ESSAYS ON MIGRATION, CONFLICT AND HUMAN CAPITAL

DEVELOPMENT: EVIDENCE FROM NEPAL

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Abstract

This dissertation consists of three main chapters. In the first main chapter, we estimate the causal impact of parental absence and remittances on educational investment of children left behind using data from the latest wave of household survey from Nepal. We find a negative effect of parental absence and a positive effect of remittances on the education of children left behind. We also show that non-parental absence has negative effect on education but effects are not significant. Further, we provide supporting evidence about the channels to disruption. Finally, we also show some heterogeneity results by child gender, age and mother's education.

In the second main chapter, we investigate whether the civil conflict in Nepal (between Maoist and State forces during 1996 - 2006) inflicted disruption on health service delivery.

By using three waves of repeated cross sections of nationally representative household surveys and by exploiting district level variation in an individual exposure to conflict, we show improvement in health status and increase in health care utilization in the areas with high conflict intensity. We further exploit rural community data of the survey to establish the possible channels of the positive conflict-health association. We find that the improvement in quality of health services particularly by way of Maoist policing of health staffs' absenteeism (in health facility) in conflict-intense areas explain the positive association between conflict and health. Several robustness checks confirm our main findings.

In the third main chapter, we analyze the impact of free health care policy on health care utilization and health spending at public facilities. By using the data obtained from second and third waves of Nepal Living Standard Survey, we show that the utilization of public care normally increase by individuals at lower end of endowment distribution. However, further investigation by socio-economic status of individuals show lower effective utilization by the poorest cohort as compared to the middle income cohorts. Our results also show that the richer sections continue visiting private care. In addition, we do not find any effect of policy in reducing the out-of-pocket expenditure on health at public facility. The placebo test further confirms our results.

Dedicated to my father Guna Bahadur Raut and mother Anita Raut who always inspire us to be a good human being.

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Nirmal Kumar Raut
GRIPS, Japan

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Abbreviations

2SLS	Two Stage Least Squares
ANC	Ante Natal Care
CA	Constituent Assembly
CPA	Comprehensive Peace Accord
DID	Difference - in - Difference
EHCS	Essential Health Care Services
GDP	Gross Domestic Product
GHF	Government Health Facility
GoN	Government of Nepal
HP	Health Post
IIA	Independence of Irrelevant Alternatives
INSEC	Informal Service Centre
MDG	Millennium Development Goals
MoHP	Ministry of Health and Population
NLSS	Nepal Living Standard Survey
OLS	Ordinary Least Squares
OOP	Out- of- Pocket
PHCC	Primary Health Care Center
PHF	Private Health Facility
PSU	Primary Sampling Unit

SHP   **S**ub - **H**ealth **P**ost

SDG   **S**ustainable **D**evelopment **G**oals

UN   **U**nited **N**ations

Chapter 1

Introduction

1.1 Health, education and human capital development

Most countries recognize the importance of health and education to promote people's welfare; hence, they are enshrined as basic human rights in the constitution. Education instills confidence for personal growth and promote social interactions. This is acquired by way of increased productivity achieved through skills enhancement - both work and life - vital to promote economic growth (Hannum and Buchmann [69]). Similar argument holds for health (see for e.g., Bloom et al. [24]). Further, there is an extensive literature discussing their importance both as indicators and as instruments of human development (Bloom [23] and Sen [126]). As such, there is a unanimous agreement that health and education are key drivers of economic growth.

Realizing the importance of human capital development, United Nations (UN) member countries adopted Millennium Development Goals (MDGs) in 2000 where five out of

eight goals relate to education or health. Similarly, after the MDG time-frame completed in 2015, UN adopted Sustainable Development Goals (SDGs) that still prioritize "improving health and education" among its major goals. Health goal now targets to eradicate various diseases and address persistent and emerging health issues whereas education goal targets to achieve universal primary education by attaining gender equality at all levels. These indicate that efforts have been made but challenges remain to improve people's access to health and education and reduce inequalities.

1.2   Migration, remittances and education

It is estimated that more than 250 million people - 3.4 percent of the world population - live outside the country of their birth and that there are more South-South migration than South-North migration. Similarly, the remittance amount sent to developing countries has risen to 432 billion United States dollars in 2015 with India as the largest recipient followed by China and the Philippines. Inflow of remittance is now larger than the Official Development Assistance and is stable source than other private capital flows (World Bank [148]).

Most empirical researches on migration and remittances have focused their attention on short-term welfare of the household usually on consumption and acquisition of household assets. Recently only the focus has been shifted towards the long-term household welfare such as investment on human capital. There is now extensive literature investigating the impact of remittances on education of children (see for e.g., Acosta [3], Borraz [27], Edwards and Ureta [57] and Yang [156]). But little is known about the direct effects of migration or parental absence. Related researches focus mostly on Mexico -to - US

migration (Antman [13, 15], and McKenzie and Rapoport [94]) and on rural - to - urban migration in China (Wang [142], Zhang et al. [158] and Zhao et al. [159]). Although South Asia now sends the largest number of international migrants, scant literature is available in this region particularly relating parental absence to education (World Bank [148]).

Here we discuss some linkages between migration and education based on past studies. We explore various channels that influence the educational outcomes of children in a household with migration experience. We broadly identify the channels into three major types: first is the disruption channel from the parental absence; second is the remittance channel; and third is the channel of educational aspiration (see Figure 1.1). [1]

[Figure 1.1 about here]

The first and the second channels are direct consequences of migration. As discussed earlier in the previous section, remittances by way of relaxing household liquidity constraints, improve spending on education resulting into higher educational attainment (Acosta [3], Borraz [27], Edwards and Ureta [57]). On the other hand, migration also results into family disruption from parental absence since this means less parental input required to maintain the children health and educational needs. In some cases, children may also need to go for paid work outside by reducing their study hours (Antman [12, 14]).

The channel of educational aspiration is associated with migration-related information with which the potential migrants revise their expected return to education in the employment destination. Lower expectations would imply lower educational aspirations and therefore lower investment in education and vice - versa. For example, Chiquiar and Hanson [40] and Kandel and Kao [84] show that the Mexican migrants expect lower return

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[1]For excellent reviews of various channels, see Antman [14] and Wang [142].

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to their education in the US which discourages household's investment in education. On the contrary, Beine et al. [21] and Docquier and Rapoport [54] show that the prospect of migrating in the future raises the expected returns to education, inducing investment in education. [2]

To sum, we observe that there are competing effects of migration on child education. There are absence effect, income effect, and aspiration - related effect. The net effect of migration thus depends on which one of these dominates and in what direction.

1.2.1 Nepalese context

Labor Migration is a 200-year-old tradition in Nepal characterized by migration towards India. Only in the last decade, Government of Nepal (GoN) opened several other destinations in GCC and Malaysia. It is now estimated that 20 percent of the total population are absent in Nepal. Out of these, 74 percent are of working age group i.e., between 15 and 60 years old and 27 percent are absent for the reasons of work. Likewise, 43 percent of total absentees are expected to reside internationally most of which is in India as shown in Table 2.1 (Central Bureau of Statistics [35]).

Migrant's remittance is a mainstay of Nepalese household. At the household level, 52 percent households are remittance recipient and remittance contributes to 30 percent of household income. A study shows that remittances reduce the incidence of poverty and that the remittances from India, although smaller, has bigger impact (Acharya and Leon-Gonzalez [1]). This finding also indicates that remittance is most likely spent on consumption needs of the household (79 percent). Only 4 percent is spent on education. This

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[2]This is referred to as "beneficial brain drain" or brain gain in the literature (see also McKenzie and Rapoport [94]).

shows increasing importance of research on remittances and child education also from policy perspective such that appropriate migration policy is formulated to ensure productive use of the remittances received.

Only two papers investigate the causal impact of parental migration (absence) and remittances on education of children left behind in Nepal (Acharya and Leon-Gonzalez [2] and Bansak and Chezum [19]). Specifically, these papers consider remittance and migration simultaneously in their econometric model. In chapter 2, we extend our analysis by further dis-aggregating migration into parental and non-parental migration and also consider remittances in the econometric specification.

1.3   Armed conflict and public health

Armed conflict is a global concern. Although it has now decreased globally, persistence of few of them such as in Syria, Iraq and Afghanistan indicates that the war is far from over (Leaning and Guha-Sapir [88]). Recent figures portray a bleak picture yet again which shows that the number of armed conflict is rising all over again. According to Uppsala Conflict Development Program, the number of conflicts increased from 34 in 2013 to 40 in 2014 and those involving more than 1000 battle deaths increased from 6 to 11 during the same time period. This urges the Government of war-torn countries design their health and education policies taking into consideration of both macro and microeconomic consequences of conflict.

[Figure 1.2 about here]

Population death and ill-health are two important consequences of war. Several channels explain conflict and health relationship such as population displacement, disordered public service system, and the persistent risk of disease transmission. This implies that there may also be indirect consequences of war that exist for several years after the war has ended (Murray et al., 2002). Likewise, there may also be food shortage due to damage made to the household assets including agricultural production; this may result into hunger and undernourishment particularly among children (see Akresh et al. [6] and Bundervoet et al. [29]). Guha-Sapir and van Panhuis [65] illustrate broader range of channels linking armed conflict and health as shown in Figure 1.2. In this dissertation, as will be seen in chapter 3, we customize the linkage focusing on two important sources of disruption relevant to Nepalese conflict: operation of health facilities such as opening hours, presence of staffs and supply of medicines, and the damage to the health infrastructure such as health posts (see Figure 3.3).

1.3.1 Nepalese context

Nepal experienced armed conflict between 1996 and 2006 between the Maoist force and Government. Maoist waged a war beginning in 13th February 1996 with an attack on a police post in the mid and far west regions of the country. This was due to the reluctance on the part of Government to consider their 40-points demand seriously: major demand being radical change in existing political and governance structure within the strict framework of Marxist, Leninist and Maoist ideology. Major causes of conflict so far identified are governance and development failure, experimental failure of the Royal Palace, and other ideological and constitutional causes (Upreti [139]). Empirical literature further demonstrates that inequality, geography, poverty and a lack of political participation are

determinant factors of conflict in Nepal (Bohara et al. [25], Do and Iyer [53], Macours [90], Murshed and Gates [103] and Nepal et al. [105]).

Anecdotal evidence is available explaining the macro level impact of armed conflict on health service delivery in Nepal. Devkota and van Teijlingen [50] conclude that the health sector was least affected from the conflict. On the other hand, Singh [129] reports that the conflict disrupted the countrys already fragile health system and therefore made heath care provision particularly in the rural areas difficult. These anecdotes based on national reports and interviews of key stakeholders may not be reliable unless supported by empirical evidence at micro - level (Haar and Rubenstein [67]). This would help identify precisely the correlates of conflict and establish causalities.

Nepalese conflict is largely under-studied particularly in terms of its microeconomic consequences.[3] Few empirical studies explore association of conflict with health, education and women employment. Price and Bohara [116] assess effect on antenatal care (ANC) utilization by pregnant women. Valente [140] and Pivovarova and Swee [112] examine the impact of exposure of children to conflict on their years of schooling completed and probability of completing primary education. And Menon and Van der Meulen Rodgers [95] assess effects on labor force participation of women.

In chapter 3, we answer the question whether the conflict had any effect on individual health status in general and health care utilization in particular. (O'Donnell [107])

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[3]On macroeconomic fronts, various estimates are available for economic cost of conflict. For example, Asian Development Bank estimates show that the total gross domestic product (GDP) growth loss for the periods between 2005 and 2009 was between 8.3 to 10.3 percent (Ra and Singh [118]).

1.4 Free health care policy and health care utilization

Access to health care is still a major global challenge. World Health Organization and the World Bank group joint report in 2015 shows that 400 million people do not have an access to essential health care. Similarly health spending has pushed 6 percent of people in low and middle income countries further into extreme poverty (World Health Organization [154]). This indicates that the out-of-pocket (OOP) spending on health continue to be high in these countries. In 2014, the OOP spending of these countries was about 37 percent which is almost double the global average of 18.2 percent. South Asia has the highest OOP at 61.5 percent (World Bank [151]). These countries have not been able to mobilize sufficient resources to pay for the health care needs of their population. In particular, health care needs of the poor and other vulnerable groups are largely unmet because of their limited ability and willingness to consume.[4] So, an emerging debate on whether to retain or remove user fees is important for these countries. [5]

Most empirical studies assessing the effects of removal of user fees on health utilization have methodological weaknesses arising particularly out of their non-experimental nature thus raising issues of selection. Other weaknesses relate to study being conducted on a small scale; adoption of before-after design without appropriate control group; and other policy changes concurrently with the abolition of user fees. For example, Deininger and Mpuga [44] and Xu et al. [155] compare time trend before and after the policy and attribute any change in utilization to the free health care policy. This method is arguably

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[4]Income, prices of health care and cost of travel are important barriers to ability to consume. Willingness to consume is more related to the cultural, information and quality barriers (O'Donnell [107]).

[5]User fee is an official fee for consultation at public facilities and constitute a small portion of the OOP expenditures on health. Other costs include amount paid for medicines, lab tests and informal payments to providers. Besides, incidental costs such as on travel, food and accommodation would also substantially raise the OOP (see James et al. [81]).

biased since the time trend not only captures the effect of free care policy but also other concurrent policy changes taking place during the same time period as the free health care policy. It is also important to note that other attributes both observed (e.g., distance to the nearest facility) and unobserved (e.g., quality of the health service) confound the effect of the policy. Hence, evidence based on the results from such studies has to be interpreted with caution (James et al. [81] and Lagarde and Palmer [86]).

Using well-defined treatment and control group, only few studies exploit natural experiment setting to claim that their assignment of treatment and control group is exogenous (see for e.g., Ansah et al. [11], Chen et al. [39] and Powell-Jackson et al. [114]). For example, Chen et al. [39] investigate the causal impact of Taiwan's National health insurance program on the utilization of health care and health status of elderly people in Taiwan. They assign those elderly population previously not working and therefore uninsured (by their employers) into the treatment group. Conversely, those previously working and insured by their employers were assigned the control group. The former group has to be mandatorily registered under the insurance program. In this dissertation, as we will see in chapter 4, we try to assess the impact of free health care policy in Nepal by considering the long-run indicators of inequality such as household head education to distinguish between treatment and control groups; these indicators are less biased and are arguably exogenous to the action of household members vis-á-vis the short-term indicators such as income and consumption.

1.4.1   Nepalese context

The interim Constitution of Nepal 2007 recognize that the basic health service is a right of every citizen and that the State should provide it free of cost. In 2008, Ministry of Health

and Population (MoHP) made essential health care services (EHCS) available at health posts, sub-health posts and primary health care centers free to all citizens. A number of essential drugs were also made free. However, the service started rolling out progressively since December 2006. (Hachette [68]).

MoHP is the main financing agent that allocates fund through health sector budget each year to purchase health services from the providers such as hospitals, health posts and sub-health posts. The GoN collects funds from various source of financing such as tax and non-tax revenue and from external development partners. These are called pooled sources. Non-pooled sources consist mainly of OOP expenditure. Under the non-pooled arrangement, patients pay directly to their providers. The OOP in Nepal is one of the highest in the world at 60 percent of total health expenditure (Shrestha et al. [128]).

GoN increased the budget for free care by 24 percent between fiscal years 2007/08 and 2008/09 from USD 9.2 millions to USD 11.4 millions. Figure 1.3 shows that both external support and OOP expenditure on health have declined from 2006 while the government health spending (form tax and non-tax revenue) has increased. A micro-level analysis is thus important to assess whether the decline in OOP is experienced at the household level. By providing additional evidence related to important policy concern, this further illuminates on whether health spending reaches the targeted group such as poor people living in backward and remote areas.

[Figure 1.3 about here]

There is no empirical evidence in Nepal suggesting that the free health care policy has been pro-poor. In chapter 4, we provide empirical evidence about the association of free

health care policy with health care utilization as well as health spending at public facilities, as experienced by individuals from various socio-economic statuses. We differ from previous studies by introducing private care in theoretical and econometric models. It is important to consider private care because growing evidence suggests people's rising preference towards private care despite public care is either subsidized or free (Borah [26]). Likewise, we correct the sample selection problem while we focus only on health expenditure made in government health facility. Hence, we exploit a variant of Dubin and McFadden [55] sample selection method when first step selection involves three choice categories (Bourguignon et al. [28]).

1.5 Research objective

In the last two decades, Nepal experienced major structural changes triggered primarily by the armed conflict and the surge in labor migration. These changes played historical role to shape the social, economic and political landscape of the country. Hence, the general objective of this dissertation is to carry out an overall assessment of the effects of migration and conflict on human capital development using household data from Nepal. The specific objectives are as follows:

1) To investigate the causal impact of parental absence and remittances on child education: school enrollment as extensive margin and education expenditure as intensive margin (chapter 2).

2) To investigate the causal impact of armed conflict on two health-related measures: individual health status and institutional health care utilization (chapter 3).

3) To assess the impact of free health care policy on health facility utilization and health expenditure at government facility (chapter 4).

1.6   Significance of study

This study has an overall contribution to the literature on human capital development. The second chapter utilizes modern applied econometrics to address the identification issue when multiple variables of interest are endogenous in the multivariate analysis. Generally, previous literature on migration have identified the impact either of migration or of remittances on child education. This is because of the complexity in addressing the selection issue when both migration and remittances are simultaneously considered in the econometric model. Besides, migration and remittances may exhibit high multicollinearity when majority households with migrants receive remittances. Recent literature, however, have observed marked differences between migration and remittances. This means that significant number of households with migrants do not receive remittances due to several reasons such as low paying jobs, hiring company fraud and other personal reasons. In NLSS-III, 30 percent of migrant household do not receive remittances whereas 29 percent of remittance-recipient households do not have migrants. We utilize this household-level variation for migrants and for remittances to separately identify their effects.

The findings in second chapter have also policy implications. We find larger negative effects of parental absence than non-parental absence on child education. This finding is important to suggest that household have to be selective in sending their household members as migrants since this will adversely affect the human capital development in the long term. This chapter also has gender dimensions particularly with regards the importance of

remittances in providing the girls with quality education. Since remittances relax household liquidity constraints, unlike in the past, households now channelize remittances to spend on girl's education.

The third chapter unveils the unconventional link that might exist between civil conflict and individual health. We find positive association between conflict and health. The supporting evidence shows that Maoist basically monitor the operation of health facilities: they ensure that the health facilities are open for longer hours and that the health staffs are present, so that the health services are provided in an adequate manner. This implies that the Maoist assumes government's responsibilities in local health facilities. Hence, it provides the government a policy lesson that the quality of health services can be improved if local facilities are regularly monitored. This chapter also provides the message that some ideology-based conflicts have an important bearing on cultural norms. This may change people's knowledge/perception about the benefits from seeking modern health care over traditional care.

Finally, the fourth chapter illuminates that the free health care policy can increase the utilization of health facility by resource-constrained people. However, the chapter also emphasizes that it is equally important to design alternative financing strategies to reach the poorest since the effective utilization of the policy is lower among these cohorts.

1.7   Organization of study

Chapter 2 seeks to answer the first research question where an assessment is made about the effects of parental absence on child education. Chapter 3 delves into answer the second research question about the association between armed conflict and health. Chapter 4

answers the third research question where we empirically test the association of free health care policy with health facility utilization and health expenditure. Chapter 5 concludes the theses with some policy recommendations.

Chapter 2

Parental Absence, Remittances and Educational Investment

2.1 Introduction

Parental migration is a widely observed phenomenon in South Asian countries. In Nepal, 50% of households have at least one absentee away (either within the same country or abroad) primarily for reasons of work, study, or living with other relatives or friends (Central Bureau of Statistics [35]). Among those, 46% are parents of schoolchildren aged 5–16.

One of the concerns of parental migration is its effect on children left behind. In particular, the effect of parental absence on the education of children is a crucial issue. While the remittances received from a migrated parent help meet the short-term consumption and long-term physical and human capital investment needs of households (e.g., Adams and

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Cuecuecha [5], Rapoport and Docquier [121], Yang [156]), parental absence does result in family disruption. This disruptive effect may be in the form of less of the parental input required to maintain children's health and educational needs. It may also require that left behind children bridge the household labor gap resulting from the absence of adult members from the household. In extreme cases, children may respond to migration by reducing their study hours and increasing hours of outside paid work (Antman [12]).

To examine the effect of parental absence due to migration, it is important to isolate the direct impact of parental absence from the effect of remittances. The investigation of the overall impact of migration, which primarily represents the combined effect of migration and remittances, is inadequate to determine policy to mitigate the adverse direct effects of parental absence. Even when the total effect of migration is positive because the income effect of remittances more than offsets the absence effect of migration, this large positive effect of remittances may mask the adverse effects of parental absence, which could be mitigated by other policy measures.

This study attempts to determine whether parental migration disrupts the education of children with the explicit simultaneous consideration of both parental migration and remittances as the variables of interest. We investigate the effects of parental absence and remittances on both the intensive and the extensive margins of educational investment: school enrollment and educational expenditure. Although the paucity of adequate information on migration and remittances in survey data in developing countries is always problematic (Amuedo-Dorantes et al. [8]), we avoid this problem by exploiting the latest household survey data from Nepal, the third round of the Nepal Living Standard Survey (NLSS), which affords rich information on both absentees and remittances and thus facilitates the identification of parental absence with more accuracy.

To identify the causal impacts of parental migration status and remittance amount, it is imperative to correct biases due to the self-selection of parental migration status and endogeneity of remittances. In our regression analysis, we address these issues explicitly by applying a two-step estimation method with instruments for migration status and remittances. In the first step, we run a selection equation for household migration decisions and in the second step, we estimate the causal impact of parental absence and remittances. To implement this method, we use a separate set of variables as excluded instruments for migration status and remittance amount. Specifically, we use two instruments for migration status. The first instrument exploits the economic conditions in potential destination countries as in Amuedo-Dorantes and Pozo [9], Antman [12], and Yang [156]. The idea here is that the better the economic conditions of destination countries, the more households migrate. Hence, we construct village-level weighted average of unemployment rates in the potential destination countries. The second instrument exploits the variation in the cost of migration as in Alcaraz et al. [7] and Demirgüç Kunt et al. [45]. Here, we construct the travel cost of migration adjusted with geographic location of each village; the geographic location being measured by altitude from sea level. As an instrument for remittance amount, we exploit the idea of community-level financial networks as in Acosta [3], Cuecuecha [41], Hanson and Woodruff [70], and McKenzie and Rapoport [94]: the more remittances a community receives, the easier and cheaper it is for migrants to send remittances. For this, we use average remittance amount (net of own remittances) at the community level as a proxy for the community-level financial network.

Our estimation results reveal the substantial disruptive effects of parental absence: the probability of children whose parents have migrated enrolling in school is 39 percentage points lower than that of children with parents at home. Educational expenditure on

children from households with migrated parents is lower by about 240% of mean expenditure than that on children without parental migration. Remittances have a positive effect on all the education variables of children left behind: a 1% increase in total remittances increases the probability of school enrollment by 3.8 percentage points and educational expenditure by 0.25%. We also find that non-parental migration has negative effects on children's school enrollment and educational expenditure on children, although the effects are not significant.

To further explore the heterogeneous impact of parental migration, we extend our analysis by allowing heterogeneity based on the education status of the mother. It is important to allow differences in maternal education given that an educated mother may be able to effectively direct children's study both at home and at school. As such, we hypothesize that mothers' education in father-migrated households has the potential to at least partially mitigate the negative effects of absence. We find some evidence of the burden from parental absence in the case of children with less educated mothers, whereas this burden is mitigated with an educated mother. This finding suggests that informed mothers can serve as a buffer against migration-related disruption.

Furthermore, we investigate the heterogeneous effects of parental migration separately by the child's gender and age. We find that the disruption resulting from parental absence is stronger for girls than for boys. Similarly, we find that the spending of remittances received is significantly higher on the education of girls than of boys. Likewise, younger children are more likely to be out of school, and educational spending on older children is likely to be lower as a result of the absence of an adult member from the household.

Our study is related to the strands of the literature on the evaluation of the overall impact of

migration on the education of children left behind (McKenzie and Rapoport [94], McKenzie [93], Mansuri [92]). The results of these studies are mixed: Mansuri [92] and McKenzie and Rapoport [94] report negative effects of parental migration on children's education in Pakistan and rural Mexico, respectively, whereas Hanson and Woodruff (2003) report a positive effect of migration on secondary school-aged girls in Mexico.

The overall impact of remittances without the separate identification of the effect of parental absence on children's education has been examined in many studies, and the results are again mixed. For example, Edwards and Ureta [57], Yang [156], and Acosta [3] report positive effects, whereas Alcaraz et al. [7] and Kroeger and Anderson [85] report the opposite effects. Moreover, Amuedo-Dorantes and Pozo [9] and Amuedo-Dorantes et al. [8] show that remittances received by a migrant household weakly explain improvements in the educational attainment of children left behind compared with those received by a non-migrant household.

This study is closely related to Bansak and Chezum [19] and Acharya and Leon-Gonzalez [2] in that they evaluate the effect of the absence of household members and remittances on children's education separately by using data from Nepal. Our study has at least two advantages over these studies, however. First, we use detailed information on the migration status of household members that was unavailable in previous household surveys in Nepal. This finer information enables us to examine the effect of parental and non-parental absence separately. Second, and more importantly, our study assesses the causal effects of migration and remittances through the careful treatment of sample selection and endogeneity of remittances by exploiting a detailed set of instruments for parental absence and remittances.

The structure of the remainder of this chapter is as follows. Section 2.2 describes the historical development of migration and education system in Nepal. Section 2.3 discusses the estimation strategy of the study. Section 2.4 presents the data and descriptive statistics. Section 2.5 reports the main results. Section 2.6 presents the heterogeneity analysis based on the education of the mother and the child's age and gender. Section 2.8 concludes.

2.2 Institutional background: migration and education in Nepal

2.2.1 Migration and remittances in Nepal

South Asia sends the largest number of migrants overseas and is the second largest recipient of remittances (World Bank [148]). Nepal is among the world's top 10 recipients of remittances relative to economic size (20% of GDP) with about 3.3% of its population having a migrant status. Nepal's stock of emigrants is also one of the largest among low income countries (World Bank [145]).

At the household level, 52% of households are remittance recipients. Surprisingly, only 71% of these are households with at least one absentee. Households without absentees receive remittances mostly from distant relatives and friends. On the contrary, 30% of households with at least one absentee receive zero remittances. There may be several reasons for not sending remittances such as low paying jobs as well as worker and hiring company fraud. As we see later in the regression analysis, this household-level heterogeneity for migrants in the household and for the receipt of remittances provides adequate

variation at the household level for the separate identification of the effects of migration and remittances.

Domestic migrants outnumber international migrants in Nepal (55% vs. 45% of total migrants, respectively). The capital city, Kathmandu, is the major destination for domestic migrants (34% of all domestic migrants) followed by Kaski (5%) and Sunsari (3%).

India is the major destination for Nepal's international migrants (Central Bureau of Statistics [35]). The first column of Table 2.1 presents the proportion of international migrants by destination. Although the number of international migrants leaving to work in Gulf Cooperation Council countries and Malaysia has grown in the past decade, India is still the single largest external destination for Nepalese migrants primarily because of factors including its easy access, open borders, and socio-cultural similarity (Central Bureau of Statistics [33, 36]).

[Table 2.1 about here]

The second column of Table 2.1 displays the percentage change in the unemployment rates of destination countries between 2008 and 2009. These changes in unemployment rates may be systematically related to household migration decisions. For example, the migration decision of a member of a household in a village with a historically high proportion of migrants to India is severely affected by the adverse macroeconomic conditions in India. As reported later, we thus construct an instrument for the migration decision based on the variation in macroeconomic conditions across destination countries combined with the share of migrants by destination country.

Out-migrants to India mainly use the traditionally popular border points (i.e., the Indian border nearest to one's region of residence). World Food Programme Nepal and Nepal Development Research Institute [153] identify 11 major migration routes to India of which *Gaddachauki* (in the far-west region), *Rupaidiha* (in the mid-west region), *Sunauli* (in the west region), *Raxaul* (in the central Region), and *Panitanki* (in the east region) are the five Indian borders widely used by out-bound migrants, as can be seen in Figure 2.1. Since the largest proportion of internal and external migrants go to Kathmandu and India, respectively and that the majority of the out-bound migrants to India use the nearest Indian border, the cost of travel to Kathmandu and to the nearest Indian border may be systematically related to the migration decision. We therefore exploit this information to construct another instrument for the migration decision, namely the location-adjusted travel cost of migration.

2.2.2 Education and school system in Nepal

Thirty-three out of every 100 South Asian children enrolled at the primary level leave school before reaching the last grade. The share of such children is highest in Nepal, at 38.3%, after Pakistan at 38.5% (UNESCO [135]). The overall completion rate through various levels of schooling (from the first grade of primary education to the last grade of secondary education) is 60%, and the rate is higher for girls than boys (Ministry of Education [97]). Although the recent figures for Nepal show encouraging trends in terms of the promotion rate and lower grade repetition and dropout rates at different school

levels, progress has been rather slow, particularly towards realizing the SDG of ensuring qualified education for all.

School education in Nepal today comprises 12 years: five years at the primary level (5–10 years of age), three years at the lower secondary level (11–14 years of age), two years at the secondary level (15–16 years of age), and two years at the higher secondary level. Basic education is defined as eight years, with five years in the primary cycle and three years in the lower secondary cycle. The secondary level concludes with the School Leaving Certificate, a national exam, which serves as a criterion for admission to the higher secondary level and university.

Schools in Nepal are either public or private. Public schools are fully or partially funded by the government and managed either by the government or by the community. Private schools, on the contrary, are institutional schools managed by the private sector; there, the financing of school expenditure depends entirely upon the funds raised from parents. The quality of public education has remained consistently poor compared with that of private schools despite interventions in the form of, for example, improved access to schools and school infrastructure (e.g., provision of drinking water, separate toilets for girls, mid-day meals), construction of new schools, transfer of school management to the community, and removal of economic barriers (no tuition fees and free textbooks). Although public education is now free (tuition and textbooks), an admission fee is charged to cover school repairs, extracurricular activities, exam fees, stationery, and uniforms. Some schools charge an additional fee for items including computer classes. Concerns have also been raised about student motivation, teacher attitude, and principal leadership in public schools. Another serious concern raised is related to teacher absenteeism (Thapa [133]).

Central Bureau of Statistics [35] reports that private school enrollment increased more than threefold between 1996 and 2011 (from 7.5% of national enrollment in 1995/96 to 26.8% in 2010/11). However, the private school enrollment of girls (43%) remains lower than that of boys (57%) at all levels (Ministry of Education [98]).

The disparity in educational attainment according to caste, gender, age, socio-economic status, and location has gained much attention among policymakers. In the estimation strategy described below, we include all these observable characteristics into an econometric model to test whether and how much they affect children's schooling outcomes

2.3 Empirical model and identification strategy

The theoretical foundation for the empirical model used in this study is drawn largely from human capital theory. This theory states that the household derives utility from the human capital of her member children owing to the altruistic parental preference towards these children as well as from the consumption of goods and services of various types. Our theoretical framework is then largely motivated by McKenzie and Rapoport [94], which builds upon human capital theory to demonstrate the overall impact of migration where remittances, by adding to the value of household resources, improve the educational attainment of children left behind, whereas family disruption resulting from parental absence, by increasing the nonfinancial costs of schooling, impedes educational attainment. Our regression equations are presented below.

2.3.1 Regression equation

Our empirical specification for the analysis of the differential impact of migration and remittances on children's educational outcomes is

$$S_{i,j} = \alpha + \beta ParentMigrant_{i,j} + \theta NonParentMigrant_{i,j} + \delta Remittance_{i,j} + \gamma' X_{i,j} + \lambda_j + \epsilon_{i,j}$$

(2.1)

where the dependent variable, $S_{i,j}$, is either a dummy variable indicating whether child i in district j attends school (extensive margin) or the logarithm of educational spending on a child (intensive margin).[6] $ParentMigrant_{i,j}$ equals one if at least one parent is absent from the household and zero otherwise. Similarly, $NonParentMigrant_{i,j}$ equals one if at least one non-parent is absent from the household and zero otherwise.[7] While we cannot identify from the survey data the precise non-parental relationships, these generally represent siblings given the growing number of nuclear families in Nepal (Goldstein and Beall [63]). $NoMigrants_{i,j}$ is a reference category. We note that only those absentee, both parent and non-parent, who are absent for the reasons of work are considered. $Remittance_{i,j}$ is the log of remittances received by the household of child i in the year preceding the survey.[8] β, θ, and δ are the coefficients of interest that capture the direct effects of parental absence, non-parental absence, and remittances, respectively.

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[6]To include children with zero educational spending in the analysis, we added one to all such expenditure.

[7]If both parents or both non-parents have migrated from a household, we categorize that household as a parent-migrated household.

[8]To include children with zero remittances in the analysis, we added one to all remittances.

Following the strands of the literature on migration and education, the other covariate vectors in $X_{i,j}$ include household assets (durable assets, livestock, landholding, and electricity), household head characteristics (gender and age), parental education, and child characteristics (age, gender, birth order, and relationship to the household head). λ_j is a district fixed effect that captures various unobserved and omitted variables at the district level that may affect migration and children's educational outcomes; these include entrepreneurship, socio-economic dynamics, and infrastructural setups. $\epsilon_{i,j}$ is the random error term. To estimate the standard errors, we cluster at the household level to allow for arbitrary correlations within households.

2.3.2 Empirical strategy

The coefficient estimates from the ordinary least squares (OLS) of migration and remittances in Equation 2.1 may be biased due to self-selection into migration and endogeneity of remittances. Although we include additional controls as observables in $X_{i,j}$, this does not account for the possible correlation of unobservables with migration and remittances as well as the outcomes of interest. For example, parental preference for child schooling out of altruism may require them to continue to invest on their education in case of adversities such as reduction in labor income. Another such situation is when an income shock forces parents to migrate and the child to change his schooling choices. Remittances, on the other hand, may also be jointly determined with investment in child schooling. A migrant brother, for instance, may be sending remittances only because he is interested in schooling of his favorite sibling. In such a case, the sibling's schooling determines the household receipt and the amount of remittances and not the reverse. In these situations, the coefficients of parental absence and remittances are biased.

We thus employ the two-step estimation method to correct for self-selection into migration status and endogeneity of remittances. Further, we also control for parental education to deal with unobserved heterogeneity relating to the children. In the first step, we estimate the predicted probability of choosing one of the migration statuses of parents in each household. In the second step, we estimate the two - stage least squares (2SLS) by using these predicted probabilities as instruments for the migration status dummy variables.[9] The process produces consistent estimates even if the first step probit (choice) model is incorrectly specified and avoids the need to adjust the generated regressors problem in standard errors (see Angrist [10] and Wooldridge [144]).

In our model, there are three migration statuses: $ParentMigrant$ ($k = 1$), $NonParentMigrant$ ($k = 2$), and $NoMigrant$ ($k = 3$). As a first step, we estimate a multinomial logit model of a household's selection into these three migration statuses:

$$M_{i,j}^{*,k} = \alpha_k + \beta^k Z_{i,j}^1 + \delta^k Z_{i,j}^2 + \gamma'^k X_{i,j} + \lambda_j + \nu_{i,j}^k \qquad (2.2)$$

and

$$M_{i,j}^k = 1 \quad \text{if} \quad M_{i,j}^{*,k} \geq M_{i,j}^{*,k'} \quad \forall k' \qquad (2.3)$$

where $M_{i,j}^{*,k}$ is the alternative-specific utility of the household of child i in district j. $M_{i,j}^k$ is a categorical variable denoting the migration status chosen by the household of child i in district j. Z^1 and Z^2 are excluded instruments for the migration decision and remittances; these will be explained in the next subsection. $X_{i,j}$ is the same covariate as

in Equation 2.1. $\nu_{i,j}^k$ is a random disturbance term that changes across alternatives k and households of child i.[10]

As discussed earlier, the predicted probabilities of parental and non-parental migration obtained from the first step estimates of Equation 2.2 are used as instruments for their corresponding variables in 2SLS in the second step to identify migration in Equation 2.1. This produces an exactly identified system, while the standard errors and test statistics from 2SLS remain asymptotically valid (Alcaraz et al. [7] and Wooldridge [144]). We then re-add Z^2 to the list of excluded instruments (in addition to predicted parental and non-parental migration) following the usual 2SLS procedure to further identify the impact of remittances.

2.3.3 Construction of instruments

To implement the estimation procedure, we need at least one instrument, Z^1, to identify migration and one additional instrument, Z^2, to identify remittances. The excluded instruments we choose as Z^1 that primarily affect selection into migration status are village-level variation in the unemployment rates in destination countries as well as in the location-adjusted travel cost of migration, as mentioned in section 2.2. An increase in the unemployment rates in the destination country may adversely affect demand for labor migrants in the source country. To avoid the possibility that households engage in anticipatory migration based on speculation about economic conditions, we instead use the percentage change in past unemployment rates between 2008 and 2009. The time period also coincides with the onset of the global financial crisis in 2008 when the number of

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[10]We conduct the Hausman test for the independence of irrelevant alternatives (IIA) and confirm that the estimated coefficients do not systematically differ because of the exclusion of certain migration categories.

new Nepalese migrants out-flowing to destinations other than India declined remarkably (with an unprecedented 12% point fall in fiscal year 2008/2009) (Mohapatra et al. [100]).

As an additional instrument, we use the location-adjusted cost of travel to the Indian border and to Kathmandu, since lower travel costs enable the sending of more migrants. [11] One possible violation to exclusion restriction may come from simultaneity between the travel cost of migration and cost of investment in child schooling. Household may decide to spend less on child education to finance the cost of migration. Conversely, an altruistic parent may select cheaper destination to migrate so that they can finance child education. In order to address this concern, we use the cost of migration borne during the period the particular absentee migrated. [12] The construction of this variable is discussed in detail in section 2.4 and in Appendix A. We believe that the use of lagged cost of migration will possibly break the link between the cost of migration and cost of investment in education. A final concern about the exclusion restriction may come from the fact that rural communities with higher costs of travel may be relatively farther from the border districts (and from Kathmandu) and therefore may have poor educational outcomes historically. However, this possibility is limited by the poor road network in Nepal, mainly the result of the country's difficult geographical terrain. For example, access to some hilly districts closer to Kathmandu is difficult compared with distant districts in the lowlands (Fafchamps and Shilpi [58]). This instrument is therefore a better measure of the pecuniary cost of migration decisions compared with distance or other similar measures.

We choose average remittance amount at the community level as a proxy for the financial

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[11]In robustness section 2.7, we demonstrate through a falsification test that the estimation results in our design, both in selection equation and 2SLS, are robust when cost of travel *not adjusted with location* is used as instrument instead.

[12]Our survey shows that, on average, an absentee has migrated for seven years.

network as Z^2 for remittances. It seems plausible that a stronger community-level financial network would lower the cost of remitting to migrant-sending communities, thus further increasing the prospects of receiving larger remittances. However, the measurement of this instrument may capture the contemporaneous peer effect since this affects the local economy, thus determining directly the level of household income. We use two measures to address this concern. First, following Chang et al. [38] and Hu [78], we exclude the remittances received by observed households in the calculation of the financial network. This approach generates a variable that depends on whether a household receives a remittance, thereby inducing variation both between and within villages (Cuecuecha [41]). Second, in the model we control for a set of community/village-level characteristics. Such community characteristics include the rural/urban distinction and past unemployment rate at the village level, which capture the changing economic dynamics of the local economy. Moreover, we also add dummies for the availability of primary school and private school education as proxies for the supply and quality of schools, respectively.

2.4   Data

We use data taken from the third round of a nationally representative household survey, the NLSS III, which is a cross-sectional sample of 5988 households from 499 primary sampling units (PSUs) with information on 8721 schoolchildren aged 5–16 for 2010–2011. However, the number of observations used in our specifications is 8617 for school enrollment and 7807 for educational expenditure because of missing information on the education status of both children and parents. This dataset is broader in content than those of the past two surveys, which did not provide explicit information on absentees who have

migrated to work or live with other relatives or friends in Nepal or abroad.[13] In our design, a migrant household has at least one adult absentee (aged 15 or above) away for more than six months in the year preceding the survey or is expected to be away for more than six months primarily because of work. A parent-migrated household is one in which either the father or the mother (or both) of at least one of the children is absent, whereas a non-parent-migrated household has at least one non-parent adult member absent. A non-migrated household has no absentees.

The survey asks each household whether it has an absent member. To further identify parent-migrated households, we exploit the questions regarding the status and level of education of the father and mother. The survey asks children whether their father and mother currently live with them. We take the parents to be at home (i.e., not absent) if the children answer "Yes" and further explore absentees' information in the survey to confirm whether the household has any non-parent absentees. We also check the non-parental absentee status of households when children report that their parents have "died."[14] However, if the answer is "No," we match the highest education completed by the father (and mother) in the household roster section with that of the adult married (either single married or poly married) person reported as absent by the household in the absentees information section to identify whether the parent absentee is in the household.[15] To establish whether

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[13]Previous surveys provide information on household receipts and remittance amounts in the previous year; however, they do not discriminate between senders who are household members expected to return to the same household and other relatives or friends/well-wishers.

[14]A dead father and mother do not fall into our definition of absentees. Naturally, such households are either non-parent or non-migrant households. We accept that the effect of parental absence due to death may have a similar or even larger impact on educational outcomes/spending; however, our focus here is on "temporary" work-related migration/absence rather than permanent absence due to death and/or missing cases.

[15]In addition to the "never married," "single married," and "poly married" options, the marital status question includes "re-married," "widow/widower," "divorced," "separated," and "do not know" options. Because of complications in establishing parental relationships, we exclude these latter options when confirming the marital status of the migrant member. Furthermore, they account for fewer than 0.5% of households reporting an absent parent.

a father or mother is absent, we additionally exploit the information on the gender of the absentee.[16] We therefore identify 8721 children aged 5–16 years with 1671 children from parent-migrated households, 1966 from non-parent-migrated households, and 5084 from non-migrated households.

School enrollment is a dummy variable equal to one if a child is enrolled in school during the survey period and zero otherwise. Essentially, the latter group includes school-aged children who have either dropped out of school or never attended school. The survey reports the educational expenditure incurred in the preceding year on each child currently attending school. Educational expenditure is the sum of all tuition and non-tuition expenditure made by parents for children's schooling in the year preceding the survey. Tuition fees are school fees and private tuition fees, whereas non-tuition fees are expenses for items such as uniforms, textbooks, exam fees, and transportation.

We then compute the percentage change in the unemployment rates in the destination countries between 2008 and 2009, weighted by the proportion of international migrants from each village to each of those destinations. The unemployment rates in the destination countries are extracted from the World Bank Database (World Bank [147]). Meanwhile, the community financial network is computed as the average remittance amount received per household at the village level, excluding remittances received by the particular household observed.

The location-adjusted cost of travel is obtained by multiplying the district-level weighted

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[16]We do not use information on the absentee's relationship with the household head to identify the parent absentee because of the difficulty of precisely attributing their relationship with the children in the household. For example, a household head may have several grandchildren living with him or her; however, it may not be possible to identify from the survey whether they are the children of her absentee or non-absentee son/daughter.

cost of travel by the altitude of village from the sea level. [17] By doing so, we allow travel costs to vary across villages. Given that Nepal has a difficult geographic terrain, we reason that the people living at higher altitudes also consider additional "geographic-burden" while making migration decisions; potential migrants from villages located at higher altitudes may find it more costly to migrate than those living at relatively lower altitude. The weighted cost of travel is the weighted average of the cost of travel from each district headquarters to the nearest Indian border and to Kathmandu. The weight is determined as the proportion of external and internal migrants from each district. We exploit the latest administrative data on bus fare and air fare information deflated to the year in which the particular absentee left home as reported in the survey (Department of Transport Management Nepal [46] and Nepal Airlines Corporation [106]). We further use the consumer price index from the World Bank Database to adjust for inflation (World Bank [146]) (for details on the construction of this variable, see Appendix A). To measure the altitude of each village from sea level, we use google map (http://www.mapcoordinates.net/en).

[Table 2.2 about here]

Table 2.2 summarizes the variables used in the analysis. School enrollment is highest among children in parent-migrated households. However, educational spending is highest among children in no-migrant households. This may reflect the difference in quality of education provided by these households. For example, no-migrant household may additionally spend on providing their children with quality education such as by enrolling in

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[17]We cannot construct the cost of travel instrument at lower than the district level, mainly because villagers in the majority of areas still have to walk to the district headquarters to access transportation to travel to other parts of the country. Moreover, administrative data on bus fares from villages are not available.

a private school. This finding also underscores the importance of empirically testing the separate effects of migration and remittances to ascertain the true effects of parental absence. The educational statistics for non-parent-migrated households are lower than those for other households; this finding suggests that either they are non-remittance recipients or, if they are remittance recipients, this money is mostly channeled to non-educational spending. There is gender disparity in school enrollment as well as in investment in education across all migration status households, indicating that boys are prioritized over girls in education spending.

There is evidence that most migrated parents are fathers, since the household heads are mostly women. The average age of the household head is also the lowest in parent-migrated households, which lends support to the gender argument above. Parent migrants are more educated than non-parent migrants. About 68% of fathers in parent-migrated households have completed at least primary education, which is considerably higher than for non-parent-migrated (37%) and non-migrant households (52%). This finding suggests that more educated fathers are migrating, maybe because of the lack of well-paying jobs locally and need to pay rising school fees.

The proportion of members of high caste households who migrate is higher than that of the other groups. This may be explained by their stronger migration networks, established by virtue of improved access to credit and migration-related information. However, except for high caste households, there is little variation in migrating castes across the three types of households.[18]

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[18]Migrating castes are indigenous castes in the hills, mostly Gurung, Magar, Rai, Limbu, and Thakali. They have a significant history of migrating for business or work.

Household size is the largest in the case of non-parent migrant households, implying a relatively low share of household resources accruing to each member. This may also discourage households from spending more on the health and education needs of their children. As already noted, non-parent migrant households have poor educational outcomes with respect to school enrollment and investment in education. There is little variation in child's age and gender across the various migration status households.

As expected, the value of durable asset is the highest for non-migrant households, followed by non-parent migrant households and parent-migrated households. This finding suggests that migration is common among liquidity- and credit-constrained households in Nepal. Accordingly, parent migrant households receive the highest remittance amounts. To reiterate, our survey reports that there are 29% of remittance recipient households without any migrant member outside whereas there are 27% migrant households that does not receive remittances at all. In the former case, distant relatives or friends may have been sending remittance to these households. But in latter case, there may be several reasons for not sending remittances such as low paying jobs, deception by manpower or the hiring company and similar other reasons.

2.5 Results

2.5.1 Main results

The results of the estimation of migration probability are shown in Table 2.3. The estimates of the coefficients of Equation 2.2 show that the location-adjusted cost of travel is a strong predictor of parental and non-parental migration, indicating that the probability

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of people living in higher altitude to participate in migration declines with the rising costs of migration. Similarly, an increase in unemployment rates also leads to a reduction in the migration probability. Although this instrument does not significantly predict non-parental migration, the sign is intuitive. The reference category, as already indicated in Equation 2.2, is a no-migrant household.

[Table 2.3 about here]

Table 2.4 shows the estimates of the coefficients of the first-stage reduced-form equation. For brevity, we only present the school enrollment results.[19] Predicted parental and non-parental migration strongly predict actual parental and non-parental migration, respectively; this is also evident from the first-stage F-stat, which exceeds the maximum relative bias (of 2SLS relative to OLS) because of weak instruments at the 5% level (Stock and Yogo [131]).

[Table 2.4 about here]

The main results of the analysis of the extensive margin (school enrollment) and intensive margin (educational expenditure) are presented in Table 2.5. The signs of the coefficients of migration are negative across all child outcomes for both parental and non-parental migration. However, only the coefficients of parental absence are significant.

The probability of school enrollment is approximately 39 percentage points lower for children with parent absentees than for children with no absentees. This magnitude is

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[19]The first-stage results for educational expenditure are similar (see Appendix Table A1).

comparable to previous studies: the probability of school enrollment in a migrant household in Mexico declines by about 16 to 22 percentage points depending on the gender and age of the children (McKenzie and Rapoport [94]). Antman [12] shows that the magnitude of disruption particularly of 12-15 years old boys increase well over 50 percentage points if Mexican migrants are fathers. Moreover, unlike these papers, our coefficient estimate is the direct effect of parental absence obtained by simultaneously considering remittances in the econometric model. This further substantiates the external validity of the estimates so obtained.

Likewise, compared to children without migrant, average annual educational expenditure is lower by 242 percentage points for children with absent parent. This large difference in educational spending is unsurprising given that there is a significant difference between private and public schools in educational expenditure. According to this survey, children enrolled in a private school pays on average seven times the children enrolled in public schools.

In sum, these findings suggest substantive disruption due to parental absence on both measures of education.

Remittances, on the contrary, have a significant positive impact on all child outcomes. [20] A one percentage point increase in remittance amount raises the probability of school enrollment by 3.8 percentage points and that of educational spending by 25.3 percentage points, implying households mobilize surplus resources on human capital investment. Although the coefficient estimates on remittances are close to the estimates in the past papers, they may not be directly comparable because of two reasons. First, their unit of measurement differ (some uses a dummy for remittance receipt of the household (see for

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[20]We use remittance dummy instead of remittance amount in the main specification and find that the results are similar (see Appendix Table A2).

e.g., Acosta [3], Amuedo-Dorantes and Pozo [9]) whereas some uses ratio of remittances to consumption (see for e.g., Bansak and Chezum [19]). Second, they measure total impact of remittances without considering parental absence in their econometric model (see for e.g., Acosta [3], Edwards and Ureta [57]). In the latter case, hence past papers may overstate the impact of remittances on child education. To illustrate, Amuedo-Dorantes and Pozo [9] show positive impact of remittances in the sample of non-migrant households while the impact disappears when all sample including migrant households are considered.

[Table 2.5 about here]

So far, comparison of the coefficients of parental absence and remittances reveals that a one standard deviation increase in the log of remittances offsets about 53% of the negative effects of parental absence.

Notably, school enrollment is higher in households having more children aged less than five, however educational spending is lower in such households. This may be that the children compete for limited household resources such that their share on educational spending is lower.

Children from castes like brahmin and chettri, which are traditionally ranked high on the orthodox Hindu caste system, have a higher probability of being enrolled in school and receiving a high quality education through increased investment. School enrollment is even higher among *Newars*; it is higher by seven percentage points than *Brahmin* and *Chettri*. Educational spending is lower among *Terai Dalits* than *Hill Dalits*. School enrollments are also lower among *Terai Dalits*. It may be the case that the information constraint lowers their ability to precisely estimate the value and returns to education.

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Boys receive more education resources than girls. This notion is persistent in the Nepalese society where parent prefer boys more than girls in education. This may be because of their higher expectations from sons about the future returns to education, which can later serve as an instrument for social security (Acharya and Leon-Gonzalez [2]).

Similarly, being a grandchild of the head of the household has an advantage in education; both school enrollment and education expenditure are higher among these children. This indicates that the grandfather or grandmother exercise more discretion in decision making related to prioritizing household resource allocation.

Likewise, singleton child has higher probability of enrolling in school and drawing larger education spending than others. Further, the mother's education status has a stronger effect than that of the father on investment in children's education. This finding is consistent with most of the literature suggesting maternal education has a bigger role predicting children educational and occupational success.

The effect of durable assets on child education is limited only to educational spending. We do not find any effect on school enrollment; this may be because of the free public education. However, households need to pay for the indirect costs of schooling of children such as admission fees, exam fees, and uniform and travel expenses. This may explain why assets have a significant positive effect on educational spending.

The findings from community characteristics show that the availability of private school would raise the probability of school enrollment. This would mean that household expects higher returns to education from private schooling. Educational spending are lower in rural areas where demand for education is relatively lower. Similarly, village unemployment

rate (lagged) would increase educational spending which might mean that the parents understand the importance of educational spending to create further job opportunities that are decent and productive.

2.5.2 Discussion on disruption channel

The absence of one or more adult members from the household may require children to bridge the labor gap in the form of either paid activities or household work. We test for this channel by estimating Equation 2.1, using the dummy for child labor as a dependent variable in $S_{i,j}$.[21] The estimation results are reported in Table 2.6. We find that the coefficients of parental migration are positive and significant at 10 percent level. This finding indicates that the disruption resulting from parental absence is partly explained by the fact that left behind children have to assume the absent member's work.

[Table 2.6 about here]

We further discuss other channels to disruption due to parental absence. Following previous literature, we hypothesize that a lack of parental monitoring and a lack of educational aspirations are the two main channels leading to such disruption. Some researchers test for the first channel by using children's exam test scores and their hours spent studying (Antman [12] and Zhang et al. [158]); an ideal test would also warrant data on (quality)

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[21]We follow the United Nations Children's Fund (UNICEF) definition to define child labor. UNICEF considers only children aged 5 to 14 as engaged in child labor during the week preceding the survey if (a) children aged 5 to 11 years did at least one hour of economic activity or at least 28 hours of household work, and (b) children aged 12 to 14 years did at least 14 hours of economic activity or at least 42 hours of economic activity and domestic work combined. Our main results for school enrollment and education expenditure does not change when we restricted child age to 5-14.

hours shared by parents with their children. This renders the explicit test of this channel problematic. In our survey, drop-out children are asked the reasons for their having to leave school. The proportions of the reasons by parental migration status are reported in Table 2.7. The majority of children with migrated parents gave poor academic progress as the major cause. Hence, these observations can be construed as supportive evidence confirming the hypothesis of a lack of parental monitoring.

[Table 2.7 about here]

The second channel of educational aspirations is related to the migration-related information that potential migrants use to revise expected returns to education in the employment destination. Educational aspirations are lower if lower returns to education are expected, and this may discourage household investment in children's education (Chiquiar and Hanson [40] and Kandel and Kao [84]). Migrants from Nepal are mostly employed in wage jobs requiring moderate skills, usually in destinations such as India and the Gulf countries (GIZ and ILO [62] and World Food Programme Nepal and Nepal Development Research Institute [153]). Indeed, 70% of absentees working away have less than a secondary level of education. Further, the proportions of primary and secondary graduates in migrant households are significantly lower than those in non-migrant households. Table 2.8 shows that households with migrant parents have the lowest proportion of educated members.

[Table 2.8 about here]

We therefore conclude that the disruption resulting from parental absence may originate from variety of sources including child labor, lack of parental monitoring and supervision

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as well as lack of educational aspirations. The comparison of the importance of these channels is left to future research.

2.6 Heterogeneous effects

In this section, we extend our analysis by allowing heterogeneity in the education status of the mother as well as in the child's gender and age.

2.6.1 Mother's education

The heterogeneity results based on the mother's education in Table 2.9 show mixed evidence for the disruption resulting from parental migration. The coefficients of parental migration of children with less educated mothers are negative and statistically significant for school expenditure and marginally significant for school enrollment. This finding suggests a debilitating effect of the father's absence on educational spending and a weak effect on school enrollment. Since the coefficients of parental migration are statistically insignificant in both the margins of educational investment, we can thus infer that having an educated mother is an important factor neutralizing, or even mitigating, the negative effects of the father's absence. Therefore, the ability of information-constrained households to understand the value and potential returns to education is limited, particularly in developing countries, where less educated women mostly assume household responsibilities, which restricts their participation in important household decisions.

Although the mother's education does not explain the effect of remittances on child enrollment at school, it does explain the effect of remittances on educational expenditure.

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This phenomenon may be explained in part by the fact that school attendance has risen in recent years thanks to free public education, while the indirect costs of education such as admission fees (in the form of school repairs, exam fees, and the like), uniform, and travel expenses pose liquidity constraints, thus warranting more spending on education. Moreover, the parental preference for providing qualified education also reflects to some extent the significant positive effect of remittances on educational spending.

The coefficients of non-parental migration suggest implications otherwise. The school enrollment estimates are insignificant, as in the case of parental migration, but the educational spending estimates reveal the negative effects of non-parental absence. This finding suggests that children with older siblings absent from the household have low educational aspirations and that educated mothers who are able to revive their aspirations play a weaker role.

[Table 2.9 about here]

2.6.2   Child's gender and age

The heterogeneity result for the child's gender in Table 2.9 shows that although children of both genders suffer, parental absence has a much larger deteriorating effect on girls than on boys; this finding suggests gender bias in the allocation of household resources as well as that girls are dedicating more time to the work previously performed by the absent parents than boys are.

The negative sign of the coefficient of non-parental migration also suggests that girls' school enrollment is disrupted. Compared with the effect of parental absence, this finding

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suggests that girls suffer only weakly from non-parental absence. The direct effect of remittances also shows that they are mostly used for sending girls to school and spending on their education relative to their male counterparts. This fact is consistent with the relaxation of the liquidity constraint hypothesis in remittance recipient households where girls are also prioritized in terms of receiving education (e.g., Acosta [3]).

The heterogeneous effects of age suggest that younger cohorts are more likely to suffer than older cohorts from the effects of both parental and non-parental absence. This is true at least in the case of school enrollment. Antman [12] also finds that younger children in Mexican households are called upon to switch from schooling to work to alleviate the immediate financial hardship of the father's migration. However, this negative effect is less significant in case of educational spending for young children after they have been enrolled in school, as shown in the bottom panel of Table 2.9. This finding also indicates the progressively higher costs of education in higher grades. Consistent with this fact, we find that older children experience a significant decline in educational spending in case of parental absence. This is not surprising. Since enrollment decisions are made only during the early years of a child's education, we find no significant effect of all types of absences on the school enrollment of older cohorts. This finding also offers an explanation why for these cohorts the direct impact of remittances on school enrollment is insignificant, but significant on educational expenditure.

2.7 Robustness

We understand concerns in this chapter with regards to the identification strategy. In particular, the validity of the instruments may be questionable. We run over-identification test

by adding one additional IV in the 2SLS specification only.[22] We use a past rainfall shock at the community level as an additional instrument and find that the exclusion restriction criteria is met. The test shows we cannot reject the null that the chosen instruments are excluded from the second stage. This confirms that the instruments are valid. [23] Interestingly, the estimates of the main variables of interest shown in Appendix Table A6 are comparable and with identical standard errors.

In order to address the concern about the use of location-adjusted cost of travel as an additional instrument, we perform a falsification test where we run the selection Equation 2.2 with Z^1 as weighted cost of travel and the unemployment rates in destination countries. Here, we do not adjust the cost of travel with the village location and instead of controlling for district fixed fixed, we control for region fixed effect in the right hand side of the specification. Notably, the exclusion of district fixed effect and inclusion of region fixed effect should not be a concern since our IV approach does not require the first step selection equation to be correctly specified. In our setting, this approach only requires that the instruments are correlated with the migration probabilities (Adams et al. [4]). We find that the overall results of all the estimates in selection equation, first stage and second stage of 2SLS estimates are consistent with the main results (see Appendix Table A3, Table A4 and Table A5).

Lastly, we consider all the parents and non-parents absent irrespective of the reasons of the absence. This implies that the parents may have been absent for the reasons of work, study, divorce, missing or death. As we can see in Appendix Table A7, parental absence

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[22]Finding an ideal instrument that affects only remittance decisions and not migration decisions is difficult. Hence, an omitted variable bias may result when the instrument is not included in the selection Equation 2.2.

[23]We choose rainfall shock in year 2008 because Nepal experienced large flood this year mostly in eastern region and some parts of mid and far-western regions of the country (UNOHCA [137] and UNOHCA [136]).

has a significant and negative effect on both the margins of education while non-parental absence has weaker or no effect. Likewise, we find significant and positive effect of remittances on child education. This confirms that our main results are robust to the addition of parents absent also for the reasons other than work. However, the magnitude of the coefficients on parental absence are smaller by about half when comparison is made with the coefficients of the main results in Table 2.5; this indicates that the disruption due to the absence for the reasons of work should be larger. This is also plausible because the family finds possible ways to cope up with the absence of long-term or permanent nature such as divorce, missing and death.

2.8 Conclusion

The study attempts to identify the direct impacts of migration and remittances on children's education outcomes, namely school enrollment as the extensive margin and educational expenditure as the intensive margin. It further decomposes the effect of migration into parental and non-parental absence to determine the relative importance to children's education of different family members' presence in the household. The results of the application of the two-step estimation method underscore the importance of correcting for both self-selection into migration and endogeneity of remittances to observe the direct effects of migration.

Although that result suggests a heterogeneous impact of parental and non-parental absence, the overall findings are consistent with the family disruption hypothesis. Parental absence negatively affects the child's education, whereas non-parental absence has weaker or no impact. Moreover, children with educated mothers are better able to cope with the

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negative effects of parental absence than those with less educated mothers, while girls and young children suffer most from parental absence.

Three important findings emerge from these results. First, non-parental migration is less detrimental to children in households with less educated mothers, as this neutralizes the negative effects on school enrollment and potential withdrawal of resources from their education. Second, non-parental migration is also a less disruptive strategy for prioritizing girls in terms of receiving education. Third, the receipt of remittances ensures that girls are enrolled in school and that they receive high quality education through higher investment in their schooling.

The short-term policy options are manifold. They include formulating a selective policy that encourages households to send non-parents rather than parents as migrants. Counseling sessions, particularly for less educated mothers, might also clarify the value of and returns to education, while special programs targeting young children with absent parents could aim either to correct their behavioral changes so that they can continue their schooling or to help them perform better at school. These policy measures could influence households' migration decisions and thus the educational investment and outcomes of children left behind.

Chapter 3

"Policing" Health Service Delivery: Evidence from Civil Conflict

3.1 Introduction

Conflict is normally disruptive for efficient delivery of public services such as health and education and therefore has a long term consequences on human capital formation. There are now large body of literature documenting negative effects of war on children's educational attainment (Chamarbagwala and Morán [37], Poirier [113], Shemyakina [127]). The most common channels put forward are the destruction of school infrastructure, teachers' absenteeism and the altruistic parental concern towards the safety of their children. By analogy though the same applies with respect to health care utilization in the war-torn regions, it is surprising that scant literature is available investigating the effects of civil war on the health in general and health service utilization in particular. Understandably, the war-induced destruction of health facilities, abduction of health personnel

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and disruption of the supply of health logistics have adverse health effects as health care become increasingly inaccessible in such areas. In this chapter, we investigate the effects of armed conflict on individual health status and the utilization of health facilities in rural Nepal. We use Maoist insurgency during 1996 to 2006 as a context of armed conflict.

The conflict setting of Nepal is interesting particularly because of two major reasons. First, the intensity of its warfare was relatively lower. For example, average number of casualties in the top ten deadly conflicts in the 1990s range from about 80,000 to 290,000 deaths (Murray et al. [102]). Nepalese conflict claimed a little over 13,000 lives. This is about 4 to 16 percent of total casualties reported elsewhere. Second, the conflict has been associated with the changing cultural norms. Maoists were believed to promote cultural practices that were progressive in nature such as low cost weddings and funerals and inter-caste marriages. Further, they strictly prohibited discrimination based on caste and gender, banned alcohol and gambling, and discouraged early marriage and polygamy (Upreti [138], Manchanda [91], Geiser [60]). They even punished parents not sending their daughters to school (Hart [71]). Given these contexts, the general understanding of the disruptive effects of war on health service delivery may not be well established in the particular case of Nepal.

There are few but contrasting evidence available that associate Nepalese conflict with the population health. There were reports of Maoists damaging number of local health infrastructures, intimidating health workers and calling frequent and lengthy general strikes that restricted the supply of health logistics including essential drugs (Ghimire and Pun [61], Stevenson [130]). This set of evidence direct us to hypothesize that the conflict may have a debilitating effect on health outcomes. While there are others who argue that the health was the least affected of all the sectors during the period of conflict since Maoists'

perception towards public service delivery was reportedly positive (Armon et al. [16] and Devkota [51]). This set of evidence, in contrast, guide us to hypothesize that the negative effects of the conflict may have been neutralized and in an extreme situation, may even have resulted into positive health outcomes. Hence, a true impact of conflict on basic service such as health is not clear a priori in the case of Nepal. Our empirical effort to establish association between conflict and health help determine health policy that can mitigate the negative health shocks arisen particularly out of the war episodes. Likewise, one may build upon the progressive cultural norms that may result indirectly from some "ideology-based" wars.

This chapter evaluates the impact of armed conflict on two health-related measures: individual health status and institutional health care utilization. [24] We assess both short-term and medium-term impacts of conflict. These correspond to the period respectively during the conflict and few years after the conflict has ended. Testing medium-term effect adds to the understanding that some conflicts may have sustained effects on people's health care seeking behavior. As hinted earlier, studies in Nepal show that the political awareness of people in general and women in particular increased in high conflict zones (Menon and Van der Meulen Rodgers [95])and Valente [140]). Similarly, Maoist - led Government in the post-conflict regime may have favored their stronghold areas by allocating more health resources. [25] These may also have changed health care seeking behavior of people in Maoist-controlled areas.

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[24]Our measure of institutional health care utilization includes the visit to the government health facility (GHF) only. We discuss the rationale for excluding private health facility/care (PHF) in detail in section 2.4.

[25]Maoist won majority of seats in the first constituent assembly (CA) election in April 2008, two years after the comprehensive peace accord (CPA) was signed with the Government in 2006. Their first budget document presented in Parliament in September 2008 introduced a free health service package with a theme of "New Nepal, Healthy Nepal". More resource allocation to their stronghold areas by the Maoist - led Government seems plausible in the sense that they pay gratitude to these people for helping them to turn into the biggest party in the election. Besides, they also want to secure their vote banks for the next election.

Our estimation strategy utilizes difference-in-difference (DID) approach where we exploit a regional/spatial variation in an individual exposure to the conflict of varying intensities for identification. We further compare OLS and 2SLS to confirm that endogeneity of conflict variables does not bias the OLS results. Following Menon and Van der Meulen Rodgers [95], we instrument conflict variables with the forest area coverage across the districts. The idea here is that the larger the area of forest, the easier it is for the Maoists to hide, move and battle (maneuver). For this, we calculated the average area of forest available in a district by dividing total area of forest by total area of land in each district.

We draw data relating to individual health and socio-demographic characteristics from nationally representative household surveys (NLSSs) collected during three time periods: first, just before conflict started in 1996 (NLSS-I: 1995-1996); second, right after conflict escalated in 2002 (NLSS-II: 2003-2004); and third, four years after conflict ended in 2006 (NLSS-III: 2010-11) (see Figure 3.1). We refer to these time frames in the study respectively as: "no conflict regime", "conflict regime", and "post-conflict regime". For empirical analysis, we further combine these household data with the detailed conflict data collected by Informal Service Centre (INSEC) in Nepal at the district level. The timing of the household surveys and conflict avoid the problem of micro survey data limitations that is generally the case in contemporary conflict and post-conflict societies (Bellows and Miguel [22]). In addition, this also enables us to evaluate the effect in the short-term (during the conflict regime) and medium-term (in the post-conflict regime).

[Figure 3.1 about here]

We find that conflict is associated with short-term improvement in individual health status. Our result shows one standard deviation increase in conflict intensity is associated with about 4 percentage point improvement in health status. We do not find medium-term association between the two. Consistent with the results from health status, we find that the conflict is associated with the increase in health care utilization. We also find medium-term association indicating sustainable improvement in health care seeking behavior. We find an increase in utilization by about 12 percentage points associated with 1 standard deviation increase in conflict-related casualties.

We also provide supportive evidence about the channels linking conflict to health. We empirically test the possible channels of disruption to health service delivery relevant to Nepalese conflict. Our empirical result lends support to the hypothesis that the health sector was the least affected during the period of conflict. In particular, we find that the presence of health staffs were higher in the high conflict zones than in the low or no conflict zones. This evidence indicates that the Maoists monitor the operation of health facilities particularly the presence of health staffs. We refer to this unique phenomenon as "policing" in the study.[26]

Our study is related to the strands of literature on evaluation of armed conflict on pubic service delivery such as health and education. Literature relating conflict to education however outnumbers those relating to health in the literature available till date. Moreover, most papers focus on conflict of relatively high intensity in war-torn countries such as in Central America, Sub-Saharan Africa, Central Asia and Europe. These papers largely confirm the general intuition that the conflict is disruptive for child education (Chamarbagwala and Morán [37], Poirier [113], Shemyakina [127] and Swee [132]).

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[26]Valente [140] also refer this particular phenomenon of the Maoist's monitoring of teacher and health worker absenteeism respectively in schools and health facilities as "policing".

Limited number of papers assess microeconomic consequences of conflict on population health particularly health service utilization. The existing studies have focused on child health. Akresh et al. [6] and Bundervoet et al. [29] find that the children's exposure to war have negative effects on their height-for-age indicating that war contributes to child stunting. An important departure of our paper from these papers is manifold. First, we gauge the health consequences of conflict of relatively moderate intensity. Second, we assess the impact on health service utilization and health status of individuals of all ages. The effect of moderate intensity conflicts might not be as disruptive as the fully fledged armed conflict particularly also when the conflict has some ideological base. And understanding of general health environment and access conditions further shed light on particular aspects of health care such as maternity and child care.

Only four papers so far evaluate the microeconomic effects of conflict in Nepal. The results of these studies are mixed: Price and Bohara [116] show negative effect of conflict on antenatal care (ANC) utilization whereas Menon and Van der Meulen Rodgers [95] and Valente [140] report positive effect of conflict respectively on women's labor force participation and children's primary school completion rates. Pivovarova and Swee [112], however, show no effects of war on schooling attainment of children. Our study contributes to these available literature at least in three important aspects. First, we draw our empirical results from larger sample size by using three rounds of nationally representative household surveys. These surveys also afford rich information such as on individual migration history which are unavailable in the Demographic Health Surveys that existing papers exploit. In our study, we carefully consider the case of selective migration since it may otherwise render the causal inference misleading. Second, to the best of our knowledge, ours is the first study to empirically document that the conflict may have prolonged effect on health care seeking behavior. Third and more importantly, our study provides

quantitative evidence of channels demonstrating clear mechanism supporting the association of conflict and health we find in the study. For this, we additionally exploit the rural community data which is available along with the household data used in this study.

The rest of the sections are organized as follows. Section 3.2 briefly discusses the background of conflict. Section 3.3 discusses the empirical strategy of the study. Section 3.4 presents the data and descriptive statistics. Section 3.5 reports the main results. Section 3.6 discusses the results. Section 3.7 runs some robustness checks. Section 3.8 concludes.

3.2 Nepalese conflict experience

Nepal experienced ten years of armed conflict between the Maoist and the Government forces beginning in 1996 and ending in 2006. More than 13,000 lives were claimed and about less than a quarter of millions of people were displaced as a consequence.

Nepal was under an absolute Monarch rule until 1990s after which the restoration of democracy relegated King's role to a constitutional monarch yet with substantial political and military power. The first democratic government formed under Nepali Congress Party in 1991 introduced a series of economic reforms so as to gradually liberalize the fiscal, financial and international trade sector. However, these reforms could do little to directly address the economic grievances of common people. In particular, the sense of social exclusion widened among the poor and disadvantaged. The Maoists used the people's grievances in their favor and waged a war against the Government by attacking a police post in one of the districts in the mid-west region in 1996. This led to the beginning of war between the Maoist and the security forces mobilized by Government.

In 2001, a series of unexpected events took place that changed the course of civil war. First, there was a royal massacre that claimed the lives of all those in immediate relationship with the then King Birendra including crown prince Dipendra who reportedly shot himself after killing his parents and others. As a consequence, Gyanendra who was far from the line of succession became a new King. Second, peace talk between government and the Maoist failed. What unfolded after these were unanticipated. The Maoist attacked police post and army barracks in several districts that claimed lives of many security personnel. Heavy fight took place after Nepalese army was deployed for the first time to retaliate the Maoist penetration into further territories. The abrupt escalation of conflict claimed more than 4000 lives in 2002 alone. However, after the failure of the second peace talk in 2003, to the surprise of many, an unanticipated alliance between the government and the Maoist in 2006 led to signing of the CPA that ended the conflict. This alliance came as a joint exercise to take to the streets to fight against the King. Consequently, 240 years monarchy was overthrown and Nepal was declared the "Federal Democratic Republic of Nepal" (previously the "Kingdom of Nepal") in 2008. Then the Maoist party joined the mainstream politics and secured the highest proportion of seats in the first CA election in April 2008.

Civil war in Nepal was primarily the upshot of the existing feudal establishment that fueled social exclusion of the disadvantaged groups such as poor and lower castes from various spheres of the state apparatus. Maoists lost faith in the current parliamentary system since it could not institutionalize their ideology and therefore demanded its dissolution such that an inclusive constitution can be drafted by holding fresh CA election.

It was the first time in Nepali history that the Communist parties in general and minorities in particular won significant representation in parliament (Dahal [42], Joshi [82]). [27] Given that more than 80 percent of population lives in rural areas, Maoist could garner the support of rural population since they promised to enact radical land reforms and to provide equitable access to the state apparatus (Joshi [82]). Strong desire among people for a change that the old parliamentary system and political parties could not deliver helped people consider the Maoist promises less rhetoric (Lawoti [87]). They were also time-tested during the war period as they not only advocated against gender and caste-based discrimination but also took action against those who do not follow them.

After the Maoist win in the first CA election in the post-conflict Nepal, the chairperson of the party Mr. Puspa Kamal Dahal ("Prachanda") became the Prime Minister of Nepal in August 2008. The main task of the government was to institutionalize the peace process by writing an inclusive constitution that ensures the rights of marginalized communities including women, poor and lower castes. Their budget document presented in parliament in September 2008 by Finance Minister Babu Ram Bhattarai introduced a slogan of "New Nepal, Healthy Nepal" with an objective of providing universal access to basic health services (**?**). This indicates that the Maoist consider attaining public health objectives as one of the important milestones towards institutionalizing the peace process (Tsai [134]).

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[27]Communist parties won 57 percent of the total seats in 2008 CA election as opposed to less than 40 percent seats in previous general elections. Similarly, Dalits (untouchables) won 8.17 percent of seats, women 33.22 percent, ethnic and indigenous people 33.39 percent and Madhesis 34.09 percent.

3.3 Empirical strategy

Our identification strategy exploits DID framework to evaluate the impact of conflict on both health - related measures considered in the study. We further utilize the variation in exposure of individuals to the conflict of various intensities at the district of their residence for the identification. The empirical model is presented below.

$$H_{i,j,t} = \alpha + \delta CONINT_j * T_1 + \gamma CONINT_j * T_2 + \tau^{'} X_{i,j,t} + T_1 + T_2 + \lambda_j + \epsilon_{i,j,t}$$

$$(3.1)$$

Where, $H_{i,j,t}$ is a dummy for poorer health status of individual i in district j at time t reporting illness or injuries in the last one month and zero otherwise. Likewise, it also represents a dummy for institutional health care utilization and zero otherwise. T_1 and T_2 are the time dummies for the survey years 2003 and 2010 respectively. This would capture the general trends reflecting the changes in individuals health status and health care utilization because of the factors occurring concurrently with the conflict (between the years 1995 and 2003 as well as between years 1995 and 2010). $CONINT_j$ is the measure of conflict intensity at district level. As we can see in Figure 3.2, this variable provides adequate variation across districts as well as regions.[28] We discuss its construction in section 3.4. The coefficients δ and γ on the interaction terms $CONINT_j * T_1$ and $CONINT_j * T_2$ respectively measures the short-term (conflict regime) and the medium-term effects of conflict (post-conflict regime). $X_{i,j,t}$ are the vector of individual (age,

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[28]The violence was concentrated in mid-western and far western regions in the beginning but it spread indiscriminately to all the regions of Nepal by the end of 2002 (Deraniyagala [47] and Price and Bohara [116]).

age squared and gender) and household level (expenditure per capita, landholding, household size, household head age , age squared, gender) controls. λ_j is district fixed effects taking into account of any potential unobserved differences across districts. $\epsilon_{i,j,t}$ is the random error term clustered at the district level. We additionally control for the indicator of chronic disease and distance to the closest health facility. The former takes into account any potential concern from unobserved differences in health propensity of individuals and the later captures the opportunity costs of seeking health care.

The theoretical signs of δ and γ coefficients are uncertain in the particular conflict setting of Nepal. If we expect that the conflict did not disrupt the health service delivery (and that the policing hypothesis is true), the signs will be negative for the health status and positive for the utilization. We expect the signs to be opposite if the conflict disrupted the delivery of health care services. We are also uncertain about the temporal signs and magnitude of these coefficients since this largely depends upon whether conflict had a short-lived or sustained impact. We adopt a linear probability model for the estimation purposes.

We now discuss some identification issues. It is important to note that some civilians were selectively targeted by Maoists particularly the wealthy landowners and members of the mainstream political parties whether or not representing the Government (OHCHR [109]). If the share of civilians possessing these characteristics are larger is a district, an omitted variable bias may arise if these people are also healthier. Hence this has to be properly accounted for in the econometric model. Unfortunately, the survey does not collect information relating to the political affiliation of the individuals. However, we include variables that represent household observable socio-economic characteristics such as consumption per capita, size of landholdings and completed levels of education in $X_{i,j,t}$. This would to some extent mitigate the concern. Omitted variable bias is also a

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concern particularly when unobservables at district level has effects on health-related and the conflict-related measures in our study. As we can see, we include district fixed effects in the model that takes into account of any such district-level confounders of health such as poverty and inequality as well as the initial locality conditions such as health infrastructure and the level of health awareness (Pivovarova and Swee [112]).

But if there are some unobservables varying over time, the concern about endogeneity remains. For example, a negative health shock (say from an outbreak of epidemic) adds to the intensity of conflict while increase the share of unhealthy population (and increase utilization of health facility) in a district. [29] This will bias the coefficient estimates on conflict-related variables. Another related concern is a migration bias which arise when most individuals with poor health propensity migrate from high intense areas to low intense areas. In such a case again, we may not be able to obtain an unbiased estimates of the conflict-related variables. In order to confirm that our design is insensitive to these concerns, we further employ 2SLS procedure using area of forest covered by each district as an instrumental variable to correct for endogeneity of conflict variables. Most empirical literature on Nepalese conflict confirm that area of forest is a strong predictor of Nepalese conflict; in other words, the share of forest area in district is positively correlated with conflict intensity (Do and Iyer [53], Bohara et al. [25] and Menon and Van der Meulen Rodgers [95]). In addition, we also include an indicator of people's health propensity as indicated above: a dummy for chronic disease in the model. This is expected to

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[29]Some districts in the mid and western regions in Nepal are prone to epidemics such as diarrhea. For example, in the year 2009, Jajarkot, one of the mid-west districts in Nepal had an outbreak of acute diarrhea that claimed over 200 people lives and affected more than thousand people. It then spread rapidly to other neighboring districts such as Rukum, Rolpa, Dolpa, Jumla, Dang, Surkhet and Dadeldhura in the mid and western Nepal (see http://www.ifrc.org/ar/noticias/noticias/asia-pacific/nepal/nepal-diarrhoea-outbreak-kills-hundreds/). All these districts were conflict-affected.

take into account the concern about selection in migration based on long - term health status.

In essence, we run both OLS and 2SLS specifications, test whether conflict variable is endogenous and, choose between the specifications based on the test of endogeneity.

3.4   Data

We use a nationally representative household survey data collected as repeated cross sections in the years 1995-96 (NLSS-I), 2003-04 (NLSS-II) and 2010-11 (NLSS-III) covering respectively 2585 (77%), 2712 (70%) and 3828 (65%) rural households respectively. Out of 75 districts, sixty-nine effective districts are used in the regression analysis since remaining districts were not surveyed in one or the other rounds (see Figure 3.2). Likewise, out of total of 15740, 15533 and 19,171 rural observations respectively in NLSS-I , NLSS-II and NLSS-III, the survey reports responses of health-specific questions (in the health section of the questionnaire) respectively from 14684, 14527 and 19054 individuals. This means about 6 to 7 percent of health related observations are missing each from NLSS-I and NLSS-II and about 1 percent is missing from NLSS-III. Further, we also exploit the rural community data of these surveys which provides detailed account of the quality of services provided by the local health facility including staffing and medicine supplies. There are information of total of 755 rural communities in the survey: 210, 226 and 319 respectively from NLSS -I, NLSS-II and NLSS-III. Of these, about 12 percent of the rural community data from NLSS-I report missing values on health quality indicators

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in the local health facilities. We address the first sampling issue about missing health observations in household data in section 3.7 and the second sampling issue about missing health quality observations in community data in section 3.6.[30]

The household surveys ask questions relating to the incidence of chronic disease, the present health status and the details of any illness or injuries in the last one month of the survey. Of particular interest to us are the latter two types of information: the present health status which is the subjective measure of health status and the illness or injuries in the last one month which is the objective measure of health status. We choose the latter because the baseline survey does not ask the self-perceived subjective health status question. [31] The types of illness reported in the survey include diarrhea, dysentery, respiratory disease, malaria, cold/fever/flu, skin disease, tuberculosis, measles, jaundice, parasites, injury and others.

The questions relating to health consultations and visit to the health facility are asked only to those individuals who reports that they have been ill in the last one month. The choice of health care provider includes GHFs like health post (HP), sub-health post (SHP), primary health care center (PHCC), hospital, mobile clinic and Ayurveda center;and private facilities like pharmacy, clinic, hospital, health worker's home and others.

We use the visit to the GHFs as our measure of institutional health service utilization. This is because of two reasons. First, our rural community survey collects data only from local public facilities. As such, we can explicitly observe the differential effects of improvement in quality of health services in public facilities arguably associated with

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[30]Since NLSS II was conducted during the conflict period, we take note of the concern that the data collected from some war intense districts may have some quality issues. Hatlebakk [72] negates this concern as the finding shows data quality to be consistent between the first two surveys (that is, NLSS I and II) as well as between Maoist affected and non-affected districts.

[31]It might also be useful to look at the self-assessed subjective measure of health status since studies have shown this to be a highly predictive of future mortality in population studies (Chen et al. [39]).

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heterogeneous levels of exposure to conflict. [32] Second, public providers are the main health providers in rural areas (Rous and Hotchkiss [123]). Private providers are mostly pharmacies (see Appendix Figure B.2 for the case of Nepal) normally selling medicines without prescription and in some cases without registration (Miller and Goodman [96], Wachter et al. [141] and Omaswa [110]). [33] As we see later, we also consider the supply of PHFs in our econometric model in order to test the sensitivity of our main results.

The conflict data is obtained from Human Rights Year Book at INSEC Nepal (http://www.insec.org.np/victim/) (Informal Sector Service Center [79]). It provides district level information of the conflict related deaths, disappearances and injuries right from the beginning of the conflict in 1996. We measure conflict intensity at the district level calculated as the number of conflict-related deaths between 1996 and 2004 (up to the end of April 2004, the month second survey ended) normalized by population in the year 1991. [34] We obtain data on proportion of district under forest area for March 2001 from Japan Forest Technology Association. Finally, data on number of health facilities damaged at district level is obtained from the Community Welfare and Study Centre (Dhakal [52]).

[Figure 3.2 about here]

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[32]This is also plausible as the the supply of public health facilities have remained fairly constant whereas number of private providers have grown remarkably over the period of our study (Hotchkiss [76]) (see Appendix Figure B.1).

[33] Basu et al. [20] show that most patients appear visiting private health care provider in developing countries because of the inclusion of unlicensed and uncertified health care providers such as drug shop owners within the definition of private sector, otherwise majority still visit public health facilities.

[34]Since population in year 2001 is affected by the conflict itself, we choose a pre-conflict population from the population census 1991 (Central Bureau of Statistics [31]) Not including death reports between 2004 and 2006 do not change our results remarkably since the district-variation in conflict intensity are identical irrespective of whether deaths thereafter are accounted for (see Appendix Figure B.3) and also that the conflict did not escalate after 2003 as was in pre-2003 levels (see Figure 3.1).

Table 3.1 summarizes the descriptive statistics of the variables used in the econometric model by year of survey and areas of conflict intensity. High-intensity areas are defined as areas with conflict intensity values greater than median and low-intensity areas are defined as areas equal to median or lower intensity values.

[Table 3.1 about here]

The pre-conflict differences in both the health status and utilization are smaller than during the conflict and post-conflict periods. The mean difference in poor health status in 1995 is 0.01 which increases by four-folds in 2003 (0.04) and two-folds in 2010 (0.02). This indicate that less (more) people in high-intensity regions reports poor health status (better health) than the people in low-intensity areas over time. However, this difference is not much stronger in the post-war period. We observe similar pattern in GHF utilization. In the pre-conflict period, relatively lower number of people utilize the facility in the high-intensity areas. Over time, however, utilization increases in the high-intensity areas than low-intensity areas. The mean difference in utilization is larger in post-war period (0.14) than during the war period (0.10). These figures suggest that the effects of conflict may not always be disruptive as is generally expected.

Landholdings in high-intense areas are larger in the baseline which decline more rapidly in the subsequent years as compared to the low-intense areas. In contrast, the consumption expenditure per capita, which reflects the household economic well-being, is higher in low intense areas. The age and gender statistics are comparable in both the areas. While prevalence of chronic disease is higher in conflict intense areas in the baseline, it tends to equalize in the subsequent years.

Household head characteristics such as gender, age and marital status are also identical in both the areas. Household heads without education are larger in conflict intense areas. There are more high caste residents i.e, Brahmin and Chettri in conflict intense areas. So far as an accessibility to the nearest health facility is concerned, conflict intense areas are farther in baseline with significant improvements in subsequent years. This may be because of the Health policy 1991 and the Eighth Five Year Plan (1992-1996), when there was an extensive construction of new public health facilities in rural areas (Hotchkiss [76]).

3.5   Results

Table 3.2 and Table 3.3 present the OLS and second stage of 2SLS estimates exploiting continuous measure of treatment —conflict intensity —for identification respectively of health status and utilization. OLS I control time dummies only whereas OLS II additionally control for $X_{i,j,t}$ covariates. Likewise OLS III further control for district fixed effects. The latter do not report conflict intensity coefficients since they are absorbed into district fixed effects. Similarly, 2SLS I does not include district fixed effects whereas 2SLS II does.

We compare OLS and 2SLS results for health status and utilization. The test of endogeniety of the conflict variables shows that there is no serious concern about endogeneity after district fixed effects are controlled for. The test results show that we fail to reject the null hypotheses that the conflict intensity variables (interacted with survey year dummies) are exogenous (see p-values in 2SLS II both in Table 3.2 and Table 3.3). Clearly when district fixed effects are not accounted for as in 2SLS I, the decision rule tend to reverse; that the

null hypothesis would now no longer be accepted (i.e the conflict-related regressors are endogenous). In such a case, we lose precision if 2SLS is preferred over OLS. Although 2SLS results largely confirm the OLS results in that both health status and utilization are positively associated with conflict intensity, based on the results about the test of endogeniety as discussed above, we choose OLS III as our preferred specification for further interpretation and analysis. [35]

Table 3.2 indicates that there is only short-term positive effects on health status. In the medium-term, although there is a positive association but the effects are weaker. One standard deviation increase in conflict-related casualties is associated with approximately 4 percentage point improvement in the health status in the short-term. Similarly, regression results for health facility utilization in Table 3.3 show results consistent with those for health status in Table 3.2 except that we also observe medium-term effects on utilization. The results show that conflict and health care utilization are positively associated indicating improvement in health care seeking behavior, both in the short and medium-term. One standard deviation increase in conflict-related casualties is associated with about 12 percentage point increase in health facility utilization in both the periods.

[Table 3.2 about here]

Our results show that conflict is associated with better health status since it encourages seeking of modern health care as against the established notion that it deteriorates public

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[35]We show the first stage results of 2SLS in Appendix Table B1. We also report the full results of the preferred specification OLS III in Appendix Table B2. In order to confirm that our chosen instruments are excluded from the second stage of 2SLS, we re-run the 2SLS specification with additional instruments: district level historical literacy rates in 1971 interacted with survey year dummies. The literacy rates are obtained from the population census 1971 (Central Bureau of Statistics [30]). The Hansen J-stat for the test of over-identification confirm the validity of the chosen instruments (see Appendix Table B3).

health due to the disruption of health facility utilization. In the next section, we discuss the possible channels relevant to the context of Nepalese conflict which justify the positive association between conflict and health. We also provide empirical evidence about the channels discussed.

Now before moving on to the next section, we discuss the effects of other variables considered in the econometric model on the health-related measures as shown in Appendix Table B2. The time trend variables depict poor health status and lower utilization of health facility. This suggest that the individual health status and health care utilization are closely related. It may be the case that the poor health is associated with lower health care seeking habits.

So far as demographics are concerned, growing age is associated with better health status initially which later deteriorates, thus exhibiting non-linear relationship. We do not find any effect of individual age on health care utilization. This indicates that the age has no specific role to direct health care seeking decisions; an individual visits the health facility conditioned on the severity of illness and the opportunity cost of seeking care. The comparison of the coefficients on age-squared between the health status and utilization reveal the phenomenon related to severity of illness; not necessarily all old age people reporting illness visit the health facility. This may be because many do not perceive themselves as seriously ill. Regarding the opportunity cost of seeking care, this is evident from the fact that no other socio-demographic variables except for household caste (such as income, wealth, gender, household head characteristics , household size) has effect on utilization while the travel time to the closest health facility has a negative effect. Health status, on the other hand, is affected by education, household size and household head characteristics. These characteristics taken together explain the general health environment and

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the hygiene-related practices of the household. For example, household with educated head (here reference category, a secondary graduate head) may have high health and hygiene standards. Hence, individuals from these households are more likely to report better health status.

[Table 3.3 about here]

Taken all the later set of evidence in the last paragraph together, we can infer that health status depends upon broader range of individual and household characteristics that nurture the household health environment whereas the utilization of health care is explained by limited set of characteristics such as the severity of illness and the opportunity cost of seeking health care.

3.6   Mechanisms

In this section, we discuss the possible mechanisms that may have resulted into positive association between conflict and health. One most plausible way is to test the association between conflict and health service delivery. Another direct channel of disruption may be through the damage to health facilities. Figure 3.3 shows how these channels link conflict to health.

[Figure 3.3 about here]

The first channel is expected to clear the confusion with regards to the "disruption vs. policing" dilemma; whether the Maoist disrupted the service delivery or they instead

monitor the operation of health facilities. We therefore regress conflict variables on health quality indicators: hours of operation of health facilities (Column 1), availability of staffs (measured as hours available per week (Column 2), number of staffs present in health facility at the time of survey (Column 3), proportion of staffs present to total sanctioned (Column 4) and supply of medicines (Column 5). The regression results in Table 3.4 provide no evidence of disruption on healthy facility operating hours and the supply of medicines. Surprisingly, we find strong evidence of the higher presence of health staffs in the health facility in conflict intense areas. One standard deviation increase in conflict intensity is associated with the presence of approximately one additional health staff. Similarly, the staff attendance ratio (proportion of health staffs presence) is also higher by about 8 and 6 percentage points respectively during the conflict and post - conflict regime. We also find some evidence of health staffs working longer hours in conflict intense areas, at least during the conflict regime.

[Table 3.4 about here]

The second channel tests if damage to the health facilities, calculated as log of number of health facilities damaged per district, inflicts disruption in conflict intense areas. The regression results in Table 3.5 show that the damage had no effect on health status as well as on the health facility utilization except for a worsening but weak effect on health status in the medium-term. This weaker or zero effect is however not a surprise since the aggregated measure of conflict intensity at district level may not be as precise as the dis-aggregated measure at the local level: say at Village Development Committee (VDC) or ward level. Health facility destruction, like schools, may be construed as a rare and isolated aspect of conflict with a potential of having large impact at the local level but

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not at the district level (Valente [140]). Eighty-five HPs were reported destroyed: this accounts for 2.5 percent of the total local public facilities in Nepal (Upreti [139]). [36]

[Table 3.5 about here]

These results confirm that the policing hypotheses is true suggesting that the Maoists monitor the operation of health facilities particularly the presence of health staffs. This is consistent with the argument put forward by Devkota and van Teijlingen [50] and Singh [129] that the Maoists may have implicitly followed their norms of not disrupting the public service delivery and that they policed health staffs' absenteeism. One facility based survey also show that in the high conflict zones, 90 percent of staff positions were filled in the local health facilities (Devkota [49]). It might however be more surprising to observe that this policing last longer well beyond the period of conflict in the post-conflict regime; it may be possible that the community may have taken up the policing job thereafter. As mentioned earlier, the conflict - hit communities experience a surge in political awareness mostly among women (Geiser [60], Manchanda [91], Pettigrew and Shneiderman [111], Eck [56] and Pyakurel [117]). Hence, it might have also improved the people's health care seeking behavior from modern health facilities.

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[36]To our understanding, this might not also be a serious concern since the positive effects of conflict we find would have offset the negative effect of the destruction of facilities (if conflict also picks up the effect of the destruction) and therefore the estimates can be taken as a lower bound of positive estimates.

3.7 Robustness

3.7.1 Selective migration

As discussed earlier in section 3.3, people with poor health propensity may move out from high conflict intensity areas to low intensity areas. This self-selection into migration may bias our results. The 2SLS process discussed above may not completely eliminate the bias. We therefore do further robustness test where we restricted our sample only to individuals who have never migrated from the district of their residence and to those who completed their migration history before the onset of the conflict. We find that there is no case of selective migration as can be seen in Table 3.6.

[Table 3.6 about here]

3.7.2 Alternative measures of conflict intensity

There may be a measurement error in the construction of conflict intensity variable since the number of conflict-related deaths may be higher than those accounted by INSEC in its books. In response, we use alternative measures of conflict intensity to confirm that measurement error does not bias our results although the measures proposed may not be as precise. We use number of people who were disappeared and those who were handicapped (per 1000 district inhabitants) due to the conflict normalized by district population as alternative measures of conflict intensity. We also use the Government classification of Maoist controlled district as an additional measure (see Hatlebakk [72]). This classification also indicate the extent of Maoist influence in the particular district. Table 3.7 shows

that, in overall, results from alternative measures are consistent with the main results suggesting that measurement error is less likely a problem.

[Table 3.7 about here]

3.7.3   Availability of private health facility

People in less conflict intense areas may visit PHFs since relatively more private providers are available in such regions. As discussed earlier, our measure of health care utilization does not consider any visit to private providers in rural areas as institutional because of their informal nature. This may have resulted into lower utilization of institutional health care (that is GHF) in less conflict intense areas vis-à-vis high conflict intense areas as suggested by regression results in Table 3.3. To confirm that our main results are stable, we control for the number of PHFs available at community level. Although we find that the availability of private providers significantly reduce the visit to the public facilities, our main results remain stable as shown in Table 3.8.

[Table 3.8 about here]

3.7.4   Missing health observations

As reported earlier, there are about 6 to 7 percent of missing health observations each in NLSS-I and NLSS-II and about 1 percent is missing from NLSS-III. If missing observations systematically differ between the high and low conflict zones, the regression results

may be biased. For example, if there are many missing observations in conflict intense areas most of which have poor health status, we may wrongly attribute better health status to the conflict. In order to test the sensitivity of the results, we regress a dummy for missing observations on conflict intensity, other household and individual controls, and zonal fixed effects separately for three survey rounds. This is because the DID specification may not be a reasonable approach to estimation when baseline observations also report missing values. Regression results in Table 3.9 confirm that the missing observations are randomly distributed between the high and low conflict zones in the first and the third survey rounds. In the second round, however, the coefficient on conflict intensity is negative and statistically significant at 10 percent level. This implies that, conditional on other covariates, people from high conflict zones are less likely to report missing health observations. This indicates that the results are not driven by sample selection bias.

[Table 3.9 about here]

3.8   Conclusion

In this study, we investigate the effect of armed conflict on individual health status and the institutional health service utilization in Nepal. We employ difference-in-difference approach to estimation to compare the effects in the conflict and post-conflict regime with effects in the no-conflict regime. We find that the conflict is associated with the positive health outcomes including improvements in health care seeking behavior. We find that the conflict primarily has only short-term effect to better health status but has both short term and medium-term effects on the health care seeking behavior. We attribute these

positive effects of conflict on health to policing of health staffs by Maoist during the conflict regime. In the post-conflict regime, community may have become aware so that they are conscious about their health needs and hence demand quality health care in the local facilities.

There are two important takeaways from this study: First, Maoist conflict changed the cultural norms of the people in rural Nepal with regards to the health care seeking behavior in particular. Availing health services from modern facilities is still not customary in large part of the remote areas. They now understand the relative merits of visiting health facility rather than relying on traditional health practices such as faith healing or simply choosing not to seek health care. Second, the policing of health facilities by Maoist and the consequent improvement in health quality may provide a competitive feat/edge to the government suggesting that they should follow the suit to ensure qualified health service.

Chapter 4

Do Poor Benefit from Free Health Care Policy?

4.1 Introduction

One of the effective ways to close the gap in health inequality is to improve an access to health care and reduce the financial risk associated with its utilization. This is warranted since the poor are more vulnerable to health shocks. Likewise, health outcomes also tend to be lower among the poor. One of the several reasons to worse health outcomes is that the poor make the least utilization of effective health interventions although several strategies are in place to raise their rate of utilization (O'Donnell [107]). There are however several demand and supply side constraints that limit the utilization of health care thus resulting into poor health outcomes. On the supply side of health services, resource availability and its appropriate allocation, and the quality of health services are important determinants while on the demand side, factors limiting the ability to consume such as income, prices

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of health care and travel cost, and those lowering willingness to consume such as culture, knowledge about the potential benefits from health care and the quality of care are the major determinants.

The important one of many strategies to raise the utilization of health care services is the financial intervention which can relax the resource-constrained household by augmenting their affordability to purchase appropriate health care services (O'Donnell [107] and Jacobs et al. [80]). Removal of user fees, free essential drugs, price subsidies to the targeted group and health insurance coverage are some examples of financial interventions. Cash incentive to cover the cost of travel is also important to attract the distant dwellers to the health facilities. This has a particular relevance in developing countries where health facilities are usually located in the town or village centers with only sparse road networks linking them to the rural communities.

This chapter analyzes the impact of universal free health care policy on public health facility utilization and on health spending at the facility. The main research question we ask is whether the policy has been pro-poor and who among the 'poor' benefit from the policy in particular. GoN introduced free health care policy in 2008 where EHCS including some essential drugs are provided for free to all the citizens. However, poor are the primary target of the policy. Several years since the introduction of free care policy, there is no empirical evidence suggesting whether the policy has been pro-poor. We are therefore interested to assess the effect of policy on the utilization of the public health facility and potential relaxation of financial strain.

In our setting, we apply DID method to the data obtained from the second (before i.e., 2003) and third (after i.e., 2010) rounds of NLSS. We show that the common trend assumption is satisfied and further relying on the common independence assumption, we

estimate the impact of the free health care policy. For the assignment of treatment and control group, we attribute household poverty to its human capital endowment. There are vast array of literature including in Nepal confirming that human capital measured in terms of educational attainment of the household head is a major predictor of household poverty (Dev Bhatta and Sharma [48], Grootaert [64] and Mukherjee and Benson [101]). In this study, we therefore consider household head education as a potential source of inequality. [37] Accordingly, we consider the household with head having lower than secondary education as low-endowment household (treatment group) and those having completed secondary education as high-endowment household (control group). The former also includes household without any formal education.

We also develop a theoretical model for the choice of health care provider as a foundation to empirical model. We demonstrate how people at various levels of income distribution in the rural households respond to the introduction of free health care policy. Accordingly, we also conduct heterogeneous analysis by further dividing the low-endowment households into three sub-categories: primary graduate (Endowment level III or upper-middle endowment group); less than primary graduate (Endowment level II or lower-middle endowment group); and no education (Endowment level I or the lowest endowment group). Endowment level IV or the highest endowment household has the head who have completed secondary education.

We find an overall increase in health care utilization by the low-endowment households.

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[37]Non-monetary or long-run indicators of inequality such as health and education provide additional information on distribution of well-being beyond what the monetary indicators or short-run indicators such as consumption and income do. Although both monetary and non-monetary indicators are important measures of socio-economic status as they capture important dimensions of inequality in outcomes, monetary indicators tend to be downward biased often by a substantial margin (Rama et al. [120]). Non-monetary indicators reflect dispersion in human capabilities which can affect individual's abilities to do what they value doing and to convert different means into well-being (Sen [124, 125]).

Further investigation by various endowment categories shows results that are not contradictory to the theoretical prediction. In particular, we find that the increase in utilization is significant among the population with lower-middle endowment. We find that the utilization is relatively less significant among the lowest and the upper-middle endowment groups. Further, there is evidence that the highest endowment cohort would continue visiting PHF. Longer waiting hours and the poor quality of health services in GHF may have induced better-off to seek health care from the private ones whereas lack of knowledge about the intervention as well as of the benefits from treatment may have impeded the poorest people's responsiveness to the policy. The latter is very much in line with the notion that the effective interventions are least utilized by the poor (O'Donnell [107]). Further, we do not find evidence of reduction in health spending at public facility. This reiterates the findings from previous studies that the patients still need to make further consultations at private facilities including the purchase of drugs. In some cases, patients may also have to pay informal fees to the service providers (Hotchkiss et al. [77] and Rous and Hotchkiss [123]).

Our study is related to the strands of literature on assessment of association between the abolition of user fees and health care utilization. Most of such studies are carried out in Africa. Lagarde and Palmer [86] and Ridde and Morestin [122] review those studies and conclude that utilization has generally improved particularly among the poor. However, results for the health care expenses are mixed. In Uganda and Ghana, for example, the expenses are still being borne by the patients as unofficial fees charged by the health workers (Kajula et al. [83], Witter et al. [143] and Yates et al. [157]). There are reports of people visiting private services when resources such as drugs become unavailable in the public sector (Kajula et al. [83] and Nabyonga-Orem et al. [104]). In some cases, the health expenditure is shown to be increased after abolition (Deininger and Mpuga [44]).

Further breakdown by socio-economic category reveals that the health expenditure has instead decreased for the non-poor than poor in some cases (Asante et al. [17], Deininger and Mpuga [44] and Xu et al. [155]). However, most of these studies are based on time trend comparison before and after the policy. They do not have a treatment and comparison group so that an average change in the health outcomes can be observed between these groups before and after the policy.

Few empirical studies evaluate the causal impact of the policy using well-defined treatment and control group (Ansah et al. [11], Chen et al. [39] and Powell-Jackson et al. [114]). Chen et al. [39] investigate the causal impact of Taiwan's National health insurance program on the utilization of health care and health status of elderly people in Taiwan. They find pro-poor increase in health care utilization but no effect on one-year mortality rate (objective measure of health status) as well as on self-reported health status (subjective measure of health status). Similarly, Ansah et al. [11] and Powell-Jackson et al. [114] use randomized experiment to divide the population of interest into treatment and control group in Ghana. They also find increase in utilization but find no effect on health outcomes on the intervention population taken overall. Further, they find that health spending reduced particularly among the rich people.

This chapter contributes to the literature in following ways: first, unlike several papers that base their findings on time trend comparison as discussed above, we exploit a DID framework with a properly defined treatment and comparison group. In addition, our treatment and control groups are defined based on long-run indicator of inequality: human capital endowment. Second, we also assess the association of policy with the utilization of PHF. It is important to consider private health care since free public care has a potential to induce competition in health care market. Besides, there is also growing number of

evidence in developing countries suggesting that the existence of private provider reduces public care utilization. This is despite the fact that public care is either free or highly subsidized (Borah [26]). We thus develop our theoretical (and econometric) model as a standard "choice of health care provider" problem. Third, our focus is on universal free care policy in Asia where limited attempts have been made to empirically analyze the effects of such policies.

The rest of the sections are organized as follows: section 4.2 provides the institutional background related to the health care system in Nepal. We also discuss inequality in health care utilization in Nepal in this section. Section 4.3 sets theoretical framework for the study. Section 4.4 discusses the empirical strategy of the study. Section 4.5 discusses data used. Section 4.6, section 4.7 and section 4.8 respectively presents the result, discusses the results and conducts some sensitivity checks of the results obtained. Section 4.9 concludes.

4.2   Institutional background

4.2.1   Health care system

There are five levels of public health care available in Nepal. At the lowest level, each village has one SHP and is usually headed by an auxiliary health worker. HPs, a cluster of 3 to 5 SHPs, operate at Ilaka Level[38] and is headed by the health assistant. SHPs and HPs are responsible to cater to the primary health care needs of the local population. PHCC, on the other hand, is the highest level of health institution at the local level and

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[38]A cluster of four to five VDCs is defined as an ilaka.

has a medical doctor as its in-charge. In addition to the basic health care services, PHCCs also provide facilities for minor surgeries. District, zonal and regional hospitals cater to the secondary health care needs of the people with more specialized services. Central hospitals provide the highest level of health care often referred to as tertiary care. They deal with complicated cases in curative care services. There are 2127 SHPs; 1689 HPs; 207 PHCCs; 85 district, zonal and regional hospitals; and 8 central hospitals (Ministry of Health and Population/Nepal [99]).

4.2.2 Free essential health care services

The OOP expenditure on health in Nepal accounts for more than 60 percent; this is one of the highest OOP in the world (Shrestha et al. [128]). With an initiative to provide access to EHCS particularly to the poor, the GoN introduced a phase-wise free health care programs from the later part of the last decade. The service began with the provision of free services to the targeted groups such as poor and vulnerable at PHCCs and district hospitals. It was later extended to all the citizens in 2008; in addition, utilizing the lower levels of health system such as HPs and SHPs (see Figure 4.1). This exempts all the citizens from paying the registration, outpatient, emergency and inpatient services and some listed essential drugs in the GHF.

[Figure 4.1 about here]

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4.2.3 Inequality in health care access and utilization

Despite extensive construction of new public health facilities between 1992 and 1996, there is still a wide disparity in health care access in Nepal. As Table 4.1 show, only 48% of the household live within half an hour distance from the nearest public facility. This disparity is wider in rural areas than in urban areas (38% vs. 67%). There was no significant addition to health facilities after 1997. Likewise, the quality of health services provided by public facilities is poor. This is because the expansion of health facilities were not matched by corresponding expansion of health workforce and medical logistics (Rai et al. [119]).

[Table 4.1 about here]

Let us now discuss utilization of public care by people of various socioeconomic statuses. We show the utilization pattern both by consumption quartile and household head education.[39]

[Figure 4.2 and Figure 4.3 about here]

Figure 4.2 and Figure 4.3 show utilization pattern of public health facility utilization respectively by household consumption quartile and household head education. The pattern revealed by these figures are consistent. They show that the utilization of public health facilities have generally declined between 2003 and 2010; we observe only marginal increase in utilization respectively among the second quartile and less than primary graduate

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[39]We shown in Appendix Table C1 that the household head education approximates household's consumption standards.

cohorts. These figures suggest that free health care has been less effective to draw people to the health facilities. This may be due to people's growing preference towards the private care. Another possible explanation may be lower level of awareness about the policy that may have induced low utilization among the lowest endowment cohorts.

[Figure 4.4 about here]

We can better observe inequality in health care utilization using the concentration curve as shown in Figure 4.4. The curve in year 2003 overlaps with the line of equality indicating less or no inequality at the baseline. However, the curve tends to lie marginally above the line of equality in 2010 indicating that the poor have now more access to public health facility but not as pronounced. These results suggest somewhat a different findings. Hence, in order to confirm the validity of these findings, it is important to conduct regression analysis controlling for several observed and unobserved characteristics at individual, household and district level. The empirical analysis helps us observe the direct effects of the policy on health outcomes considered in the study. This further guides policymakers formulate health policy based on robust set of evidence.

4.3   Theoretical framework

An individual derives utility from the non-negative consumption of goods ($C \geq 0$) and the quality of health care ($H \geq 0$) such that the utility function is given by $U(C, H)$. Assumption is that the utility is concave, continuous and increasing in C and H. We consider three choices of health care: private health care (H_1); government health care

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(H_2); and no care (H_3). The price and quality of public care is determined by the policy and is therefore exogenous to the individual. However, an individual can choose among the various qualities of private care at their given prices. [40]

The indirect utility by choosing private care will be:

$$v^{pvt}(Y, p_1) = U(Y - p_1 H_1^*, H_1^*) \tag{4.1}$$

The indirect utility by choosing public care will be:

$$v^{pub}(Y, P_2) = U(Y - P_2, H_2) \tag{4.2}$$

The indirect utility without health care will be:

$$v^{nocare}(Y) = U(Y, 0) \tag{4.3}$$

where, Y is the disposable income of the individual, p_1 is the price of private health care and P_2 is the user fee (including diagnostic and drug fees) in the public facilities. The quality of health care in case of no health care H_3 is normalized to zero. The quality of public care is assumed to be positive $(H_2 > 0)$. H_1^* is the optimal level of private health care obtained by solving the following utility maximization problem.

$$\begin{aligned} \underset{H_1 \geq 0}{\text{maximize}} \quad & U(C, H_1) \\ \text{subject to} \quad & Y = p_1 H_1 + C \end{aligned} \tag{4.4}$$

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[40]We draw our theoretical framework based on Gutiérrez and Tanaka [66].

Solving this maximization problem yields the optimal level of private care $H_1 = H_1^*(Y, p_1)$ and the private care indirect utility function can be written as $v^{pvt}(Y, p_1)$ as stated in Equation 4.1.

Under the above assumptions about $U(.)$, the function $H_1^*(Y, p_1)$ is continuous and increasing in Y and so are v^{pub}, v^{pvt} and v^{nocare}. The induced utility function is $W(Y, p_1, P_2) = max\{v^{pub}, v^{pvt}, v^{nocare}\}$ which is continuous and increasing in Y. Hence the individual will choose whether to seek health care or not, and to which type of health care, to maximize $W(Y, p_1, P_2)$.

[Figure 4.5 and Figure 4.6 about here]

Figure 4.5 demonstrates the three (indirect) utility functions for private, public and no care. Depending upon the level of income and the price of the care (other things remaining the same), people will choose among the health providers. If $Y < Y^{min}$, an individual will maximize $W(Y, p_1, P_2)$ by choosing not to seek any care. Utility maximization requires choosing public care for any level of income Y between Y^{min} and Y^{max} i.e., $Y^{min} < Y < Y^{max}$. Similarly, individuals with income Y greater than Y^{max} will be better off by choosing private care $(Y > Y^{max})$.

Next we investigate the effects of removal of user fees in the GHF. In Figure 4.6, the utility function from public care $v^{pvt}(Y, P_2)$ shifts upward to $v^{pvt}(Y, P_2 = 0)$ if care is available for free in government health facilities. This will increase Y^{max} to Y'^{max} and reduce Y^{min} to Y'^{min} indicating some switch respectively from the private care and no care to the public care.

A people in very low income group (say very poor) and those in the high income group (say very rich) may remain unresponsive to any reduction or removal of user fees in public health facilities (the health care demand in public facilities may be inelastic at very low income and at very high income ranges). In Figure 4.6, people with income $Y < Y'^{min}$ will still maximize $W(Y, p_1, P_2)$ by choosing no care and those with income $Y > Y'^{max}$ by choosing private care. A former group may yet find indirect cost (such as travel cost, opportunity cost etc.) high enough to access the health care whereas very rich people find any reduction in price of public health care low enough (a very small increase in real income of the very rich people) to change their decision to seek public care (given that the health benefits from perceived quality of private care is always higher). Asymmetric information about the availability of free care in public facilities among the very poor may also explain the low utilization of government health facilities by these people.

4.4 Econometric model and estimation strategy

We propose econometric model and estimation strategy as explained in the succeeding sub-sections.

4.4.1 Choice of health care provider

We use DID strategy for both health-related specifications considered in the study. As already mentioned, our outcomes of interest are utilization of GHF and health spending at the facility. Since free health care induce competition into the health care market, we also introduce visit to the PHF in the econometric model. The model then becomes a standard

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"choice of health care provider" model. We utilize multinomial logit model for estimation purpose which is illustrated below. [41]

$$H_{i,h,t}^{*k} = \beta_1^k + \beta_2^k L_{h,t} + freecare_t + \beta_2^k L_{h,t} * freecare_t$$
$$+ \beta_3'^k X_{i,h,t} + \pi_j + \nu_{i,h,t}^k, t = \{2003, 2010\} \tag{4.5}$$

and

$$H_{i,h,t}^k = 1 \quad \text{if} \quad H_{i,h,t}^{*,k} \geq H_{i,h,t}^{*,k'} \quad \forall k' \tag{4.6}$$

where $H_{i,h,t}^{*k}$ is alternative-specific utility of individual i living in household h at time t. $H_{i,h,t}^k$ is a categorical variable denoting the choice of health care provider k chosen by the individual i. An individual can either choose to visit between public ($k = 1$) and private ($k = 2$) health facilities, or may choose not to visit the health facility i.e., no consultation ($k = 3$). $L_{h,t}$ is a treatment dummy for low-endowment households, as defined in section 4.1. Hence, in our setting high-endowment households are control groups. $freecare_t$ is a dummy for observations from year 2010, the year after the introduction of free care policy.[42] $L_{h,t} * freecare_t$ is an interaction term between treatment household L_{ht} and a free health care dummy $freecare_t$. The coefficient of the interaction term β_3 yields the effect of the free care policy. $X_{i,h,t}$ represents vector of other individual and household characteristics. This will be explained in the data section. π_j is the district fixed effects which accounts for the time-invariant district level characteristics such as the level of health awareness and health infrastructure set up. $\nu_{i,h,t}^k$ is a random error term which

---

[41]We also show the results from OLS and Probit Model.

[42] $freecare_t$ may also capture the time trend implying that the effect of any other policy changes concurring with free health care between 2003 and 2010 and having an effect on health facility utilization and health expenditure made. We will show in the robustness section that the time trend in our design captures none other than the free health care policy.

changes across alternative k and individual i. We cluster it at household level to allow for arbitrary correlation within household.

The endogeniety of indicator of low-endowment category $L_{h,t}$ may be a concern for identification since it may be systematically correlated with some unobserved individual or household characteristics. Since household head education is predetermined, it is arguably exogenous to the action of household members, to define the endowment cohorts. This argument however may not be valid if most household members assume the role of heads in the household. In our data, fourteen percent of household members reporting illness in the survey are household heads. We are further aware that the unobservable household head characteristics might also be correlated with the health care seeking behavior of the household members. We assume that such correlation exists only indirectly. Also, we exploit district fixed effects in the model so that any concern about district level unobserved heterogeneity affecting both the household endowment and the health outcomes is corrected.

The major concern regarding the use of multinomial logit model is that the IIA assumption may not be satisfied. This requires that there is no systematic change in the coefficients if one of the choice categories in $H_{i,h,t}^{k}$ is excluded from the model. In response, we test whether the IIA is violated following Hausman and McFadden [73] procedure.

4.4.2 Health expenditure in government health facility

To understand the effects of policy on the health expenditure in GHF facility, it is important to correct the sample selection bias. Since we observe the health expenditure of only those individuals who report consultation, it may be the case that the error terms $\nu_{i,h,t}^{k}$ in

the selection Equation 4.5 and $\epsilon_{i,h,t}^{k}$ in the outcome Equation 4.7 are correlated. In such a situation, selection is on unobservable. In order to address this sample selection issue, we first run a selection equation (in our case, a multinomial logit model) for the choice of health care provider, derive correction terms and then run an outcome equation (in our case, OLS) for the health expenditure using the correction terms as explanatory variables. The health expenditure at GHF equation is:

$$
\begin{aligned}
Lillexp_{i,h,t} &= \alpha_1 + \alpha_2 L_{h,t} + freecare_t + \alpha_2 L_{h,t} * freecare_t \\
&+ \alpha_3^{'} X_{i,h,t} + \pi_j + \epsilon_{i,h,t}, t = \{2003, 2010\}
\end{aligned}
\tag{4.7}
$$

$Lillexp_{i,h,t}$ is a log of illness expenditure spent by individual i at GHF. Other terms on the right hand side are defined as in Equation 4.5.

We employ a variant of Dubin and McFadden [55] method of correcting sample selection. Bourguignon et al. [28] show that the variant is based on less restrictive assumptions and therefore outperforms even those of Lee [89] and Dahl [43]. Here, assumption is such that $[\epsilon_{i,h,t}|L_{h,t}, X_{i,h,t}] = \gamma^{'}\lambda_{i,h,t}$, where $\lambda_{i,h,t}$ is dependent on estimated choice probabilities derived using a multinomial logit model and γ is a vector the components of which are proportional to the correlation between $\epsilon_{i,h,t}$ and the error terms of the choice equation. Here, we relax the assumption that γ sums to zero. We then proceed to correct the sample selection bias by adding a correction term $\hat{\lambda}_{i,h,t}$ which is an estimate of $\lambda_{i,h,t}$ into Equation 4.7 as follows:

$$
\begin{aligned}
Lillexp_{i,h,t} &= \alpha_1 + \alpha_2 L_{h,t} + freecare_t + \alpha_2 L_{h,t} * freecare_t \\
&+ \alpha_3^{'} X_{i,h,t} + \pi_j + \gamma^{'}\hat{\lambda}_{i,h,t} + \epsilon_{i,h,t}, t = \{2003, 2010\}
\end{aligned}
\tag{4.8}
$$

where we need to estimate γ in Equation 4.8. For this, we need at least one variable which primarily affects the choice of health care provider given by Equation 4.5 but not the amount of health expenditure given by Equation 4.8. We choose subjective measure of self-reported health status as an excluded variable in the outcome Equation 4.8. We assume that, conditional on covariates denoted by $X_{i,h,t}$, self-reported health status determines whether or not the individual make health consultation and the choice of health care provider but does not directly affect the amount of health spending. Further, inclusion of consumption expenditure per - capita in the health expenditure equation may also induce reverse causality in that it may be simultaneously determined with the health expenditure. We show that our results are robust when the consumption variable is not included as an explanatory variable in the equation.

4.4.3 Heterogeneous analysis by endowment categories

The theoretical model presented above motivates us to classify treatment households (low-endowment) into further sub-categories to analyze how individuals from various socio-economic backgrounds respond to the free health care policy. Thus, our choice of health care provider model we next estimate is as follows:

$$
\begin{aligned}
H_{i,h,t}^{*,k} = \beta_1^k + \sum_{s=1}^{n-1} \beta_2^{k_s} l_{h,t}^s + freecare_t + \sum_{s=1}^{n-1} \beta_3^{k_s} l_{h,t}^s * freecare_t \\
+ \beta_4^{'k} X_{i,h,t} + \pi_j + \nu_{i,h,t}^k, t = \{2003, 2010\}
\end{aligned}
\tag{4.9}
$$

and

$$
H_{i,h,t}^k = 1 \quad \text{if} \quad H_{i,h,t}^{*,k} \geq H_{i,h,t}^{*,k'} \quad \forall k' \tag{4.10}
$$

where, $l_{h,t}^s$ are categorical variables for the levels of endowment s possessed by the household. We further categorize low endowment households $L_{h,t}$ as follows: no education=1, less than primary graduate=2 and primary graduate=3. We consider high endowment household as a base category (secondary graduate=4). Hence $s = 1, 2, 3,$ and4. As already mentioned, we refer to these respectively as "Endowment level I", "Endowment level II","Endowment level III" and "Endowment level IV" implying progressively larger human capital endowment. $\sum_{s=1}^{n-1} \beta_2^{k_s} l_{h,t}^s * freecare_t$ are interaction terms between each endowment categories $\sum_{s=1}^{n-1} \beta_2^{k_s} l_{h,t}^s$ and a free health care dummy $freecare_t$. The coefficients of these interaction terms $\beta_3^{k_s}$ give the effect of the free care policy, as perceived by individuals possessing various levels of endowment. Other variables are similar as defined in Equation 4.5 and Equation 4.6.

Similarly, the health expenditure equation with sample selection correction term is expressed as follows:

$$
\begin{aligned}
Lillexp_{i,h,t} = \alpha_1 + \sum_{s=1}^{n-1} \alpha_2 l_{h,t}^s + freecare_t + \sum_{s=1}^{n-1} \alpha_3 l_{h,t}^s * freecare_t \\
+ \alpha_4' X_{i,h,t} + \pi_j + \gamma' \hat{\lambda}_{i,h,t} + \epsilon_{i,h,t}, t = \{2003, 2010\}
\end{aligned}
\tag{4.11}
$$

The right hand side variables are as defined in Equation 4.5 and Equation 4.8.

4.5 Data

We use second and third rounds of NLSS: NLSS-II and NLSS-III in the study, which were collected respectively in 2003-2004 and 2010-2011 following World Bank Living Standard Measurement Survey. We consider only rural households in the study where

majority of the poor population live. Number of rural households in NLSS-II are 2712 with 15,533 observations and in NLSS-III are 3828 with 19,171 observations. There are about 6.5 % missing health observations in NLSS-II and less than 1 % in NLSS-III. We consider these sampling issues in the robustness section.

The household surveys ask questions relating to the incidence of chronic disease, the present health status and the details of any illness or injuries in the last one month of the survey. The questions relating to health consultations and visit to the health facility are asked only to those individuals who reports that they have been ill in the last one month. The types of illness reported in the survey include diarrhea, dysentery, respiratory disease, malaria, cold/fever/flu, skin disease, tuberculosis, measles, jaundice, parasites, injury and others. The choice of health care provider include GHFs like HP, SHP, PHCC, hospital, mobile clinic and Ayurveda center;and private facilities like pharmacy, clinic, hospital, health worker's home and others. The questions relating to health expenses are asked to all those who have had reported illness and had some health consultations. The health expenses are reported for diagnostic cost, medicine cost and travel cost.

[Table 4.2 about here]

Table 4.2 summarizes the data used in the econometric model by year of survey and the household endowment, the later measured in terms of household head education. Households with head having completed secondary education are referred to as "high-endowment" and households with head having only primary and below education are referred to as "low-endowment".

Before the introduction of free health care, we observe that the visit to the GHF is higher among the high-endowment households. In the post free care regime, although the visit

to the GHF declines for both the groups, this trend reverses in that the visit by the high-endowment households is now smaller. This general decline in the visit to the GHF is induced mainly by the people's growing preference towards the PHF. As we can see that there is no significant difference in visit to the PHF in the baseline. However, after the free health care policy, the comparison of figures reveals that more patients from better-off households visit the PHF than the GHF; increase in utilization of PHF by the high-endowment households is about 2.5 times higher than by low-endowment households. Conversely, decrease in utilization of GHF is about 4 times lower by the high-endowment households. This indicates that the free health care policy has been able to induce utilization of GHF by the poor households.

The simple DID results in Table 4.3 provides further quantitative evidence of the hypotheses that the policy has somehow been able to attract low-endowment households to the GHF. In panel A, we observe that the utilization of GHF by low-endowment households is significantly higher by about 11 points whereas in Panel B utilization of PHF is lower by about 9 points. We also observe that the utilization and health spending are not significantly different between the low and high-endowment households in the baseline, hence satisfying the common trend assumption. In the regression analysis that follows, we consider controlling number of observable individual and household characteristics and district fixed effects. This will further help establish robust association between the choice of health care provider and the household endowment.

[Table 4.3 about here]

Let us now assess what happens with the health expenditure incurred at GHFs. The pre and post free care figures illustrates that the low-endowment households are likely to

spend more on GHFs. After the free health care policy, the low-endowment households spend even more than before whereas high-endowment households spend less. This may be because poor households may still have to pay for the medicines and may as well have to incur high cost of travel. The DID figure in Panel C of Table 4.3 show that the low-endowment households incur higher health expenses but this is not significantly different from the expenses made by high-endowment households. The regression analysis for health expenses provide a robust picture of this association since we consider an econometric framework taking into consideration potentially large number of zeros in health expenditure (particularly in the post free health care regime) and the sample selection issue induced from the selection of sub-sample for whom visit to the public health facility is positive.

The consumption expenditure per - capita is significantly higher among high-endowment households both before and after the free health care policy. However, the inequality in consumption has further narrowed over time between these two groups. We observe that the consumption expenditure of the low-endowment households have increased by about 48 percentage points whereas the same for high-endowment households is only by about 35 percentage points. This may be because of the growth of inward remittances in recent years that has helped narrowed down inequality and reduce poverty (Acharya and Leon-Gonzalez [1]). This increase in purchasing power among the poor households may also explain why these people as well chose to visit the PHF vis-á-vis GHF. As may seem obvious, immovable asset such as landholding size is also bigger for high-endowment households.

So far as demographics are concerned, the figures are comparable between the two groups in age and gender. But the age, marital status and gender of the household head are

different in both periods. The heads in the high-endowment households are relatively younger, more likely to be female and married. There is not much difference in household size. Further, most people belong to high ethnic groups in high-endowment households and most untouchables and indigenous castes belong to low-endowment households. The former are also more likely to live near the health facilities. The inequality in access to the health facility in terms of distance to the closest health facilities have not changed over time for both the groups. The average time taken for the high-endowment household is about 39 minutes whereas for the low-endowment household is about 55 minutes.

Finally, there is no significant difference between the prevalence of chronic disease between the two groups.

4.6   Results

Table 4.4 presents the estimation results based on Equation 4.5. Column (1) and (2) show the multinomial logit results respectively for the utilization of GHF and PHF. No consultation is a reference category. Likewise, we also report results using alternative specifications for GHF utilization: OLS in column (3) and probit in column (4).

Results from regression analysis confirm the simple DID result in Table 4.3. The multinomial logit results show that the utilization of GHF increase among the treatment cohorts. We find that the utilization is higher by 11 percentage points. The OLS and Probit results respectively in column (3) and column (4) are consistent with the multinomial logit results in column (1). This finding indicates that the individuals from low-endowment households benefit from the free care policy. Conversely, we observe that there is a decrease in utilization of PHF by these individuals. However, the coefficient is marginally significant

at 10.2 percentage level. Alternatively, this suggests that high-endowment households increase the utilization of PHF.

The coefficient on free care dummy is negative and significant for GHF utilization whereas it is positive and significant for PHF utilization. This shows that, over time, people prefer private care over public care. As already suggested, private facility is usually characterized by quality health care and therefore any presence of private care in the community will significantly reduce the visit to the GHF. This is also evident from Table 4.4 which shows that there is a significant increase in PHF utilization and the decline by about similar magnitude in GHF utilization, when private facility exists.

[Table 4.4 about here]

The results further show that other household and individual characteristics do not affect the utilization of GHF except for age of an individual and household ethnic background. Utilization of health facility decrease with age of an individual. So far as ethnicity is concerned, we observe that *Newar* and *Indigenous Castes* are less likely to visit GHF as compared to the high caste *Brahmin* and *Chettri*. On the other hand, PHF utilization is higher among *Terai Middle Castes* and the *Muslim* communities.

From the coefficients on time taken to closest health facility both for GHF and PHF, it is revealed that the PHF is closer to the communities than the GHF. This is unsurprising result for Nepal where only 38 percent of rural population live within 30 minutes distance from the closest GHF as reported in Table 4.1. Likewise, private care mostly pharmacies open retail outlets in rural communities thus making access easier (see Figure B.2).

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[Table 4.5 about here]

We next discuss the results of heterogeneity analysis by endowment categories given by Equation 4.9. Table 4.5 exhibits that the individuals from all low-endowment households categories increase the utilization of GHF. A closer examination of the statistical significance shows that coefficient on endowment level II is significant at 5 percent level whereas coefficients on endowment levels I and III are significant only at 10 percent level. This suggests that the utilization by individuals in the poorest cohort is not as much effective; however the magnitude of coefficients on utilization are not statistically different between the cohorts. Roughly speaking, these results do not contradict with the theoretical prediction in section 4.3 particularly with respect to the effectiveness in utilization of the free care policy by different socio-economic groups. We predicted that the policy is less effective to the poorest (corresponding to endowment level I) and the richest households (corresponding to endowment level IV) whereas the policy is effective mostly to the middle - income households particularly to those at the lower end of endowment distribution (corresponding to endowment level II).

[Table 4.6 about here]

Table 4.6 presents the results for health expenditure given by Equation 4.8. We find that there is no effect of free health care policy on health expenditure. Although the sign of the coefficient is negative for the treatment group interacted with free care dummy for which we observe significant increase in public facility utilization, it is insignificant. The results in column (2) using correction method proposed by Lee [89] confirms the results in column (1) based on correction method proposed by Bourguignon et al. [28]: they show

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that the policy is not effective to reduce the OOP spending in public health facilities. Our regression results do not change when we use endowment categories in health expenditure equation given by Equation 4.11 (see Appendix Table C2).

4.7 Discussion

Our results confirm the notion that the policy is less effective to induce utilization of health facility among the poorest households. Several empirical studies have documented that effective utilization of the intervention by poor are lower than non-poor. This may be because they are least aware of the interventions made and the potential health benefits from the health care utilization (O'Donnell [107]). Benefit incidence analysis of the public health spending in Nepal also shows that the poorest get less than 10 percent of the total health spending (Filmer [59] and O'Donnell et al. [108]). Some qualitative studies conclude that the poorest households are usually unaware of the policy so that their utilization of the health facility is limited (see for e.g., Prasai [115]). On the other hand, richer people may want to avoid overcrowding in the public health facilities by seeking private care, so that they enjoy quality health service.

[Figure 4.7 about here]

Similarly, results of health expenditure corroborate with the previous findings that people do not experience any decline in OOP in public facilities. There may be several reasons to this effect. First, the registration fee is usually nominal in pubic care. Any reduction or abolition of such fees will have least impact on reduction in OOP. Second, OOP in public

care is higher than those in private care (Hotchkiss et al. [77] and Rous and Hotchkiss [123]). This indicates that the patients bear high OOP in public facilities since they need to buy drugs from private pharmacies. Our survey shows that the medicine expenditure constitutes 76 and 62 percent of total health expenditure respectively in 2003 and 2010 as shown in Figure 4.7. This suggests that only few patients are provided with free drugs from GHF under the free policy regime. Remaining still need to purchase from the private pharmacies. Third, patients may have to pay informal fees to the public health provider (Banerjee et al. [18]). By resorting to informal payments, patients can avoid queuing up and receive full benefits of free care including free drugs. In Nepal, average consultation expenditure (in real terms) increased by more than double between 2003 and 2010. Also consultation expenditure constitutes 14 percent and 26 percent of total health expenditure respectively in 2003 and 2010. This is despite consultation is free at GHF under free care policy regime, suggesting informal payments in public facilities. Fourth, high cost of travel is also one of the reasons justifying no reduction in OOP spending in health in the post-policy regime. The mean travel costs are 96 and 94 Nepalese rupees respectively in the years 2003 and 2010.

4.8 Robustness

We carry out a robustness test to confirm that our main results are driven by the free health care policy. We use rural household survey data from NLSS-I and NLSS-II which were collected respectively during years 1995-1996 and 2003-2004. The results from placebo test in Table 4.7 show that the coefficients on the interaction terms between low-endowment and free health care variables are insignificant. This imply that the health care seeking behavior of these people remain unchanged between 1995 and 2003, the period

where there was no financial intervention through free health care policy. This suggests that our main results for health care utilization in Table 4.4 are driven by the free health care policy introduced in 2008.

[Table 4.7 about here]

Likewise, we are also concerned about the missing health observations primarily in NLSS-II since this may be systematically different across households with various endowment levels. If this is true, the regression results may be biased. In response, we rerun the DID specification Equation 4.5 with the dependent variable as a dummy for missing health observations in NLSS-II and NLSS-III. We find that the missing observations are not significantly different between the high and low-endowment households as shown in column (2) of Table 4.7. We also carry out the regression analysis separately for NLSS-II and the test for missing health observations is still robust (see Appendix Table C3).

Finally, our regression results on health expenditure are robust even after excluding consumption expenditure per capita from the Equation 4.8 for the issues of reverse causality (see column (1) in Appendix Table C4). Similarly, our results are also robust to the use of Heckman [74, 75] method of correcting sample selection bias (see column (2) in Appendix Table C4).

4.9   Conclusion

In this chapter, we assess the impact of free health care policy on health facility utilization and health expenditure. GoN introduced the policy in 2008. We use nationally

representative household survey data collected during years 2003-2004 and 2010-2011. Our estimation strategy is based on DID method where we analyze how people from different socio-economic background respond to the introduction of free care policy. We find that the utilization of free care increase among the low-endowment households. The heterogeneity analysis by endowment categories further reveals that the utilization by lower-middle endowment is highly significant. We find relatively weak (or relatively less significant) effect of policy on utilization by the poorest endowment cohort and those at the higher end of endowment distribution. Further, we do not find any effect of policy on the health spending at GHF.

This paper has policy implications. GoN recognizes that financial intervention by reducing user fees is important to induce patients to seek for modern care. But it is also important to increase awareness particularly among the poor people about the intervention and the benefits of seeking modern health care. Further, sustainability of such interventions is questionable since we do not find effect of policy in reducing OOP. Free medicines are usually out-of-stock and people have to buy from private pharmacies. Besides, informal payment to health providers and high cost of travel are other important concerns. This will incentivize patients to bypass public care and visit private care which affords better quality of service at similar or lower cost. Hence, it may be important to design some alternative financing strategies such that the poor people bear the least economic burden from the illness of any kind. Also close monitoring of the availability and distribution of drugs in the health facilities and of the informal payments made to the health providers are important to ensure that the needy and poor do not buy drugs from private pharmacies.

Chapter 5

Conclusion and implications

In this dissertation, we explore the microeconomic consequences of migration and armed conflict on two major indicators of human capital: education and health. In addition, we also seek to answer the question whether the free EHCS that the GoN introduced in 2008 has been pro-poor with respect to health care utilization and health expenditure.

5.1   Summary

In chapter 2, we illuminate on another facet of migration largely unexplored in the region: parental absence. We assess the causal effects of the parental absence on educational investment of children left behind. By using the data from the latest round of NLSS and applying two-step estimation method, we find that parental absence has disruptive effects on both school enrollment and educational expenditure. We also find the disruptive effects in case of non-parental absence but such effects are weaker or non-significant. We also show that remittances have positive effect on educational investment.

In chapter 3, we explore the causal impact of civil conflict on individual health. There are now number of studies investigating the effects of conflict on educational attainment of children. To the best of our knowledge, we are the first to empirically investigate the effect of conflict on individual health status and health facility utilization. By using three rounds of NLSS data and applying a DID strategy, we find improvement in health status and increase in health facility utilization in high-conflict intense areas. We provide supportive evidence about this positive association between conflict and health. We show that increase in quality of health service particularity the higher presence of health staffs in conflict intense areas have contributed to this positive conflict-health association. Past evidence supporting this finding suggests that the Maoist police the operation of health facilities in their stronghold areas. They require that the health staffs should present in the health facility and provide services for longer hours.

In chapter 4, we explore the impact of free health care policy on health facility utilization and health spending at GHF. This is the first empirical study in Nepal to assess the relevance of the policy to targeted groups particularly the poor. By using later two rounds of NLSS data and applying a DID strategy, we find an overall increase in health care utilization by individuals from lower socio-economic backgrounds. In particular, we find a significant increase in utilization among the people with lower-middle socio-economic statuses whereas those with the poorest status is not significant as much. Better-off still prefer to visit the PHF. With regards to OOP spending in GHF, we find that the policy is ineffective to reduce it.

5.2 Policy recommendations

Based on the findings from the study above, we briefly review the policy recommendations:

In chapter 2, we recommend the adoption of selective policy that encourages households to send non-parents rather than parents as migrants. Likewise, counselling sessions for less educated mothers is helpful to clarify them the value of and returns to education. Special programs for young children to revive their educational aspirations are also important.

In chapter 3, we recommend that the government monitors the operation of health facilities if they intend to achieve their goal of raising the utilization rate particularly of public health facilities. This has an effect of improving the quality of health services in the rural communities.

In chapter 4, we recommend that the government devises alternative financing strategies and supportive measures so that the free health care policy can effectively reaches out to the poorest sections. Besides, it may also be helpful to ensure that the drugs are adequately supplied to health facilities and that the listed drugs are provided for free to the needy. Informal payments to health providers also require close monitoring.

Appendix A

Annex to Chapter 2

A.1 Construction of the weighted cost of travel

In this appendix, we provide further details on the construction of the cost of travel. The Department of Transport and Management in Nepal only recently began to document bus fare information and make it publicly available. Therefore, in areas with good road networks, we use the latest bus fare information to calculate the weighted cost of travel to the nearest Indian border and to Kathmandu. In hilly or mountainous districts lacking good road networks, we use the airfare between district airports (or the nearest airport in the neighboring district) and the airport district with the nearest Indian border (or neighboring airport district). If the airport is in another district and not in the district with the nearest Indian border, we add the bus fare from the airport district to the border district to the airfare. Similarly, we use the airfare information from airports in those hilly and mountainous districts to Kathmandu airport to calculate the cost of travel from each district to

Kathmandu. The formula used for the calculation is

$$W_j = w_j^d * \frac{\sum_{i=1}^{N} TC_{ij}^d}{N} + w_j^e * \frac{\sum_{i=1}^{N} TC_{ij}^e}{N} \tag{A.1}$$

where W_j is the weighted average cost of travel in district j. w_j^d and w_j^e are the proportions of domestic and external migrants from district j, respectively. TC_{ij}^d and TC_{ij}^e are the cost of travel to Kathmandu and to the nearest Indian border, respectively deflated to the year in which absentee i left the household in district j and N is the total number of absentees in district j.

TABLE A1: Regression estimates for first stage 2SLS: education expenditure

Variables	Parental Migration	Non-Parental Migration	Log of Remittance
Predicted parental migration	1.119***	0.0.093	10.54***
	[0.081]	[0.088]	[0.970]
Predicted non-parental migration	0.498***	0.976***	11.88***
	[0.105]	[0.125]	[1.236]
Village financial network	-0.008**	-0.002	0.111*
	[0.004]	[0.005]	[0.0573]
Household assets	Yes	Yes	Yes
Parents' education	Yes	Yes	Yes
Household (head) and child characteristics	Yes	Yes	Yes
Community level characteristics	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes
Observations	7,807	7,807	7,807
R-squared	0.387	0.145	0.330
First Stage F-stat	70.25	27.07	65.41

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include the child's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE A2: Instrumental variable estimates with remittance dummy

Variables	School Enrollment=1	Log of Education Expenditure
Parental migration	-0.374**	-2.446**
	[0.164]	[1.234]
Non-parental migration	-0.265	-1.654
	[0.178]	[1.331]
Remittance receipt (=1)	0.479**	3.417**
	[0.234]	[1.670]
Household assets	Yes	Yes
Parents education	Yes	Yes
Household (head) and Child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	5.788	4.480
Kleibergen-Paap F Stat	2.669	2.206
Stock - Yogo critical value	NA	NA
Observations	8671	7807
R-squared	-0.115	-0.106

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE A3: Falsification test: Selection Equation

Variables	Parent	Non-Parent
Log of cost of migration	-0.233**	-0.043
	[0.112]	[0.085]
% Change in UR at destination (2008-2009)	-3.474***	-2.280***
	[0.908]	[0.765]
Village financial network	0.429***	0.150***
	[0.059]	[0.039]
Household assets	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
Region fixed effects	Yes	Yes
Observations	8,617	8,617
Hausman test for IIA [P-Value]	0.00[1.00]	0.00[1.00]

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Variables	Parental Migration	Non-Parental Migration	Log of Remittance
Predicted parental migration	1.174***	0.147	11.034***
	(0.107)	(0.110)	(1.316)
Predicted non-parental migration	0.736***	0.856***	12.060***
	(0.134)	(0.145)	(1.552)
Village financial network	-0.016***	-0.000	0.064
	(0.004)	(0.006)	(0.059)
Household assets	Yes	Yes	Yes
Parents' education	Yes	Yes	Yes
Household (head) and child characteristics	Yes	Yes	Yes
Community level characteristics	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes
Observations	8,617	8,617	8,617
R-squared	0.367	0.131	0.333
First Stage F-stat	44.08	16.37	47.37

Clustered standard errors in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include the child's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE A5: Falsification test: Main Results

VARIABLES	School enrollment	Log of education expenditure
Parental migration	-0.426***	-2.245**
	(0.166)	(1.057)
Non-parental migration	-0.163	-0.813
	(0.157)	(1.026)
Log of total remittances	0.037**	0.237**
	(0.017)	(0.102)
Household assets	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	10.089	8.720
Kleibergen-Paap F Stat	4.447	4.208
Observations	8,617	7,807

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE A6: Test of Exclusion Restriction

Variables	School Enrollment=1	Log of Education Expenditure
Parental migration	-0.404***	-2.064**
	(0.155)	(0.980)
Non-parental migration	-0.229	-0.839
	(0.140)	(0.856)]
Log of total remittances	0.039**	0.213**
	(0.016)	(0.097)
Household assets	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	8.551	7.569
Kleibergen-Paap F Stat	3.869	3.699
Stock - Yogo critical value	NA	NA
Hansen J-stat [p-value]	0.766	0.221
Observations	8617	7807
R-squared	0.062	0.258

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: In second step 2SLS, parental migration, non-parental migration and remittances are instrumented with predicted parental migration, predicted non-parental migration, village financial network and normalized rainfall in year 2008. The normalized rainfall is the village level variation in the deviation of rainfall in the year 2008 from the historical average spanning 1970-2005. Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE A7: Regression estimates for parental absence due to all reasons

Variables	School Enrollment=1	Log of Education Expenditure
Parental absence	-0.223***	-1.052**
	(0.074)	(0.490)
Non-parental absence	-0.119	-0.928*
	(0.082)	(0.856)]
Log of total remittances	0.025**	0.179***
	(0.010)	(0.067)
Household assets	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	20.460	18.236
Kleibergen-Paap F Stat	9.189	8.856
Observations	8617	7807
R-squared	0.215	0.325

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Parental absence includes parent absent for all the reasons including work, study, divorce, missing and death. Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Appendix B

Annex to Chapter 3

FIGURE B.1: Supply of government health facilities (in units)
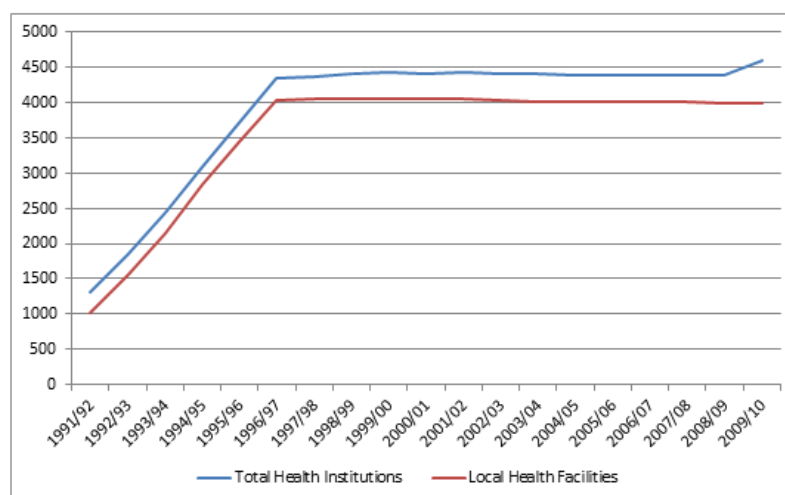
Source: Ministry of Finance, Various Issues. Note: Health institutions comprises all the government agencies that provides health services to the general public including hospitals, health centers, health posts, ayurvedic center, Sub-health posts and Primary health centers. Local health facilities include health posts; sub-health posts and primary health centers which are regarded as the first contact points for health services in local communities.

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FIGURE B.2: Supply of health providers in rural areas (in 1995, 2003 and 2010)
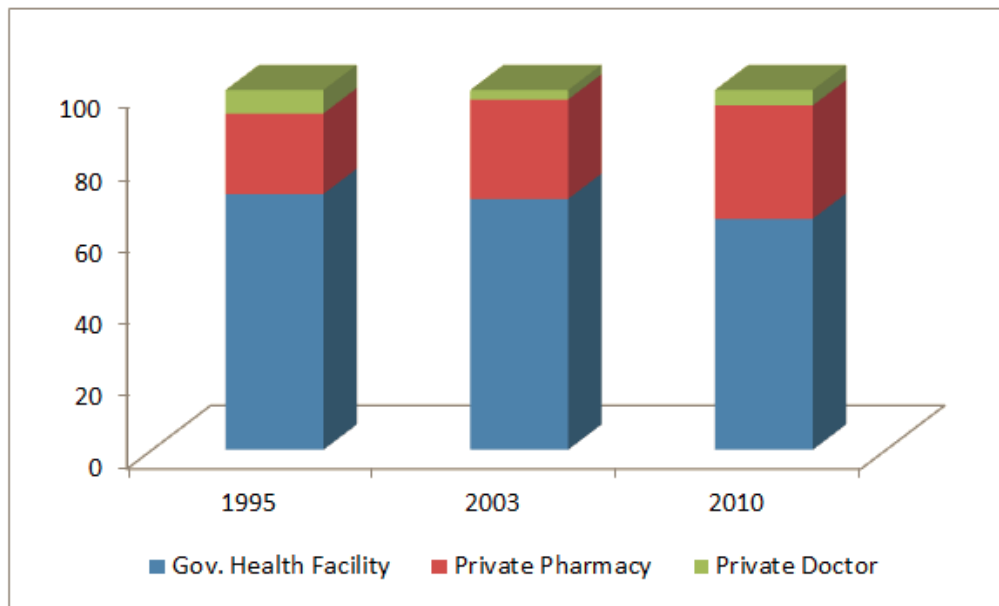
Source: Central Bureau of Statistics [32, 34, 35]

FIGURE B.3: Conflict intensity between 1996-2004 and 1996-2006 by district codes arranged in ascending order
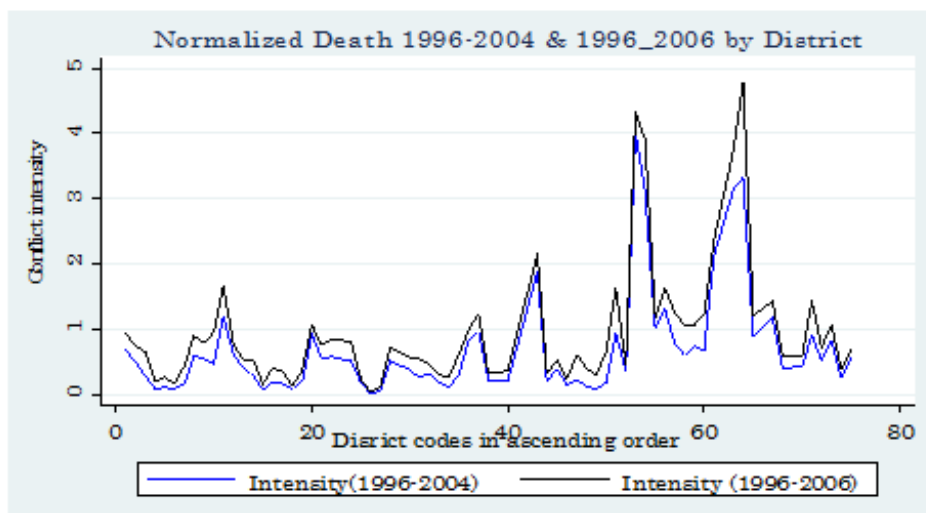
Source: Central Bureau Of Statistics/Government of Nepal, 1992 & INSEC, 2016)

TABLE B1: First stage of 2SLS estimates

Variables	Poor Health Status Equation		Utilization Equation	
	Conflict Intensity * Year 2003	Conflict Intensity * Year 2010	Conflict Intensity * Year 2003	Conflict Intensity * Year 2010
Normalized forest area	1.668***	-0.064	1.112***	0.544
* Year 2003	(0.409)	(0.047)	(0.205)	(0.336)
Normalized forest area	0.049	1.874***	-0.025	1.889***
* Year 2010	(0.039)	(0.513)	(0.019)	(0.468)
Other Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes
Survey Year Fixed Effects	Yes	Yes	Yes	Yes
First Stage F-stat[p-value]	14.06[0.00]	6.70[0.00]	15.10[0.00]	15.65[0.00]
Observations	48,265	48,265	7,231	7,231
R-squared	0.554	0.537	0.687	0.557

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility

TABLE B2: Full Regression results for health status and health facility utilization

	OLS	
Variables	Poor Health Status (=1)	Utilization (=1)
Conflict Intensity*Year 2003	−0.0512***	0.144**
	(0.0138)	(0.0711)
Conflict Intensity*Year 2010	-0.0117	0.147***
	(0.0138)	(0.0230)
Log of Consumption Expenditure	0.0292***	0.0223
Per Capita (in Rs.)		
	(0.00578)	(0.0174)
Log of Landholding (in hectares)	-0.00792	-0.00704
	(0.00629)	(0.0233)
Year 2003[a]	0.0254	−0.144***
	(0.0155)	(0.0383)
Year 2010	0.0596***	−0.197***
	(0.0113)	(0.0296)
Age	−0.00411***	-0.00113
	(0.000377)	(0.000895)
Age Squared	$5.87e-05$***	6.53e-06
	(4.92e-06)	(1.31e-05)
Male (=1)	-0.00121	-0.00740
	(0.00346)	(0.0107)
Head no education[b]	0.0244**	0.0418
	(0.0104)	(0.0326)
Head less than primary	0.0212*	0.0224
	(0.0120)	(0.0328)
Head Primary Graduate	0.0238**	0.0364
	(0.0115)	(0.0282)
Age of HHD	-0.00110	-0.00261
	(0.000833)	(0.00280)
Age squared of HHD	4.09e-06	2.47e-05
	(8.30e-06)	(2.78e-05)
Household Size	−0.00620***	0.00270
	(0.000786)	(0.00389)
HHD Male (=1)	−0.0207***	0.00995
	(0.00713)	(0.0176)
HHD Married (=1)	0.0126*	9.63e-06
	(0.00747)	(0.0249)
Newar[c]	0.0242	−0.105***
	(0.0150)	(0.0346)
Dalits	0.00957	0.00638
	(0.00771)	(0.0210)
Terai Middle Caste	0.00458	-0.0454
	(0.0111)	(0.0302)
Other Castes (Janajatis & others)	-0.0110	−0.0575**
	(0.00664)	(0.0223)
Chronic Disease (=1)	0.103***	0.00328
	(0.00810)	(0.0167)
Log of time taken to reach to	0.00507*	−0.0444***
the nearest health facility (in minutes)		
	(0.00258)	(0.00835)
District FE	YES	YES
Observations	48,265	7,231
R-squared	0.040	0.078

Notes:*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Note: a. Base year 1995. b. Base education is head secondary graduate. c. Base caste is Brahmin Chettri. Standard errors clustered at district level.

TABLE B3: Regression results for health status and health facility utilization (Exclusion restriction)

Variables	Poor Health Status (=1)	Utilization (=1)
Conflict Intensity*Year 2003	−0.081***	0.157
	(0.0311)	(0.097)
Conflict Intensity*Year 2010	-0.036	0.178***
	(0.0226)	(0.047)
Survey Year Fixed Effects	Yes	Yes
Other controls	Yes	Yes
District Fixed Effects	Yes	Yes
KP rK Wald F Stat	5.12	5.07
Stock-Yogo critical values		
15% maximal IV size	9.93	9.93
Hansen J-stat (p-value)	0.882	0.964
Observations	48,265	7,231
R-squared	0.031	0.025
Endogeneity Test (p-value)	0.369	0.719

Notes:*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Conflict intensity (interacted with year dummies) instrumented with normalized forest area and literacy rate in 1971 (interacted with year dummies). The endogeneity test is like C-statistics obtained by using endog option in ivreg2 command. Unlike Durbin-Wu-Hausman tests, this option reports test statistics robust to heteroskedasticity. Null hypothesis is that the conflict-related regressors are exogenous. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility.

Appendix C

Annex to Chapter 4

TABLE C1: Household head education and consumption levels

Household head education	Real consumption per capita (in '000 NRs.)	
	Year 2003	Year 2010
No education	17.28	24.25
Less than primary graduate	19.38	26.29
Primary graduate	23.78	33.94
Secondary graduate	39.10	47.14

Notes: t —test of all consumption expenditures are significantly different from zero at 1 percent level of significance. Also test for equality of four group means for each surveys also support this result. Source: Central Bureau of Statistics [34, 35]

TABLE C2: Regression estimates for health expenditure in government health facility with sample selection correction (by endowment categories)

Sample selection correction method	(1) Bourguignon et al. [28]	(2) Lee [89]
	Log of health expenditure in GHF	
Endowment level I	0.585	0.246
	(0.563)	(0.425)
Endowment level II	0.772	0.290
	(0.788)	(0.578)
Endowment level III	0.429	0.210
	(0.598)	(0.517)
Endowment level I *Free care	0.0640	0.180
	(0.845)	(0.726)
Endowment level II* Free care	-0.541	0.296
	(1.171)	(0.893)
Endowment level III* Free care	0.0100	0.274
	(0.909)	(0.814)
Other controls	Yes	Yes
Free care dummy	Yes	Yes
District fixed effects	Yes	Yes
Sample correction term	Yes	Yes
Observations	5,756	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level and bootstrapped with 100 replications. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. We also include a dummy for individuals suffering from chronic disease.

TABLE C3: Test for missing observations for NLSS-II

Variables	Missing health observation =1
Low-endowment	0.002
	(0.120)
Other controls	Yes
District fixed effects	Yes
Observations	15,533
R-squared	0.10

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level. Estimation based on OLS. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility.

TABLE C4: Regression estimates for health expenditure in government health facility

	(1)	(2)
	Log of health expenditure on GHF	
Sample selection correction method	Bourguignon et al. [28]	Heckman ML
Low-endowment	-0.498	0.438
	(0.642)	(0.487)
Low-endowment*Free care	0.053	-0.037
	(1.006)	(0.698)
Consumption exp. per capita	No	Yes
Other controls	Yes	Yes
Free care dummy	Yes	Yes
District fixed effects	Yes	Yes
Sample correction term	Yes	Yes
Observations	1,663	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level and bootstrapped with 100 replications in column (1). Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. We also include a dummy for individuals suffering from chronic disease.

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TABLE 2.1: Proportion of international migrants and percentage change in unemployment rates by destination

Destination Country	International Migrants (%)	Change in Unemp. Rate (2008-2009)
India	45.23	-0.05
Bhutan	0.04	0.05
China	0.37	0.00
Bangladesh	0.22	0.14
Hong Kong	1.25	0.44
Malaysia	9.46	0.12
Japan	0.81	0.25
Saudi Arabia	8.87	0.06
Qatar	11.74	0.00
United Arab Emirates	3.83	0.05
United kingdom	3.17	0.44
United States	3.42	0.59
South Korea	0.52	0.12
Australia	2.10	0.33
Israel	0.52	0.23
Other countries	8.47	0.11

Notes: Some villages report no international migrants. We estimated the missing unemployment rates of villages as the predicted values obtained by regressing the observed unemployment rates on district level geographic characteristics (hill, mountain, plains, maximum elevation, area of forest normalized by area of district), socio-economic characteristics (such as Human Development income index 2001, length of road normalized by area of district, literacy rate, and infant mortality rate) demographic characteristics (such as caste), political characteristic (such as number of people killed during the state-Maoist conflict between 1992 and 2006 normalized by population of the district) and the region fixed effects. District level data for elevation, forest area, road, literacy rate, caste and number of people killed in conflict are obtained from Do and Iyer [53]. For other countries, we use the world aggregate of the unemployment rates. Source: Central Bureau of Statistics [35] and World Bank [147].

TABLE 2.2: Descriptive statistics for children by migration status, 5-16 years-old

Migrants	All		Parent		Non-Parent		No	
VARIABLES	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Dependent Variables								
School Attendance (dummy)	0.91	0.29	0.93	0.25	0.89	0.32	0.90	0.30
Male	0.92	0.28	0.94	0.24	0.90	0.30	0.91	0.28
Female	0.89	0.31	0.93	0.26	0.87	0.33	0.89	0.31
Total Education Expenditure (in 000 NRs.)	6.82	11.13	6.34	9.90	4.18	9.10	6.81	12.15
Male	6.61	11.60	7.00	10.60	4.55	7.99	7.37	12.14
Female	5.56	11.18	5.65	9.08	3.81	10.10	6.26	12.14
HHD Characteristics								
HHD Head age	43.99	12.22	42.25	13.73	47.57	12.50	43.18	11.28
Male HHD Head (dummy)	0.74	0.44	0.30	0.46	0.72	0.45	0.90	0.30
HHD Size	6.16	2.70	5.84	3.37	6.40	2.90	6.17	2.33
Number of children aged less than 5	0.52	0.80	0.60	0.88	0.60	0.87	0.46	0.74
Total number of students	2.75	1.43	2.53	1.28	2.29	1.24	2.45	1.30
Father education-Primary and more (dummy)	0.52	0.50	0.68	0.47	0.37	0.48	0.52	0.50
Mother education-Primary and more (dummy)	0.22	0.42	0.29	0.45	0.14	0.34	0.23	0.42
Caste								
Brahmin chettri (dummy) (Ref.cat)	0.31	0.46	0.34	0.48	0.27	0.45	0.32	0.47

Terai Madhesh Other Caste	0.13	0.34	0.12	0.33	0.12	0.33	0.14	0.35
Hill dalit (dummy)	0.10	0.30	0.11	0.32	0.11	0.32	0.09	0.28
Terai dalit (dummy)	0.04	0.20	0.02	0.15	0.04	0.20	0.05	0.21
Newar (dummy)	0.07	0.25	0.04	0.19	0.05	0.21	0.08	0.27
Hill janajati (dummy)	0.22	0.41	0.21	0.41	0.25	0.43	0.21	0.41
Terai janajati (dummy)	0.07	0.26	0.09	0.29	0.08	0.28	0.06	0.24
Muslim (dummy)	0.05	0.22	0.05	0.22	0.07	0.25	0.04	0.21
Other castes (dummy)	0.01	0.08	0.00	0.05	0.00	0.05	0.01	0.10
Children's Characteristics								
Age	10.61	3.41	10.13	3.42	10.99	3.42	10.63	3.38
Male (dummy)	0.49	0.50	0.50	0.50	0.50	0.50	0.49	0.50
Son or Daughter of HHD Head (dummy)	0.78	0.41	0.69	0.46	0.73	0.45	0.83	0.37
Grandchildren of HHD Head (dummy)	0.15	0.35	0.24	0.43	0.18	0.38	0.10	0.31
Other relationship to HHD Head (dummy)(Ref.cat)	0.05	0.22	0.07	0.25	0.08	0.28	0.05	0.22
Eldest (dummy)	0.20	0.40	0.22	0.41	0.16	0.37	0.21	0.41
Middle order (dummy)	0.32	0.47	0.30	0.46	0.34	0.47	0.32	0.46
Youngest (dummy)	0.40	0.49	0.39	0.49	0.41	0.49	0.39	0.49
Singleton (dummy)(Ref.cat)	0.09	0.28	0.09	0.28	0.09	0.29	0.09	0.28
Household assets								
Value of durable assets (in 000 NRS)	106.72	292.72	92.61	136.54	95.15	271.51	115.83	334.92
Livestock units (in Tropical livestock unit)	1.96	2.08	1.74	1.77	2.58	2.49	1.80	1.95

Landholding size (in hectares)	0.97	2.17	0.88	1.58	1.18	2.82	0.91	2.04
Electricity(dummy)	0.67	0.47	0.72	0.45	0.63	0.48	0.68	0.47
Household remittance (in 000 NRS)	39.64	137.25	109.13	208.51	67.24	164.94	6.13	67.15
Community characteristics								
Rural (dummy)	0.73	0.45	0.77	0.42	0.83	0.37	0.67	0.47
Primary school within 30 min. (dummy)	0.06	0.23	0.06	0.24	0.07	0.25	0.05	0.23
Private School within 30 min. from Village Centre (dummy)	0.56	0.49	0.60	0.49	0.48	0.50	0.58	0.49
Village Unemployment rate (2008)	0.03	0.04	0.02	0.04	0.02	0.03	0.03	0.04
Instrumental variables								
Weighted UR at Destination (Village, Change in %)	0.047	0.096	0.035	0.086	0.028	0.080	0.057	0.103
Weighted cost of travel (in NRs)	752.22	1.04	623.45	0.80	796.71	1.09	777.34	1.09
Financial Network (Village, in 000 NRS)	247.21	1301.61	328.54	1605.03	214.44	949.05	233.16	1307.32
Observations	8721		1671		1966		5084	

TABLE 2.3: Selection equation: Multinomial logit model

Variables	Parent	Non-Parent
Log of cost of migration (district) * log of altitude from sea level (village)	-0.023***	-0.016**
	[0.005]	[0.006]
% Change in UR at destination (2008-2009)	-3.047***	-1.062
	[1.155]	[0.980]
Village financial network	0.391***	0.135***
	[0.069]	[0.0405]
Household assets	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Observations	8,617	8,617
Hausman test for IIA [P-Value]	0.00[1.00]	0.00[1.00]

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: No Migration is a reference category. Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE 2.4: Regression estimates for first stage 2SLS: School enrollment

Variables	Parental Migration	Non-Parental Migration	Log of Remittance
Predicted parental migration	1.116***	0.119	10.35***
	[0.079]	[0.091]	[0.982]
Predicted non-parental migration	0.452***	1.006***	11.03***
	[0.100]	[0.125]	[1.265]
Village financial network	-0.007*	-0.002	0.119**
	[0.004]	[0.005]	[0.054]
Household assets	Yes	Yes	Yes
Parents' education	Yes	Yes	Yes
Household (head) and child characteristics	Yes	Yes	Yes
Community level characteristics	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes
Observations	8,617	8,617	8,617
R-squared	0.384	0.143	0.323
First Stage F-stat	75.22	29.09	63.20

Clustered standard errors in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include the child's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE 2.5: Regression estimates for second stage 2SLS

VARIABLES	School enrollment	Log of education expenditure
Parental migration	-0.395**	-2.421**
	[0.156]	[0.724]
Non-parental migration	-0.220	-1.204
	[0.140]	[0.930]
Log of total remittances	0.038**	0.253**
	[0.016]	[0.083]
Number of children aged less than five	0.053***	-0.109**
	[0.009]	[0.054]
Number of students	0.110***	0.042
	[0.007]	[0.045]
Head age	-0.004	-0.003
	[0.002]	[0.015]
Head age squared	4.43e-05*	-1.97e-05
	[2.49e-05]	[0.00]
Head male	0.016	-0.023
	[0.021]	[0.153]

Terai madhesh other Caste	-0.057***	-0.444***
	[0.020]	[0.146]
Hill dalit	0.012	-0.281**
	[0.015]	[0.112]
Terai dalit	-0.143***	-0.706***
	[0.034]	[0.209]
Newar	0.069***	0.155
	[0.019]	[0.131]
Hill janajatis	0.014	-0.196**
	[0.012]	[0.088]
Terai janajatis	-0.001	-0.358***
	[0.019]	[0.121]
Muslims	-0.105***	-0.344*
	[0.026]	[0.183]
Other castes	-0.033	0.151
	[0.047]	[0.367]
Household size	-0.047***	-0.016
	[0.005]	[0.027]
Student age	0.099***	0.262***
	[0.007]	[0.047]

Student age Squared	-0.005***	-0.007***
	[0.000]	[0.002]
Student male	0.022***	0.188***
	[0.007]	[0.039]
Son or daughter of a household head	0.064***	0.196*
	[0.019]	[0.110]
Grandchildren of a household head	0.126***	0.430**
	[0.026]	[0.160]
Eldest son or daughter	-0.067***	-0.239***
	[0.015]	[0.089]
Middle order son or daughter	-0.095***	-0.520***
	[0.016]	[0.096]
Youngest son or daughter	-0.062***	-0.437***
	[0.013]	[0.082]
Father's education (Primary and Above=1)	0.017	0.248***
	[0.013]	[0.085]
Mother's education (Primary and Above=1)	0.009	0.422***
	[0.009]	[0.072]
Log value of durable assets (in 000 NRS)	0.008	0.196***
	[0.005]	[0.037]

Livestock units (measured in Tropical Livestock Unit)	0.001	-0.078***
	[0.003]	[0.0203]
Log of landholding size (in hectares)	-0.002	-0.013
	[0.002]	[0.014]
Electricity (dummy)	0.010	0.111
	[0.014]	[0.089]
Primary school in the locality	-0.019	-0.113
	[0.017]	[0.141]
Private school in the locality	0.022*	0.110
	[0.011]	[0.081]
Rural (dummy)	0.0124	-0.433***
	[0.013]	[0.091]
Unemployment rate	-0.101	2.155**
	[0.154]	[0.982]
District fixed effects	Yes	Yes
Cragg-Donald F Stat	10.773	9.312
Kleibergen-Paap F Stat	4.856	4.542
Stock-Yogo critical values	NA	NA

Observations	8,617	7,807
R-squared	0.075	0.187

Clustered standard errors in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Reference category for is High Caste i.e. Brahmin and Chettri. Reference category is other relationship to the Household Head. Reference category is singleton.

TABLE 2.6: Instrumental variable estimates for child labor

Variables	Child Labor=1
Parental migration	0.432*
	[0.229]
Non-parental migration	0.276
	[0.184]
Log of total remittances	-0.048**
	[0.023]
Household assets	Yes
Parents education	Yes
Household (head) and child characteristics	Yes
Community level characteristics	Yes
District fixed effects	Yes
Cragg-Donald F Stat	9.395
Kleibergen-Paap F Stat	5.031
Stock-Yogo critical values	NA
Observations	7141
R-squared	-0.106

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: A child aged 5 to 14 is considered a labor during the week preceding the survey if (a) he or she is 5 to 11 years old and did at least one hour of economic activity or at least 28 hours of household work, and (b) if he or she is 12 to 14 years and did at least 14 hours of economic activity or at least 42 hours of economic activity and domestic work combined. Household assets include value of durable assets, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

TABLE 2.7: Reasons for dropping out from school by household migration status

Q.Reason for leaving School	Parent-migrated	Non-parent-migrated	No migration
Poor academic progress	45%	41%	32%
Household work	19%	17%	23%
Expensive	6%	11%	7%
Parents unwilling	10%	5%	7%
Paid job	3%	1%	6%
Others	17%	25%	25%

Source: Central Bureau of Statistics [35].

TABLE 2.8: Proportion of primary graduates and secondary graduates by household migration status

Migration status	Proportion of Primary Graduates	Proportion of Secondary Graduates
Parental migration	0.17	0.077
Non-parental migration	0.20	0.079
No migrant	0.27	0.13
Test of means proportion (assuming equal covariance group matrices)		
Wilks Lambda [P-Value]	0.96[0.00]	0.98[0.00]
Pillais trace [P-Value]	0.040[0.00]	0.013[0.00]
Lawley-Hotelling trace [P-Value]	0.041[0.00]	0.013[0.00]
Roy's Largest Root [P-Value]	0.041[0.00]	0.013[0.00]

Note: Test results does not change when we assume unequal covariance matrices. Source: Central Bureau of Statistics [35]

TABLE 2.9: Heterogeneous effects

	Parental Migration	Non-Parental Migration	Log of Remittance
Dependent Variable: School Enrollment			
Gender			
Male	-0.188	0.029	0.021
	[0.161]	[0.131]	[0.017]
Female	-0.49**	-0.405*	0.046*
	[0.228]	[0.234]	[0.025]
Age			
Young (5-10)	-1.177**	-0.704*	0.115**
	[0.474]	[0.362]	[0.049]
Old (11-16)	-0.030	-0.014	-0.001
	[0.111]	[0.117]	[0.012]
Mother's education			
Educated mother	-0.082	-0.046	0.009
	[0.092]	[0.095]	[0.009]
Uneducated mother	-0.275	-0.153	0.028
	[0.210]	[0.169]	[0.025]
Dependent Variable: Log(Education Expenditure)			
Gender			
Male	-1.338	-0.701	0.156
	[1.107]	[0.834]	[0.110]
Female	-3.320**	-2.447	0.353**
	[1.497]	[1.536]	[0.158]
Age			
Young (5-10)	-3.555*	-2.373	0.335
	[2.118]	[1.611]	[0.219]
Old (11-16)	-1.788**	-0.459	0.237***
	[0.742]	[0.760]	[0.079]
Mother's education			
Educated mother	-1.208	-1.760**	0.184**
	[0.787]	[0.769]	[0.081]
Uneducated mother	-2.03*	-0.724	0.241
	[1.185]	[1.215]	[0.158]

Clustered standard errors in brackets

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

TABLE 3.1: Summary statistics by high and low conflict intensity (1995, 2003 & 2010)

Survey Years	1995		2003		2010	
VARIABLES	High	Low	High	Low	High	Low
Dependent Variables						
Poor Health Status (dummy)	0.12	0.13	0.10	0.15	0.19	0.21
Utilization (dummy)	0.35	0.40	0.38	0.28	0.36	0.22
Income and assets						
Landholding size (in hectares)	1.08	0.81	0.77	0.64	0.61	0.60
Consumption per capita (in 000 NRs.)	17.44	19.54	19.578	22.83	29.41	34.42
Individual Characteristics						
Age	23.19	23.86	24.31	24.25	26.08	26.41
Age Squared	897.86	933.61	969.69	960.58	1109.66	1115.51
Male (dummy)	0.50	0.51	0.49	0.50	0.45	0.46
Chronic Disease(dummy)	0.08	0.06	0.05	0.05	0.12	0.11
HHD Characteristics						
HHD size	5.77	5.60	5.33	5.38	4.84	5.07
HHD Head age	44.45	44.90	45.51	45.86	46.62	46.75
HHD Head age squared	2180.92	2226.85	2295.36	2291.31	2385.34	2372.00
Male HHD Head (dummy)	0.86	0.87	0.79	0.81	0.71	0.75
HHD Married (dummy)	0.85	0.86	0.83	0.87	0.86	0.89
HHD Head No Education (Ref. cat.)	0.73	0.66	0.65	0.62	0.57	0.51
HHD Head below primary (dummy)	0.12	0.09	0.13	0.11	0.16	0.16
HHD primary graduate (dummy)	0.13	0.22	0.17	0.20	0.20	0.23
HHD Head secondary graduate (dummy)	0.02	0.02	0.05	0.06	0.06	0.10
Caste						
Brahmin Chettri (Ref. cat.)	0.44	0.29	0.42	0.26	0.44	0.26
Newar (dummy)	0.05	0.04	0.05	0.05	0.03	0.05
Dalits (dummy)	0.12	0.07	0.12	0.14	0.15	0.12
Terai Middle Caste (dummy)	0.00	0.06	0.01	0.15	0.02	0.20
Other Castes (Janjatis & Others)	0.39	0.54	0.39	0.40	0.36	0.37
Community Characteristics						
Time to the closest health facility (in mins.)	107.02	67.39	73.68	44.75	69.99	41.90
Observations	14684		14527		19054	

Note: High and Low conflict intensity is divided according to the median value of conflict intensity. Districts with conflict intensity greater than median is categorized as high conflict areas whereas those at median or lower than median is categorized as low conflict intense areas.

TABLE 3.2: Regression results for health status

| | Poor Health Status (=1) | | | | |
| | OLS | | | 2SLS | |
	OLS I	OLS II	OLS III	2SLS I	2SLS II
Conflict Intensity	0.00386	0.00726		0.016	
	(0.0106)	(0.0109)		(0.021)	
Conflict Intensity*Year 2003	−0.0517***	−0.0507***	−0.0512***	−0.089**	−0.0903**
	(0.0141)	(0.0144)	(0.0138)	(0.0395)	(0.0399)
Conflict Intensity*Year 2010	-0.0109	-0.00834	-0.0117	-0.0348	-0.0417
	(0.0151)	(0.0143)	(0.0138)	(0.0232)	(0.0279)
Survey Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes	Yes
District Fixed Effects	No	No	Yes	No	Yes
Mean of dep. var.	0.12	0.12	0.12	0.12	0.12
Std. dev. of conflict-related casualties	0.80	0.80	0.80	0.80	0.80
Effect on dep. var. per std. dev. change in casualties (Year 2003)	-0.040	-0.040	-0.040	-0.071	-0.072
Effect on dep. var. per std. dev. change in casualties (Year 2010)	-0.009	-0.007	-0.009	-0.028	-0.033
KP rK Wald F Stat				3.659	7.980
Stock-Yogo critical values					
10% maximal IV size				na	7.03
Observations	48,265	48,265	48,265	48,265	48,265
R-squared	0.013	0.032	0.040	0.0309	0.0306
Endogeneity Test (p-value)				0.1899	0.3820

Notes:*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Forest area coverage in a district normalized by area of the district is used to instrument conflict intensity. The endogeneity test is like C-statistics obtained by using endog option in ivreg2 command. Unlike Durbin-Wu-Hausman tests, this option reports test statistics robust to heteroskedasticity. Null hypothesis is that the conflict-related regressors are exogenous. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community character tics such as time taken to reach to the nearest heath facility.

TABLE 3.3: Regression results for health facility utilization

	OLS			2SLS	
	OLS I	OLS II	OLS III	2SLS I	2SLS II
Conflict Intensity	-0.0342	−0.0496**		0.0445	
	(0.0227)	(0.0236)		(0.0363)	(0.0764)
Conflict Intensity*Year 2003	0.204***	0.224***	0.144**	0.234**	0.140
	(0.0565)	(0.0549)	(0.0711)	(0.1067)	(0.1150)
Conflict Intensity*Year 2010	0.117***	0.127***	0.147***	0.116*	0.175***
	(0.0268)	(0.0247)	(0.0230)	(0.0620)	(0.0527)
Survey Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	Yes	Yes
District Fixed Effects	No	No	Yes	No	Yes
Mean of dep. var.	0.38	0.38	0.38	0.38	0.38
Std. dev. of conflict-related casualties	0.80	0.80	0.80	0.80	0.80
Effect on dep. var. per std. dev. change in casualties (Year 2003)	0.163	0.179	0.115	0.187	0.112
Effect on dep. var. per std. dev. change in casualties (Year 2010)	0.094	0.101	0.118	0.093	0.140
KP rK Wald F Stat				5.596	8.115
Stock-Yogo critical values					
10% maximal IV size				na	7.03
Observations	7,231	7,231	7,231	7,231	7,231
R-squared	0.021	0.037	0.078	0.024	0.026
Endogeneity Test (p-value)				0.0416	0.7810

Table header spanning: "Utilization (=1)" spans all five columns.

Notes:*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Forest area coverage in a district normalized by area of the district is used to instrument conflict intensity. The endogeneity test is like C-statistics obtained by using endog option in ivreg2 command. Unlike Durbin-Wu-Hausman tests, this option reports test statistics robust to heteroskedasticity. Null hypothesis is that the conflict-related regressors are exogenous. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility.

TABLE 3.4: Estimates for health facility operating hours, staff absenteeism and availability of medicines (Community level)

Variables	(1) Hours of HF Operation Per week	(2) Number of Hours Health staffs available per week	(3) Total Health Staffs present	(4) Proportion of HF staffs present to total sanction	(5) Supply of Medicines
Conflict Intensity*Year 2003	3.081	15.63*	2.186***	0.118**	0.0633
	(1.958)	(8.330)	(0.627)	(0.0514)	(0.0470)
Conflict Intensity*Year 2010	-0.773	2.932	1.240**	0.0976***	0.0517
	(1.464)	(7.158)	(0.548)	(0.0347)	(0.0352)
District Fixed Effects	Yes	Yes	Yes	Yes	Yes
Survey Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Effect on dep. var. per std. dev. change in casualties (Year 2003)	2.03	10.31	1.44	0.08	0.04
Effect on dep. var. per std. dev. change in casualties (Year 2010)	-0.51	1.93	0.81	0.06	0.03
Observations	716	729	729	729	729
R-squared	0.143	0.146	0.159	0.144	0.227

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. PSU level OLS estimations. PSU level weights are used. Standard errors clustered at district level. Thirty-nine observations are missing for dependent variable in column (1) and 26 observations are missing each for other dependent variables in columns (2) - (5) in the rural community data for the baseline year 1995. The t-test results show that we fail to reject the null hypothesis of no significant difference in missing observations between high and low conflict zones (Results are available on request).

TABLE 3.5: Regression estimates for damage to health infrastructure

Variables	Poor Health Status (=1)	Utilization (=1)
Log of number of health facilities destroyed in a district *Year 2003	0.040	0.030
	(0.034)	(0.053)
Log of number of health facilities destroyed in a district *Year 2010	0.027*	0.043
	(0.015)	(0.053)
Other controls	Yes	Yes
District Fixed Effects	Yes	Yes
Survey Year Fixed Effects	Yes	Yes
Observations	48,265	7,231
R-squared	0.039	0.071

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility.

TABLE 3.6: Regression estimates for never migrated individuals only

Variables	Poor Health Status (=1)	Utilization (=1)
Conflict Intensity*Year 2003	-0.045***	0.152**
	(0.0130)	(0.0667)
Conflict Intensity*Year 2010	-0.008	0.142***
	(0.0138)	(0.0230)
Other controls	Yes	Yes
District Fixed Effects	Yes	Yes
Survey Year Fixed Effects	Yes	Yes
Observations	40,166	5,439
R-squared	0.037	0.065

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Sample restricted to never migrated individuals only. Standard errors clustered at district level. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility.

TABLE 3.7: Regression estimates using alternative measures of conflict intensity

Variables	Maoist Controlled Districts (Government Classification)		Handicapped		Disappeared	
	Poor Health Status (=1)	Utilization (=1)	Poor Health Status (=1)	Utilization (=1)	Poor Health Status (=1)	Utilization (=1)
Conflict Intensity *Year 2003	-0.046^*	0.047	-0.175^{***}	0.515	-0.0424	0.218
	(0.0253)	(0.063)	(0.035)	(0.34)	(0.071)	(0.270)
Conflict Intensity *Year 2010	-0.0149	0.120^{**}	-0.108^{***}	0.322^{***}	-0.019	0.482^{**}
	(0.015)	(0.05)	(0.030)	(0.113)	(0.048)	(0.234)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Survey Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48,265	7,231	48,265	7,231	48,265	7,231
R-squared	0.039	0.073	0.040	0.073	0.039	0.073

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. For Government classification, we use a dummy for Maoist controlled district. The alternative measure of conflict intensity derived from the people handicapped and the people injured are calculated in the similar fashion as calculated for conflict intensity based on casualties in Equation 3.1. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility.

TABLE 3.8: Regression estimates after controlling for number of PHFs

Variables	Poor Health Status (=1)	Utilization (=1)
Conflict Intensity*Year 2003	-0.051^{***}	0.153^{**}
	(0.014)	(0.071)
Conflict Intensity*Year 2010	-0.012	0.147^{***}
	(0.014)	(0.023)
Log of number of private health	0.008	-0.055^{**}
facilities (community level)	(0.008)	(0.023)
Other controls	Yes	Yes
District Fixed Effects	Yes	Yes
Survey Year Fixed Effects	Yes	Yes
Observations	47,745	7,199
R-squared	0.038	0.067

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. Eight communities (out of 210) in the baseline have missing values for the number of PHFs. The t-test result of the same shows that the missing is not significantly different between high and low conflict zones (Results available upon request).

TABLE 3.9: Regression estimates for missing health observations

	Missing (=1)		
Variables	NLSS-I	NLSS-II	NLSS-III
Conflict Intensity	-0.009	-0.012^*	-0.000
	(0.007)	(0.007)	(0.001)
Other controls	Yes	Yes	Yes
Zonal Fixed Effects	Yes	Yes	Yes
Observations	15,740	15,533	19,171
R-squared	0.008	0.088	0.092

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors clustered at district level. Missing is a dummy equal to 1 if health observation is missing and zero otherwise. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. Development regions are the highest administrative levels in Nepal which are further divided into zones and then into districts. Nepal has 5 development regions and 14 zones.

TABLE 4.1: Proportion of households within 30 minutes distance to the nearest government health facility (Access)

Survey Years	Urban	Rural	Nepal
1995-1996	74%	26%	36%
2003-2004	66%	38.5%	47%
2010-2011	67%	38%	48%

Source: Central Bureau of Statistics [32, 34, 35]

TABLE 4.2: Summary statistics by survey years and household endowment (2003 and 2010)

| Survey Years | 2003 | | 2010 | |
VARIABLES	High-endowment(C)	Low-endowment(T)	High-endowment(C)	Low-endowment(T)
Dependent Variables				
Visit to GHF (dummy)	0.36	0.31	0.23	0.28
Visit to PHF (dummy)	0.36	0.35	0.51	0.41
Health exp. at GHF (in NRs.)	754.71	932.30	738.59	1036.11
Income and assets				
Landholding size (in hectares)	1.28	0.65	1.10	0.66
Consumption per capita (in 000 NRs.)	40.65	20.33	54.79	30.17
Individual Characteristics				
Age	24.44	24.26	27.06	26.21
Age Squared	917.67	967.18	1115.83	1112.91
Male (dummy)	0.49	0.49	0.48	0.46
Chronic Disease(dummy)	0.06	0.05	0.11	0.11
HHD Characteristics				
HHD size	6.69	6.50	6.00	6.14
HHD Head age	40.72	46.59	40.44	47.63
HHD Head age squared	1771.66	2353.40	1759.81	2449.43
Male HHD Head (dummy)	0.84	0.96	0.91	0.78
HHD Married (dummy)	0.96	0.88	0.94	0.90
Caste				
Brahmin Chettri (Ref. cat.)	0.56	0.30	0.56	0.29
Newar (dummy)	0.07	0.04	0.05	0.04
Dalits (dummy)	0.04	0.13	0.02	0.15
Terai Middle Caste (dummy)	0.11	0.11	0.14	0.14
Indigenous Castes (dummy)	0.20	0.35	0.20	0.32
Muslims (dummy)	0.02	0.07	0.03	0.05
Community Characteristics				
Time to the closest health facility (in mins.)	39.16	56.09	38.64	54.45
Observations	15533		19171	

Note: High-endowment household have head completed secondary education and low-endowment household have head completed less than secondary education including no education.

TABLE 4.3: Simple difference-in-difference

	High-endowment(C)	Low-endowment (T)	Difference (T-C)
Panel A: Visit to GHF (=1)			
Year 2003	0.36	0.31	-0.05
Year 2010	0.22	0.28	0.06**
Difference-in-Difference			0.11**
Panel B: Visit to PHF (=1)			
Year 2003	0.36	0.35	-0.01
Year 2010	0.51	0.41	-0.10^{***}
Difference-in-Difference			-0.09^{*}
Panel C: Heath expenditure in GHF (in NRs.)			
Year 2003	754.71	932.30	177.59
Year 2010	738.59	1036.11	297.52
Difference-in-Difference			119.93

Note: High-endowment household have head completed secondary education and low-endowment household have head completed less than secondary education including no education.

TABLE 4.4: Regression estimates for the visit to the government health facility

	(1)	(2)	(3)	(4)
	Multinomial Logit		OLS	Probit
VARIABLES	Visit to GHF=1	Visit to PHF=1	Visit to GHF=1	
Low-endowment (=1)	-0.055	0.055	-0.056	-0.052
	(0.046)	(0.055)	(0.052)	(0.047)
Low-endowment* Free care	0.110*	-0.102	0.112*	0.112*
	(0.056)	(0.064)	(0.061)	(0.058)
Log of Consumption Expenditure	0.00651	0.0944***	0.00399	0.00515
Per Capita (in Rs.)	(0.0165)	(0.0176)	(0.0168)	(0.0164)
Log of Landholding (in hectares)	-0.000203	0.00340	0.000785	0.00101
	(0.0230)	(0.0236)	(0.0230)	(0.0226)
Free care (=1)	-0.150***	0.122**	-0.150**	-0.151***
	(0.0560)	(0.0613)	(0.0588)	(0.0564)
Age	-0.00176*	-0.00205**	-0.00174*	-0.00172*
	(0.000947)	(0.00102)	(0.000971)	(0.000947)
Age Squared	1.50e-05	1.46e-05	1.49e-05	1.45e-05

	(1.40e-05)	(1.51e-05)	(1.43e-05)	(1.40e-05)
Male (=1)	-0.0117	0.0373***	-0.0132	-0.0130
	(0.0115)	(0.0122)	(0.0116)	(0.0114)
Age of HHD	-0.00160	-0.00523	-0.00143	-0.00127
	(0.00348)	(0.00377)	(0.00365)	(0.00346)
Age squared of HHD	1.69e-05	5.46e-05	1.46e-05	1.33e-05
	(3.62e-05)	(3.93e-05)	(3.79e-05)	(3.58e-05)
Household Size	0.00103	0.00839**	0.000432	0.000370
	(0.00341)	(0.00368)	(0.00337)	(0.00341)
HHD Male (=1)	0.0124	-0.0701***	0.0157	0.0146
	(0.0203)	(0.0214)	(0.0204)	(0.0202)
HHD Married (=1)	-0.000414	0.0162	0.000635	-0.000636
	(0.0256)	(0.0279)	(0.0257)	(0.0254)
Terai Middle Caste(=1)	-0.0234	0.0579*	-0.0284	-0.0268
	(0.0327)	(0.0320)	(0.0307)	(0.0317)
Dalits(=1)	0.000743	0.0391	0.00232	0.00256
	(0.0249)	(0.0277)	(0.0277)	(0.0254)
Newars(=1)	-0.129***	0.0592	-0.117***	-0.123***
	(0.0406)	(0.0415)	(0.0348)	(0.0393)
Indigenous castes (=1)	-0.0562***	-0.0163	-0.0603***	-0.0592***

|				
	(0.0202)	(0.0221)	(0.0210)	(0.0203)
Muslims (=1)	0.0115	0.0819**	0.00137	0.00128
	(0.0393)	(0.0385)	(0.0400)	(0.0394)
Private facility in community (=1)	-0.0568***	0.0667***	-0.0550***	-0.0550***
	(0.0184)	(0.0208)	(0.0196)	(0.0185)
Chronic Disease (=1)	0.0197	-0.0516**	0.0171	0.0172
	(0.0189)	(0.0210)	(0.0192)	(0.0188)
Log of time taken to reach to	-0.0403***	0.0216**	-0.0420***	-0.0412***
the nearest health facility (in minutes)	(0.00924)	(0.0102)	(0.00959)	(0.00926)
District fixed effects	Yes	Yes	Yes	Yes
R-squared	0.096	0.096	0.067	0.068
Observations	5,756	5,756	5,756	5,756
Hausman test for IIA [P-value]	0.00[1.00]	0.00[1.00]		

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level. Marginal effects are reported in column (1), (2) and (4). No consultation is a reference category for the multinomial logit model.

TABLE 4.5: Regression estimates for the visit to the government health facility (by endowment categories)

| VARIABLES	(1) Visit to GHF=1	(2) Visit to PHF=1
	Multinomial Logit	
Endowment level I	-0.0484	0.0607
	(0.0480)	(0.0573)
Endowment level II	−0.0909*	0.0947
	(0.0545)	(0.0644)
Endowment level III	-0.0534	0.0449
	(0.0504)	(0.0598)
Endowment level I*Free care	0.103*	-0.0873
	(0.0593)	(0.0650)
Endowment level II*Free care	0.145**	−0.161**
	(0.0689)	(0.0750)
Endowment level III*Free care	0.114*	-0.0999
	(0.0642)	(0.0707)
Other controls	Yes	Yes
Free care dummy	Yes	Yes
District fixed effects	Yes	Yes
Observations	5,756	5,756
Hausman test for IIA [P-value]	0.00[1.00]	0.00[1.00]

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level. Marginal effects are reported. No consultation is a reference category. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. We also include a dummy for individuals suffering from chronic disease.

TABLE 4.6: Regression estimates for health expenditure in government health facility (with sample selection correction)

	(1)	(2)
	Log of health expenditure in GHF	
Sample selection correction method	Bourguignon et al. [28]	Lee [89]
Low-endowment	0.543	0.262
	(0.671)	(0.379)
Low-endowment*Free care	-0.080	0.216
	(1.059)	(0.618)
Other controls	Yes	Yes
Free care dummy	Yes	Yes
District fixed effects	Yes	Yes
Sample correction term	Yes	Yes
Observations	1,663	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level and bootstrapped with 100 replications. Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. We also include a dummy for individuals suffering from chronic disease.

TABLE 4.7: Placebo test and test for missing observations

Variables	(1) Visit to GHF=1	(2) Missing health observation =1
Low-endowment	0.073	0.005
	(0.075)	(0.011)
Low-endowment*Free care	-0.119	-0.007
	(0.088)	(0.111)
Other controls	Yes	Yes
Year 2003 dummy	Yes	Yes
District fixed effects	Yes	Yes
Observations	3,390	34,704
R-squared		0.073

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parenthesis clustered at household level. For placebo test, NLSS-I and NLSS-II are used. Multinomial logit model is used for estimation in column (1) and OLS in column (2). Marginal effects are reported in column (1). Other controls include individual characteristics such as age, age squared and gender; household level characteristics such as expenditure per capita, landholding, household size, household head age, age squared and gender; and community characteristics such as time taken to reach to the nearest heath facility. We also include a dummy for individuals suffering from chronic disease for placebo test only.

FIGURE 1.1: Channels linking migration to education
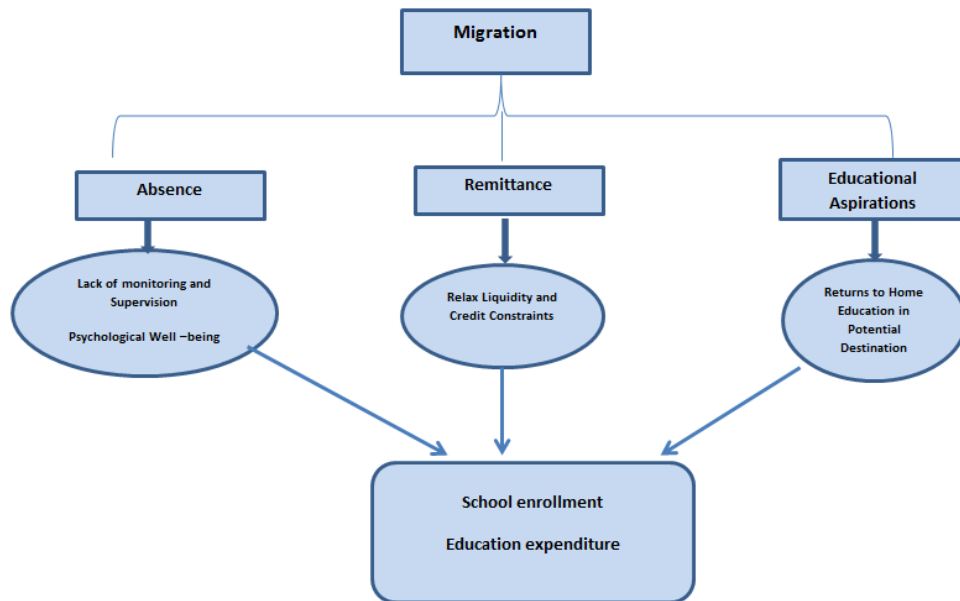
Source: Authors

FIGURE 1.2: Channels linking armed conflict to health
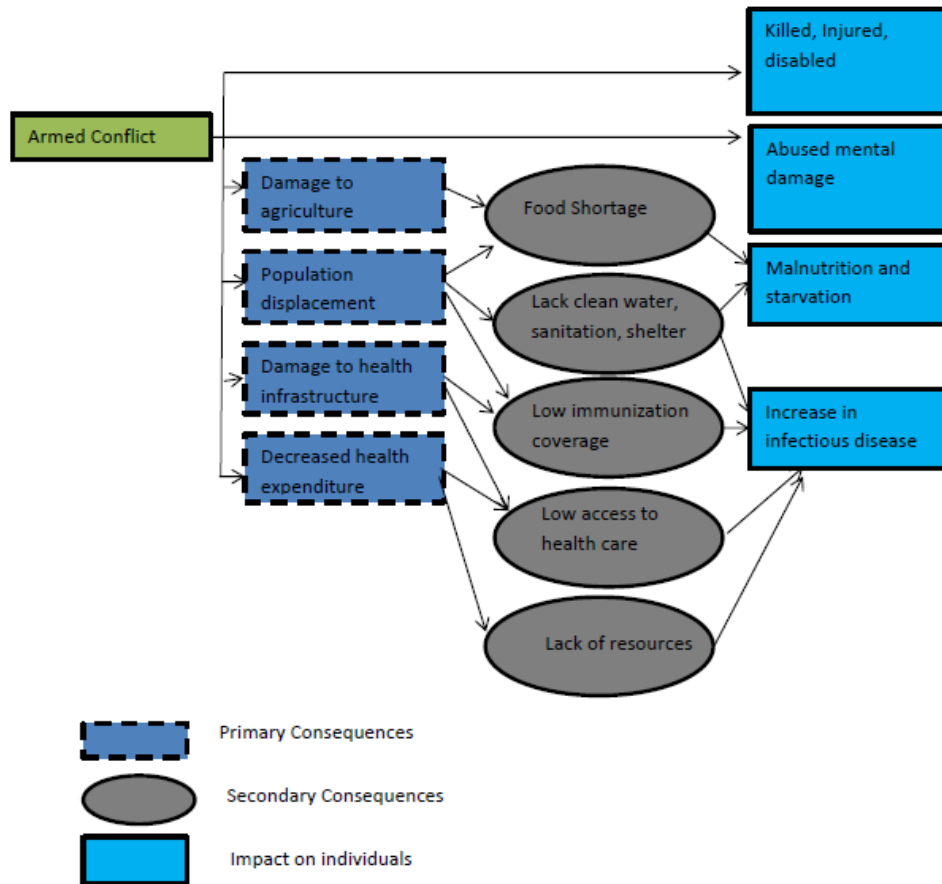
Source: Guha-Sapir and van Panhuis [65]

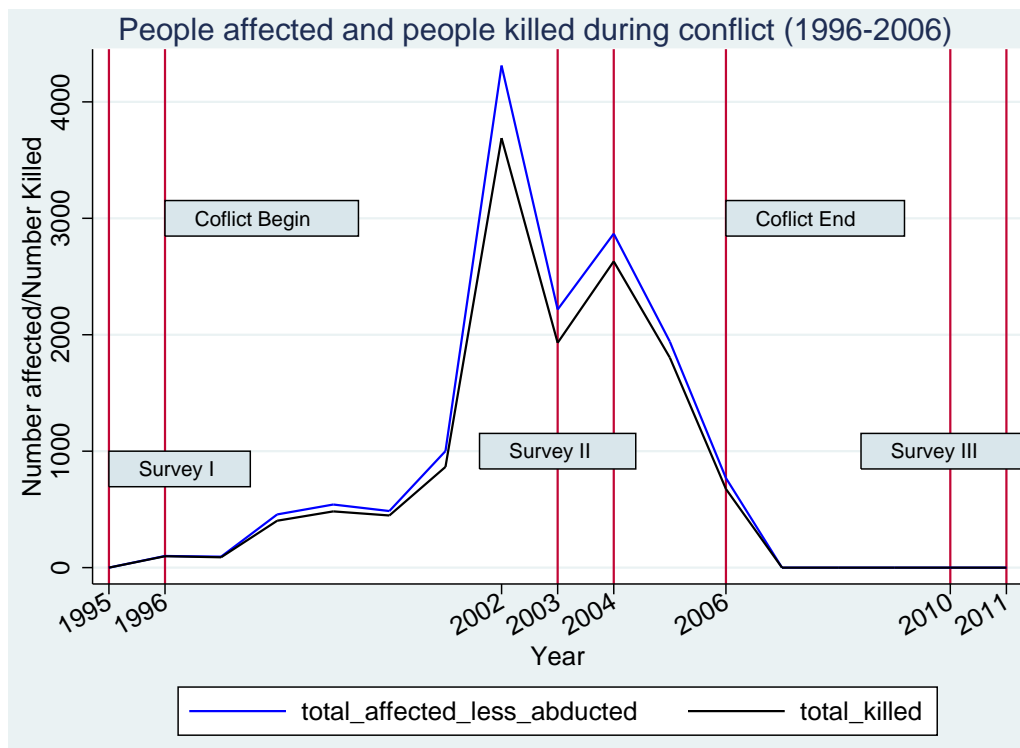FIGURE 1.3: Total health expenditure by source of finding (%)
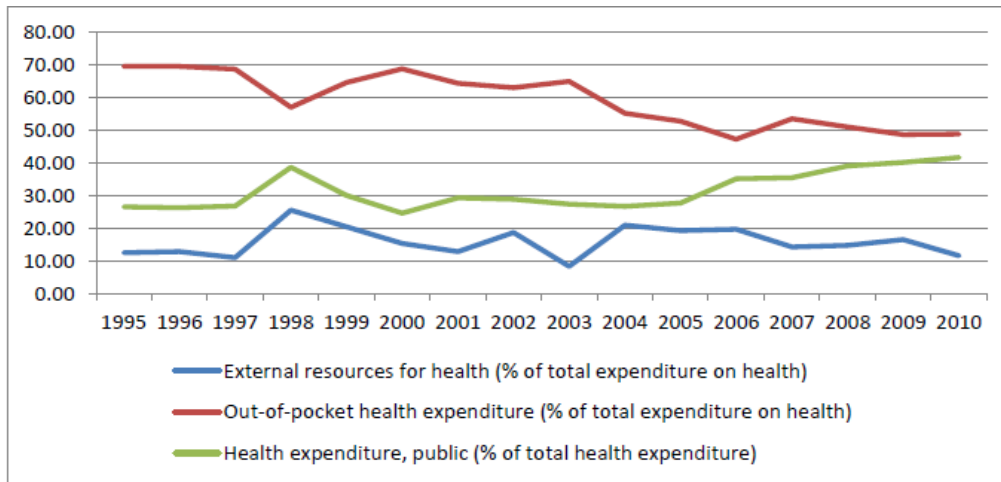
Source: World Bank [149, 150, 152]

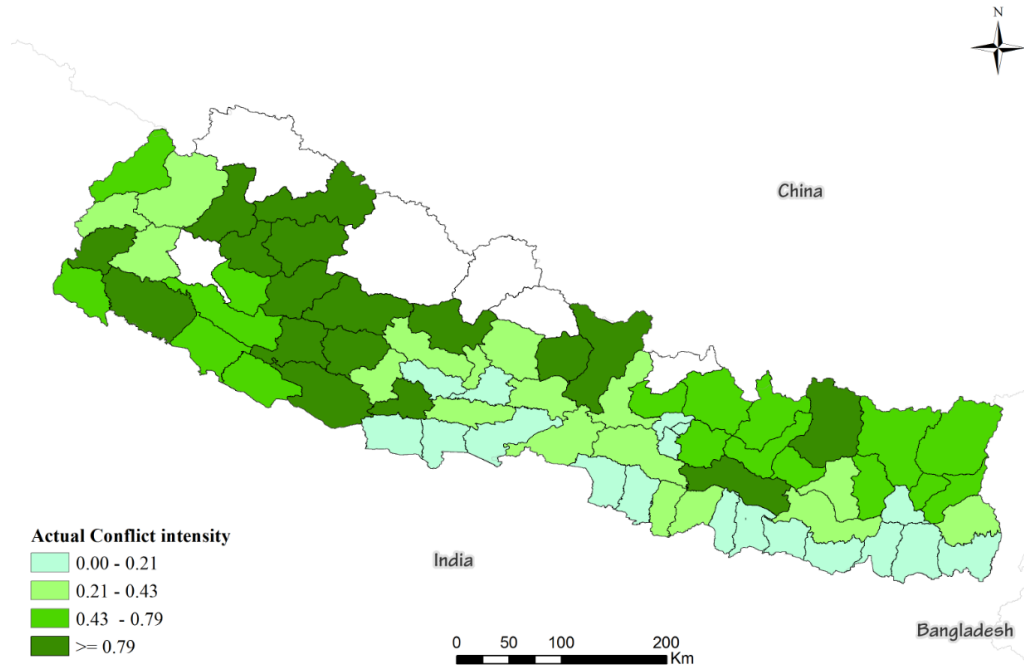FIGURE 2.1: Map of Nepal with Indian borders for outbound migrants to India
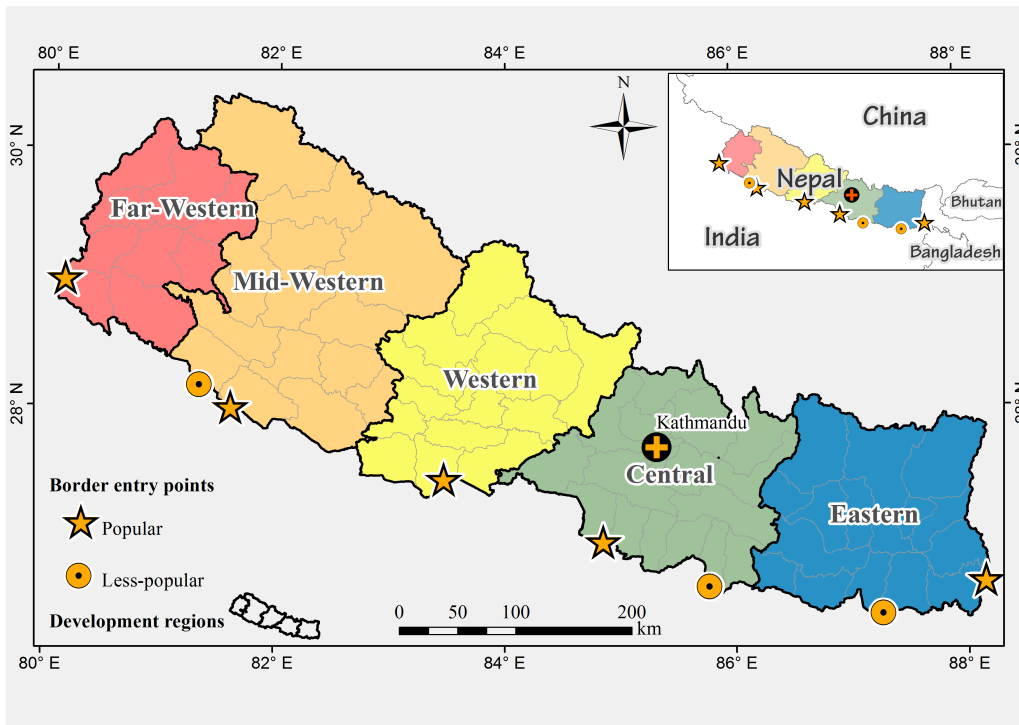
People affected and people killed during conflict (1996-2006)

Source: Electronic files INSEC (Accessed on 10th December 2016).

FIGURE 3.2: Conflict intensity by district (1996-2004)

Note: Six districts (left blank in the map) were not surveyed in one or other rounds. Darker the shades, higher is the conflict intensity. Conflict intensity is measured as total number of conflict-related deaths in a district between 1996 and 2004 (per thousand inhabitants) normalized by 1991 district population.

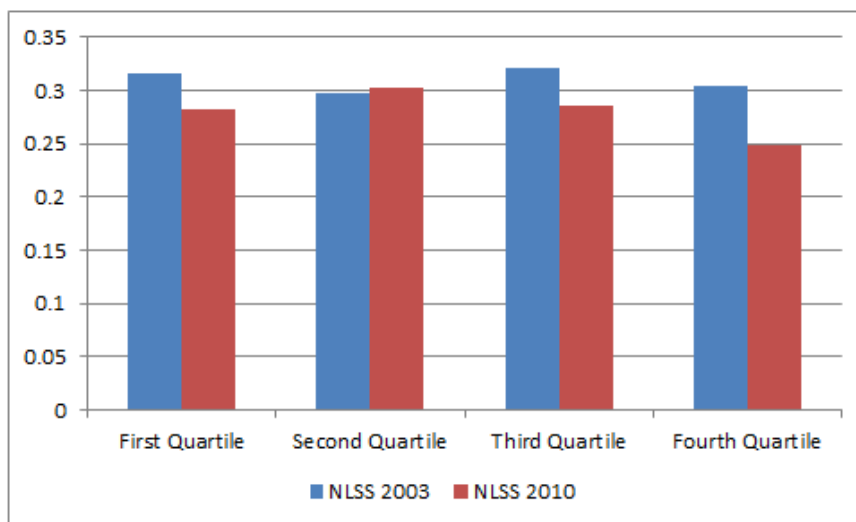FIGURE 3.3: Linkage between armed conflict and health
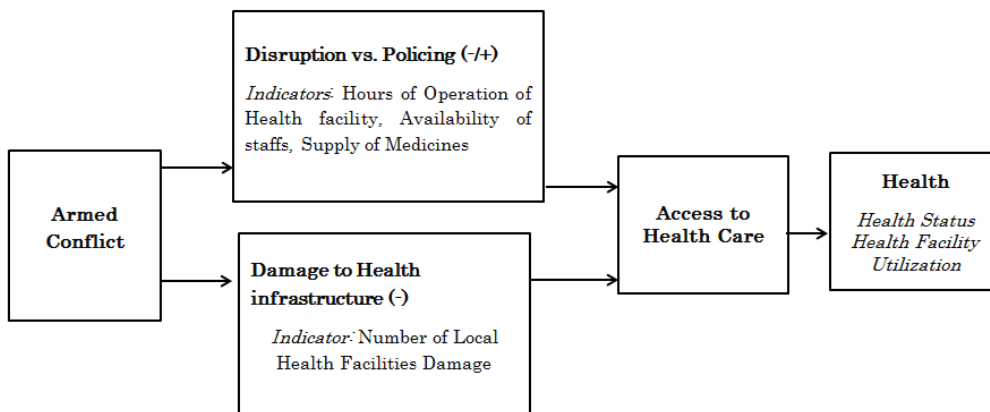
FIGURE 4.1: Evolution of free health care policy in Nepal

15th December, 2006	8th October, 2007	16th January, 2008
Free Healthcare at DHs and PHCCs to the targeted groups was declared	User fee abolishment at all HPs/SHPs and free care to all was declared	Free Care Policy at all HPs/SHPs implemented

15th January, 2009	16th November, 2008
• Free OPD at all DHs to targeted groups • Free 40 essential drugs at all DHs to all • Free all essential drugs to all at all facilities	Universal free care was expanded to PHCCs

FIGURE 4.2: Utilization pattern of public health facilities (%) (by consumption quartile)

Source: Central Bureau of Statistics [34, 35]

FIGURE 4.3: Utilization pattern of public health facilities (%) (by household head education)
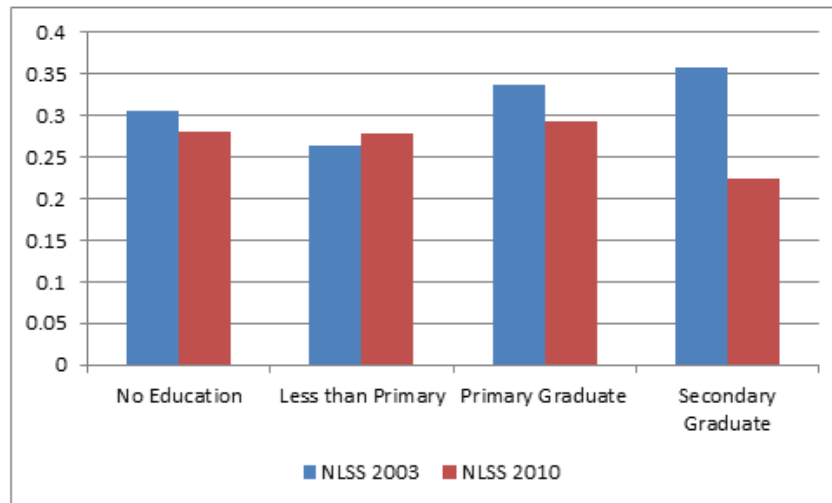
Source: Central Bureau of Statistics [34, 35]

FIGURE 4.4: Concentration curve for inequality in government health facility utilization
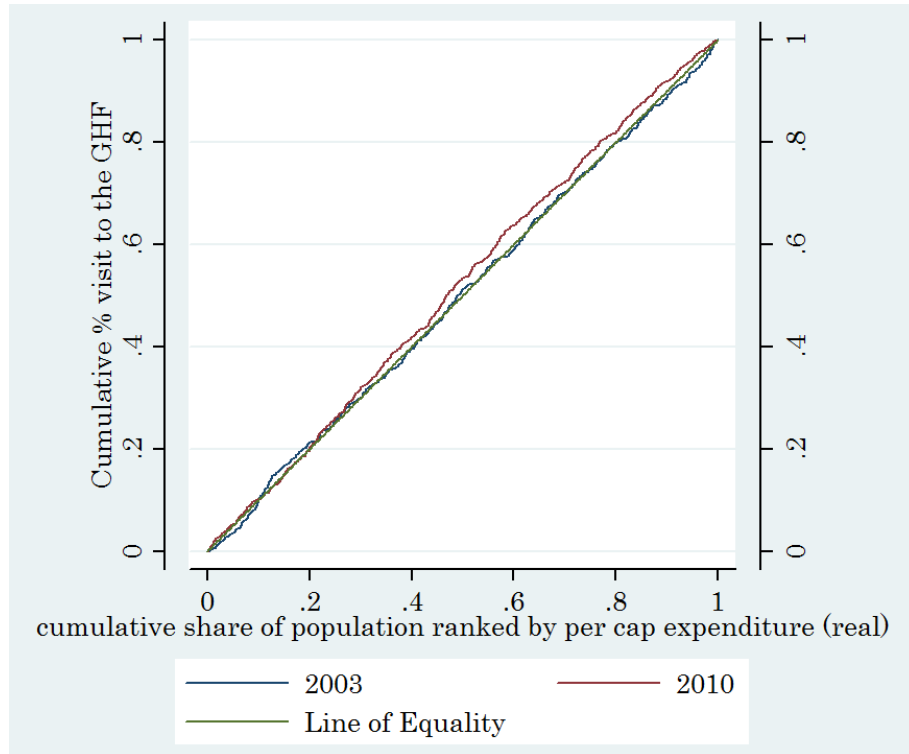
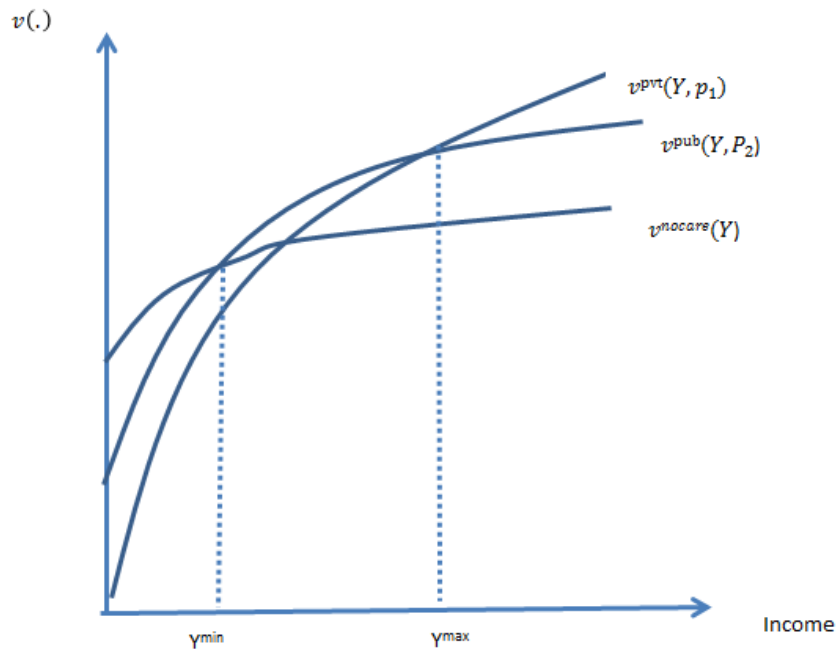FIGURE 4.5: (Indirect) utility function for the choice among pubic, private and no care

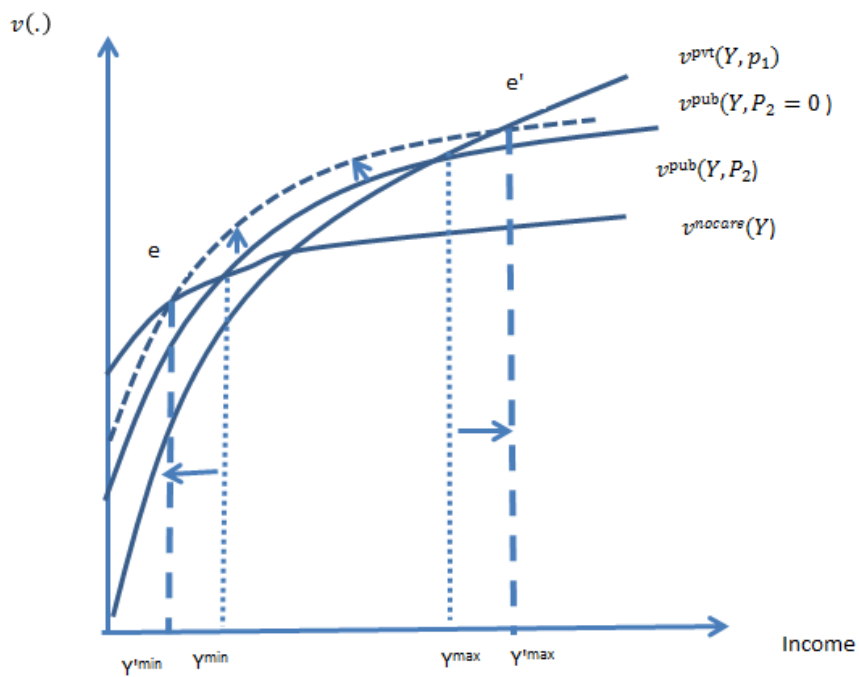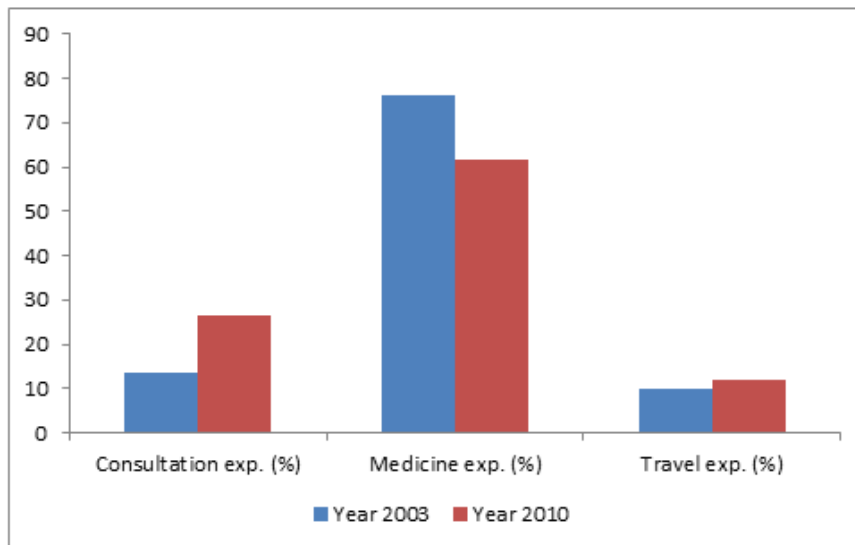FIGURE 4.6: Effects of removal of user fees in public care

FIGURE 4.7: Breakdown of total health expenditure at GHF by years of survey (in % of total)

Source: Central Bureau of Statistics [34, 35]