		**2001**		**2006**	
	Unweighted N	*% of Sample, Weighted*	*Unweighted N*	*% of Sample, Weighted*	*Unweighted N*	*% of Sample, Weighted*
Overall Sample	8373	100.0	8719	100.0	8632	100.0
Basic indicators of women's status						
Employed						
Yes	6634	77.3	7341	82.9	6481	73.6
No	1739	22.7	1378	17.1	2151	26.4
Husband Gone						
Yes	1747	20.8	2096	25.0	2657	29.7
No	6626	79.2	6623	75.0	5975	70.3
Education						
No schooling	6689	80.0	6265	72.0	5371	62.6
Some or all primary school	890	11.0	1272	14.8	1461	16.8
Some secondary school	537	6.3	832	9.3	1211	14.1
Completed secondary school +	257	2.7	350	3.9	589	6.4
Literate						
Yes	1802	20.9	3134	35.3	4072	46.7
No	6571	79.1	5585	64.7	4560	53.3
Age						
age<=20	1275	15.5	1218	14.4	1061	12.1
20<age<=35	4467	53.4	4744	54.2	4646	53.4
age>35	2631	31.2	2757	31.4	2925	34.5
Geographical indicators						
Region						
Eastern	1666	22.9	2067	24.1	1916	21.4
Central	2489	33.4	2388	32.1	2213	33.2
Western	1584	19.6	1556	20.3	1683	19.4
Mid-Western	1389	14.3	1141	13.7	1403	11.7

Far-Western	1245	9.8	1567	9.8	1417	14.2
Terrain						
Mountain	1055	6.8	1188	6.9	1154	7.1
Hill	3577	42.8	3241	41.4	3325	41.3
Terai grasslands	3741	50.4	4290	51.6	4153	51.6
Urban						
Yes	946	8.4	1153	9.6	2279	14.8
No	7427	91.6	7566	90.4	6353	85.2
Socioeconomic status indicators						
Husband's education						
No schooling	3367	40.7	3131	37.3	2182	26.2
Some or all primary school	1901	22.0	2184	24.8	2349	27.6
Some secondary school	1625	19.4	2050	22.8	2458	28.2
Completed secondary school +	1480	17.9	1354	15.1	1643	17.9
House has electricity						
Yes	1552	17.3	2068	22.5	4064	47.4
No	6821	82.7	6651	77.5	4568	52.6
House has improved floor						
Yes	836	8.7	1171	12.0	1920	22.2
No	7537	91.3	7548	88.0	6712	77.8
House has radio						
Yes	3522	40.7	3934	43.9	5229	60.0
No	4851	59.3	4785	56.1	3403	40.0
House has television						
Yes	641	6.9	1245	13.4	2396	29.1
No	7732	93.1	7474	86.6	6236	70.9
Household composition and ethnicity indicators						
Two+ children under 5 yrs						
Yes	1102	13.0	960	11.1	740	8.0
No	7271	87.0	7759	88.9	7892	92.0
Religion is Hindu						

Yes	7343	87.5	7479	85.5	7537	85.6
No	1030	12.5	1240	14.5	1095	14.4
Ethnic group						
Brahmin	1159	13.6	1122	12.8	1187	12.1
Chhetri	1682	17.5	1829	17.8	1899	18.4
Occupational	1248	14.6	1720	21.1	1173	12.6
All other	4284	54.4	4048	48.3	4373	56.8

Notes: Weighted to national level with weights provided by the Nepal DHS in each year.
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Table 3. Average Sub-Region Characteristics by More- and Less-Forested, Nepal DHS, 1996 (In percent)

	Less-Forested Sub-Regions	*More-Forested Sub-Regions*	*Difference*
Basic indicators of women's status			
Employed	85.7	81.1	4.6
	(4.3)	(9.2)	(9.5)
Self-Employed	92.2	93.3	-1.1
	(2.3)	(3.6)	(4.9)
Education			
No schooling	82.6	86.7	-4.1
	(2.6)	(2.5)	(5.3)
Some or all primary school	9.8	7.6	2.2
	(1.2)	(1.6)	(2.4)
Some secondary school	5.4	4.3	1.0
	(1.0)	(1.3)	(2.2)
Completed secondary school+	2.2	1.4	0.8
	(0.7)	(0.9)	(1.4)
Literate	18.7	15.8	3.0
	(3.0)	(2.8)	(6.1)
Age			
age<=20	14.8	18.0	-3.2
	(1.1)	(1.3)	(2.3)
20<age<=35	52.6	52.4	0.1
	(0.7)	(3.1)	(1.9)
age>35	32.6	29.5	3.1
	(0.9)	(1.8)	(1.9)
Geographical indicator			
Urban	6.4	3.5	2.9
	(2.7)	(2.9)	(5.5)
Socioeconomic status indicators			
Husband's education			
No schooling	42.8	41.0	1.8
	(2.9)	(3.3)	(6.0)
Some or all primary school	24.0	24.5	-0.5
	(1.8)	(3.3)	(3.9)
Some secondary school	18.5	19.3	-0.7
	(1.2)	(2.3)	(2.6)
Completed secondary school+	14.6	15.2	-0.6
	(1.9)	(1.8)	(3.9)
House has electricity	15.1	5.8	9.2
	(3.8)	(5.1)	(7.9)

House has improved floor	8.2	3.5	4.7
	(2.0)	(3.0)	(4.1)
House has radio	39.8	42.3	-2.5
	(2.4)	(4.6)	(5.2)
House has television	5.0	2.7	2.4
	(2.2)	(2.4)	(4.6)
Household composition and ethnicity indicators			
Two+ children under 5 yrs	13.1	15.5	-2.4
	(1.3)	(6.1)	(3.8)
Religion is Hindu	86.3	97.2	-10.9
	(3.5)	(2.5)	(7.0)
Ethnic group			
Brahmin	14.2	11.0	3.2
	(1.8)	(2.6)	(3.8)
Chhetri	20.1	43.1	-23.0**
	(4.4)	(13.3)	(10.6)
Occupational	17.8	15.6	2.2
	(4.1)	(5.6)	(8.5)
All other	47.9	30.3	17.6
	(7.9)	(20.8)	(18.2)

Notes: Weighted to national level with weights provided by the Nepal DHS in 1996. Standard errors in parentheses. The notation *** is $p<0.01$, ** is $p<0.05$, * is $p<0.10$.
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Table 4. Marginal Probabilities for Likelihood of Employment, Nepal DHS, 1996-2006

	All Women		*Women with Husbands Migrated*		*Widow/Sep/Div/HH Head*	
	Employed	*Self-Employed*	*Employed*	*Self-Employed*	*Employed*	*Self-Employed*
Interaction Terms (reference=conflict_1996)						
Conflict_2001	0.098**	0.063***	0.134**	0.001	0.099**	0.149***
	(0.032)	(0.010)	(0.032)	(0.018)	(0.023)	(0.012)
Conflict_2006	0.095***	0.046***	0.136***	-0.013	0.079*	0.090*
	(0.016)	(0.012)	(0.017)	(0.020)	(0.029)	(0.031)
Education (reference=no schooling)						
Some or all primary school	-0.024***	0.025***	-0.041**	0.034***	-0.016	0.079***
	(0.009)	(0.008)	(0.017)	(0.009)	(0.031)	(0.020)
Some secondary school	-0.054***	0.013	-0.063**	0.020*	-0.031	-0.062
	(0.013)	(0.012)	(0.028)	(0.010)	(0.039)	(0.061)
Completed secondary school+	-0.076***	-0.325***	-0.153***	-0.365***	-0.052	-0.043
	(0.021)	(0.043)	(0.049)	(0.054)	(0.048)	(0.078)
Age (reference=age<=20)						
20<age<=35	0.109***	0.004	0.086***	0.005	0.108**	0.069**
	(0.016)	(0.011)	(0.027)	(0.012)	(0.047)	(0.032)
age>35	0.146***	0.038***	0.128***	0.016	0.110*	0.134***
	(0.019)	(0.011)	(0.026)	(0.016)	(0.072)	(0.045)
Socioeconomic status	YES	YES	YES	YES	YES	YES
Household composition	YES	YES	YES	YES	YES	YES
Year and sub-region dummies	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.194	0.207	0.236	0.275	0.174	0.202
N	25,724	21,807	5,253	4,430	1,404	1,282

Notes: Weighted to national level with weights provided by the Nepal DHS in each year. Standard errors, in parentheses, are clustered by region-year. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. In each regression the key difference-in-difference terms are the binary variable for more- or less-forested interacted with the year dummies. The Widow/Sep/Div/HH Head sub-sample excludes women whose husbands have migrated. Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Table 5. Marginal Probabilities for Likelihood of Employment using Predicted Values, Nepal DHS, 1996-2006

	Linear Forest Instrument		*Linear Forest and Other Instruments*	
	Employed	*Self-Employed*	*Employed*	*Self-Employed*
Interaction Terms (reference=conflict_1996)				
Conflict_2001	0.098***	0.063***	0.130***	0.065***
	(0.011)	(0.008)	(0.011)	(0.010)
Conflict_2006	0.095***	0.046***	0.056***	0.034**
	(0.013)	(0.009)	(0.014)	(0.014)
Education (reference=no schooling)				
Some or all primary school	-0.024***	0.025***	-0.023**	0.025***
	(0.008)	(0.006)	(0.009)	(0.007)
Some secondary school	-0.054***	0.013	-0.053***	0.013
	(0.013)	(0.011)	(0.014)	(0.010)
Completed secondary school+	-0.076***	-0.325***	-0.075***	-0.324***
	(0.020)	(0.028)	(0.018)	(0.027)
Age (reference=age<=20)				
20<age<=35	0.109***	0.004	0.109***	0.005
	(0.007)	(0.007)	(0.009)	(0.007)
age>35	0.146***	0.038***	0.144***	0.038***
	(0.007)	(0.007)	(0.008)	(0.007)
Socioeconomic status	YES	YES	YES	YES
Household composition	YES	YES	YES	YES
Year and sub-region dummies	YES	YES	YES	YES
Pseudo R^2	0.194	0.207	0.194	0.206
N	25,724	21,807	25,724	21,807

Notes: Weighted to national level with weights provided by the Nepal DHS in each year. Standard errors, in parentheses, are clustered by region-year and bootstrapped to adjust for use of first-stage predicted values in the second-stage. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. In each regression the conflict-year interactions are constructed as predicted values based on the linear forest instrument only (columns 1 and 2) and based on all the geographical variables in linear form (columns 3 and 4).
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Table 6. Instrumental Variable Probits for Likelihood of Employment, Nepal DHS, 1996-2006

	Likelihood of Employment			*Likelihood of Self-Employment*		
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Interaction Terms (reference=conflict_1996)						
Conflict_2001_2006	0.799**	10.692*	-61.243	0.744*	10.061*	-55.379
	(0.392)	(5.822)	(42.690)	(0.401)	(5.171)	(39.992)
Education (reference=no schooling)						
Some or all primary school	-0.102***	-0.105***	-0.064	0.154***	0.137**	0.183***
	(0.032)	(0.034)	(0.048)	(0.056)	(0.058)	(0.053)
Some secondary school	-0.206***	-0.235***	-0.166***	0.067	0.012	0.097
	(0.045)	(0.053)	(0.061)	(0.077)	(0.100)	(0.077)
Completed secondary school+	-0.280***	-0.300***	-0.236***	-1.130***	-1.152***	-1.049***
	(0.070)	(0.068)	(0.084)	(0.110)	(0.106)	(0.166)
Age (reference=age<=20)						
20<age<=35	0.421***	0.386***	0.394***	0.024	0.011	0.022
	(0.063)	(0.075)	(0.065)	(0.065)	(0.062)	(0.062)
age>35	0.633***	0.594***	0.599***	0.234***	0.223***	0.229***
	(0.102)	(0.120)	(0.103)	(0.074)	(0.079)	(0.075)
Socioeconomic status	YES	YES	YES	YES	YES	YES
Household composition	YES	YES	YES	YES	YES	YES
Year and sub-region dummies	YES	YES	YES	YES	YES	YES
Wald test of exogeneity χ^2	3.90**	2.23	1.38	5.72**	1.82	1.26
N	25,724	25,724	25,724	21,807	21,807	21,807

Notes: Weighted to national level with weights provided by the Nepal DHS in each year. Standard errors, in parentheses, are clustered by region-year. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. In each regression we instrument for conflict with a binary variable for more- or less-forested interacted with a dummy that combines 2001 and 2006. Model (1) measures conflict as total mortality; Model (2) proxies for conflict as number of husbands migrated; and Model (3) proxies for conflict as number of women divorced, separated, widowed, or living with incapacitated husbands.

Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Table 7. Two Stage Least Squares for Likelihood of Employment at the Sub-Region Level, Nepal DHS, 1996-2006

	Linear Forest Instrument			*Binary Forest Instrument*		
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Interaction Terms (reference=conflict_1996)						
Conflict_2001	0.803*	-6.672	15.331	0.234	-4.359	4.486
	(0.457)	(4.073)	(10.535)	(0.359)	(3.017)	(5.210)
Conflict_2006	0.091***	-10.595*	2.432***	0.053***	-6.889	1.194**
	(0.021)	(6.298)	(0.828)	(0.018)	(4.676)	(0.503)
Education (reference=no schooling)						
Some or all primary school	0.255	2.328	-0.499	-0.505	1.282	-0.730**
	(0.706)	(1.965)	(0.529)	(0.549)	(1.437)	(0.321)
Some secondary school	0.903	10.249*	0.243	0.326	6.752	0.030
	(0.594)	(6.108)	(0.752)	(0.462)	(4.525)	(0.465)
Completed secondary school+	-1.722	14.473	-1.581	-0.709	9.304	-0.488
	(1.073)	(9.173)	(1.875)	(0.836)	(6.777)	(1.085)
Age (reference=age<=20)						
20<age<=35	0.368	6.085*	0.140	0.262	4.136	0.205
	(0.342)	(3.452)	(0.529)	(0.264)	(2.551)	(0.350)
age>35	1.346*	-0.671	0.881	0.632	-0.226	0.418
	(0.757)	(1.029)	(1.103)	(0.586)	(0.717)	(0.646)
Socioeconomic status	YES	YES	YES	YES	YES	YES
Household composition	YES	YES	YES	YES	YES	YES
Year and sub-region dummies	YES	YES	YES	YES	YES	YES
Wald χ^2 test	3349***	467***	1447***	5518***	1121***	3120***
R^2	0.987	0.908	0.970	0.992	0.962	0.986
N	43	43	43	43	43	43

Notes: Weighted to national level with weights provided by the Nepal DHS in each year. Standard errors in parentheses. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. The first three regressions instrument for conflict with a linear forest variable interacted with year dummies; the last three regressions replace this linear variable with a binary variable for more- or less-forested. Model (1) measures conflict as total mortality; Model (2) measures conflict as husbands migrated; and Model (3) measures conflict as women divorced, separated, widowed, or alone.
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Appendix Table 1. Weighted Percentages of the Top Five Occupations for Employed Women by Less/More Forested Regions and Year, Nepal DHS, 1996-2006

Less Forested Regions					
1996		*2001*		*2006*	
Occupation	*Weighted %*	*Occupation*	*Weighted %*	*Occupation*	*Weighted %*
agriculture self-employed	77.7	agriculture self-employed	90.1	agriculture self-employed	75.6
agriculture employee	11.1	sales	4.4	agriculture employee	9.1
sales	4.1	skilled manual	2.4	sales	5.6
skilled manual	3.4	prof., technical, managerial	1.7	skilled manual	4.3
unskilled manual	1.7	unskilled manual	0.5	services	2.2

More Forested Regions					
1996		*2001*		*2006*	
Occupation	*Weighted %*	*Occupation*	*Weighted %*	*Occupation*	*Weighted %*
agriculture self-employed	91.8	agriculture self-employed	95.1	agriculture self-employed	87.8
agriculture employee	3.8	sales	2.1	agriculture employee	3.5
sales	1.5	prof., technical, managerial	1.5	sales	3.3
unskilled manual	1.1	skilled manual	0.8	services	1.7
skilled manual	0.8	services	0.3	prof., technical, managerial	1.2

Notes: Weighted to national level with weights provided by the Nepal DHS in each year.

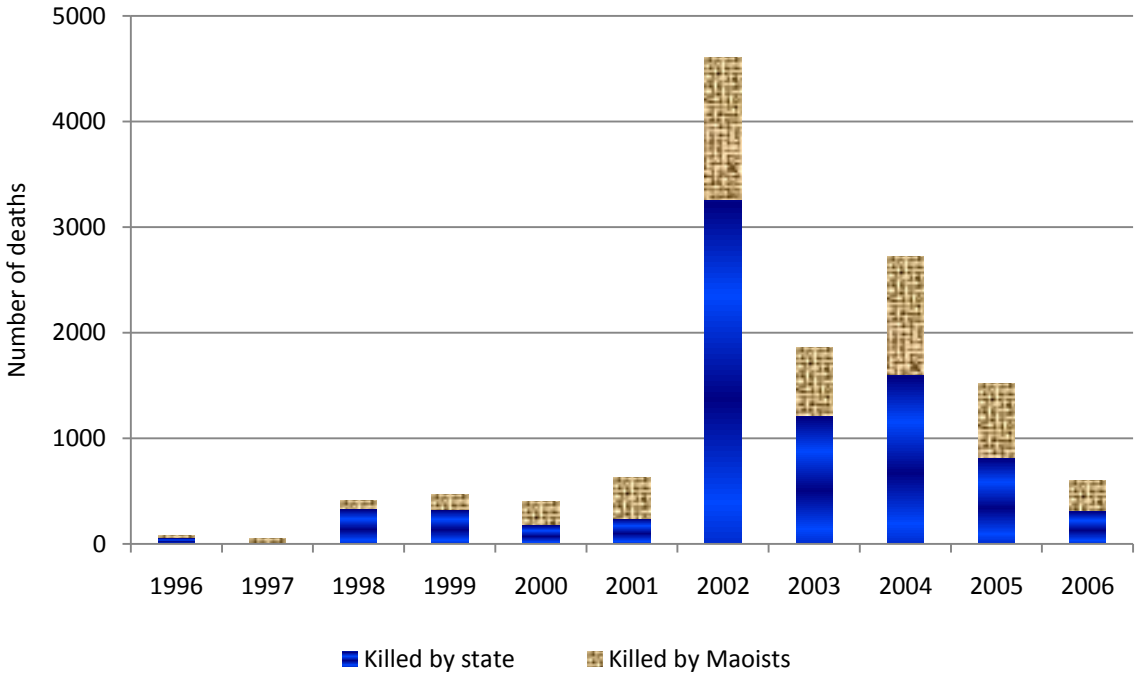
Appendix Table 2. Naïve Probits: Marginal Probabilities for Likelihood of Employment, Nepal DHS, 1996-2006

	All Women		*Women with Husbands Migrated*		*Widow/Sep/Div/HH Head*	
	Employed	*Self-Employed*	*Employed*	*Self-Employed*	*Employed*	*Self-Employed*
Interaction Terms (reference=mortality_1996)						
Mortality_2001	0.477**	0.384***	0.604**	0.093	0.454	1.647***
	(0.201)	(0.108)	(0.296)	(0.104)	(0.327)	(0.418)
Mortality_2006	0.045***	0.018	0.084***	-0.016	0.084**	0.080
	(0.017)	(0.015)	(0.028)	(0.015)	(0.040)	(0.053)
Education (reference=no schooling)						
Some or all primary school	-0.024***	0.025***	-0.041**	0.034***	-0.015	0.079***
	(0.009)	(0.008)	(0.017)	(0.009)	(0.031)	(0.020)
Some secondary school	-0.054***	0.013	-0.063**	0.021**	-0.034	-0.061
	(0.013)	(0.012)	(0.029)	(0.010)	(0.041)	(0.061)
Completed secondary school+	-0.076***	-0.324***	-0.153***	-0.363***	-0.057	-0.046
	(0.021)	(0.043)	(0.049)	(0.054)	(0.049)	(0.080)
Age (reference=age<=20)						
20<age<=35	0.109***	0.005	0.087***	0.005	0.107**	0.057
	(0.016)	(0.011)	(0.027)	(0.012)	(0.048)	(0.034)
age>35	0.146***	0.039***	0.129***	0.016	0.107*	0.122***
	(0.019)	(0.011)	(0.026)	(0.016)	(0.072)	(0.046)
Socioeconomic status	YES	YES	YES	YES	YES	YES
Household composition	YES	YES	YES	YES	YES	YES
Year and sub-region dummies	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.193	0.207	0.234	0.276	0.173	0.201
N	25,724	21,807	5,253	4,430	1,404	1,282

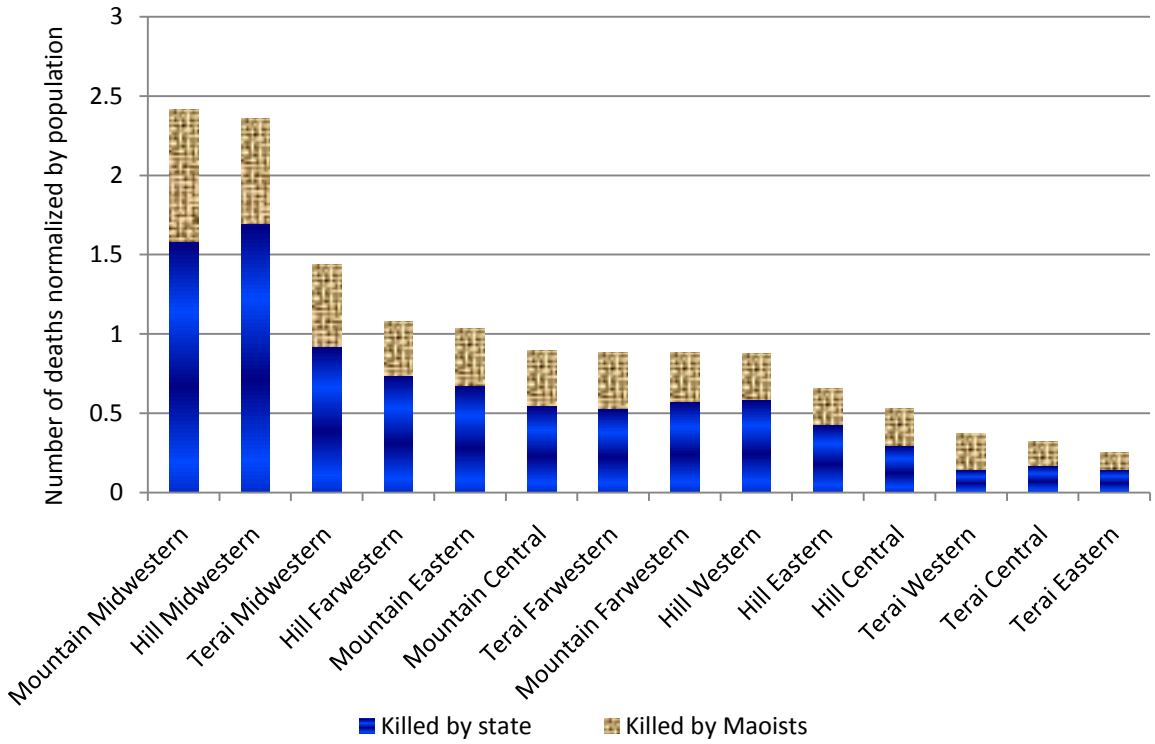
Notes: Weighted to national level with weights provided by the Nepal DHS in each year. Standard errors, in parentheses, are clustered by region-year. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. In each regression the mortality-year interactions are presumed exogenous and we do not instrument for them. The Widow/Sep/Div/HH Head sub-sample excludes women whose husbands have migrated.
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Figure 1. Conflict-related deaths in Nepal, 1996-2006

Panel A: Total Number of Deaths, per Year



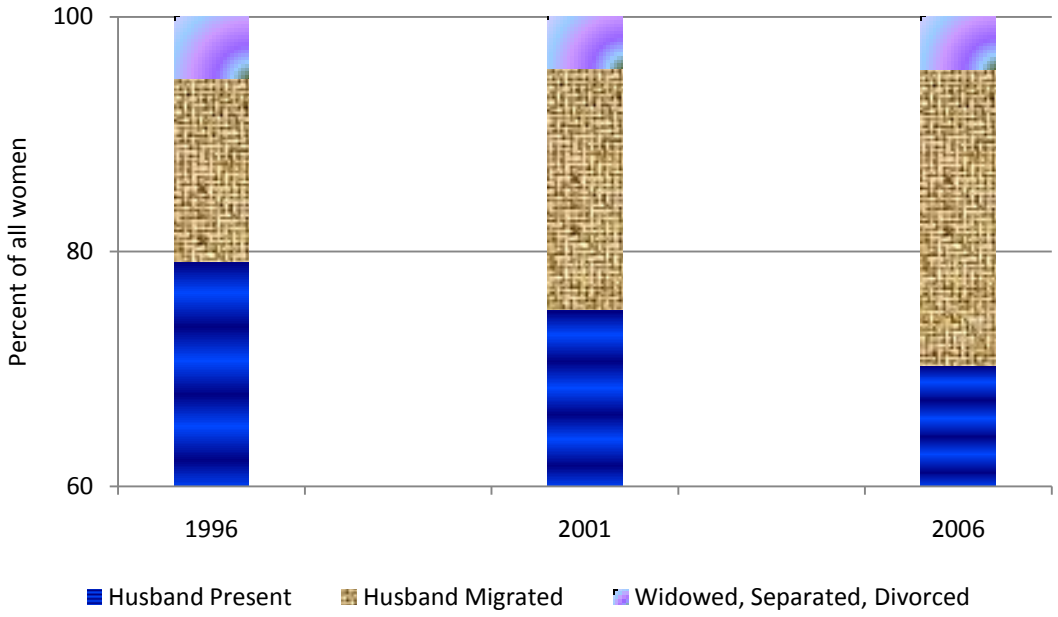
Panel B: Number of Deaths Normalized by Populations, by Sub-Region



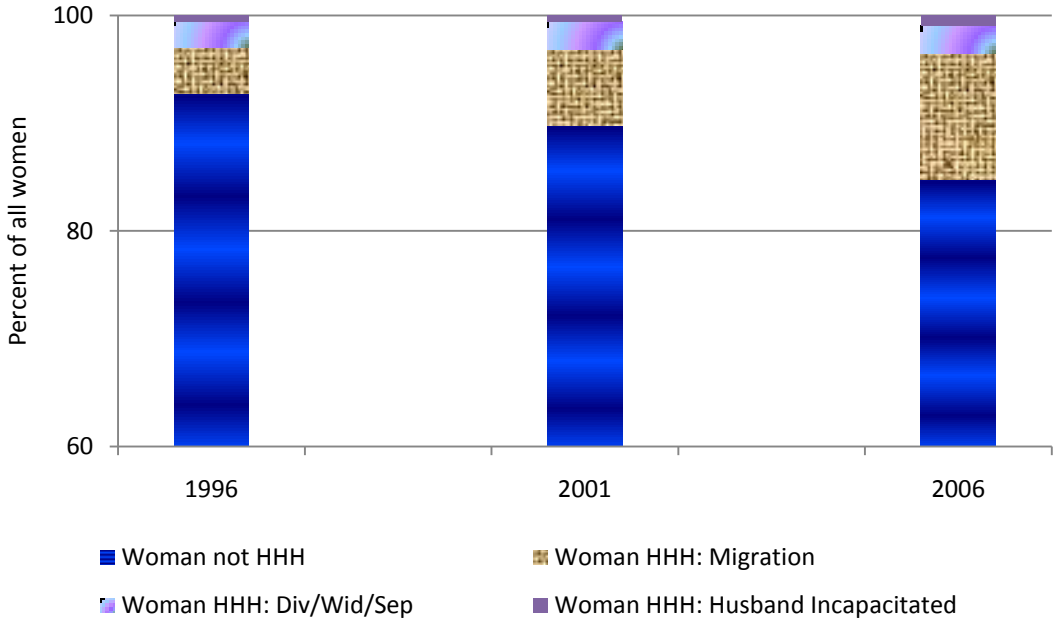
Source: Authors' calculations based on INSEC (2010).

Figure 2. Indicators of Women Alone, Nepal DHS, 1996-2006

Panel A. Status of Husband's Presence



Panel B. Status of Household Headship



Notes: Weighted to national level with weights provided by the Nepal DHS in each year.
Source: Authors' calculations based on MHP/NE/MI (2007), MH/NE/ORC (2002), and Pradhan *et al.* (1997).

Endnotes

[1] See, for example, de Walque (2006) on Cambodia, Ibáñez and Vélez (2008) on Colombia, Blanc (2004) on Eritrea, and Verwimp (2003) on Rwanda.

[2] In a separate set of regressions, we tested the predictive power of our instruments from 1994 in explaining the growth in conflict intensity over the 1996-2006 time period. These regressions are not reported in the paper and are available upon request.

[3] We acknowledge that in the form used in this study's regressions (third column of the final panel of Table 1), the partial F for the "Forested" variable falls below the generally accepted benchmark value of 10. Our results should be interpreted with this in mind.

[4] We coded as self-employed those individuals who reported that they worked for themselves or for their family. The reference group is individuals who worked for someone else.

[5] Note that the types of occupations do not differ much between less and more forested areas.

[6] This specification excludes the woman's potential wage, a variable that could also determine women's participation in the labor market (as in Dex *et al.* 1995 and Prieto-Rodriguez and Rodriguez-Gutierrez 2003 in their studies of the added worker effect). Including this variable would necessitate an instrumental variables technique to estimate the potential wage. Because the Nepal DHS does not include information on cash earnings in the three years of our analysis, we cannot follow this approach.

[7] Because the two sub-samples of women with husbands not present are not representative of all women, the estimates in columns 3-6 may be subject to selectivity bias. We address this issue by noting that male migration was already well-entrenched in Nepal before the conflict began. Furthermore, a specification check of the average proportion of husbands who had migrated regressed on the forest/year interaction terms and the full set of regressors at the year/sub-

regional level finds no evidence of confounding effects from the pre-conflict instruments in 2001 or 2006. A similar test for women who are widowed, separated, or household heads for a reason other than husband's migration also indicates that selection does not affect the results.

[8] We needed to combine the 2001 and 2006 dummies in order to achieve model convergence.

[9] Another check involved using district-level means of a wealth index in the 1996 DHS data constructed from factor scores as another indicator of poverty. These results were similar to those from the district-level measure of poverty for a pre-conflict time period.

[10] Since more forested regions could be poorer, we included the forest variable directly in the difference-in-difference model as a final control for effects related to poverty. The forest variable is negative and significant in these runs, indicating that in more-forested areas, women are less likely to be employed. However, our main results as measured by the coefficients on the forest/year interaction terms remain positive and significant. Thus, even with the inclusion of the forest variable directly in the model, our previous results continue to hold.

[11] These regressions, including those with district means of the DHS 1996 wealth index from factor scores, are not reported in the paper. They are available upon request.

[12] This approach is similar to the strategy followed to address selection bias from migration in Angrist and Kugler (2008).

[13] These regressions, as well as those testing for selection bias described above, are not reported in the paper. They are available upon request.