Education, Gender, and Migration

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Introduction

Education has been identified in sociological research as a harbinger and a catalyst of social, economic, and ideational change. Particularly in rural areas and poorer countries, where formal education was previously uncommon or even completely inaccessible, the introduction of schools can instigate vast changes in communities and individual behavior. Social science has linked education to changing mortality rates (Caldwell 1979; Caldwell 1986; Preston 1996; Sastry 1996), fertility and marriage patterns (Axinn and Barber 2001; Bongaarts 2003; Martin 1995; Singh and Samara 1996; Yabiku forthcoming), labor force participation, and gender roles (De Jong 2000; Niraula and Morgan 1996). In this paper, I examine the relationship between education and migration, and hope to add to this body of knowledge about the consequences of education. Using a broad theoretical framework drawing from the migration, family, and fertility literature and empirical data analysis, I examine how different aspects of education may affect the likelihood that men and women will move away from a rural area.

The relationship between education and migration is not new in theory or research. It is however a complex relationship, both from the theoretical and empirical standpoint, that is not thoroughly understood. Economic theories of migration in particular propose that individual education affects migration (Stark and Bloom 1985; Todaro and Maruszko 1987). Some studies have indeed found strong positive effects of education on the propensity to migrate (Donato 1993; White, Moreno and Guo 1995). However, other studies have found negative effects of education on migration in certain settings (Massey et al. 1987; Massey and Espinosa 1997; Taylor 1987), and still others have found no significant effects at all (Massey and Espinosa 1997). In general, the

literature appears to favor the prospect that education does increase the likelihood of migration, however, it is not entirely clear why such disparate results may appear in different studies.

In this paper, I continue the examination of how education is related to migration, and why research may be yielding such different results. I conduct separate analyses for men and women in order to better understand how social norms, roles, opportunities, and expectations may result in different causes of migration for men and women (Pedraza 1991). I also analyze educational attainment and enrollment separately to test how these different aspects of education may affect the likelihood of migration differently. Finally, I include community-level data on access to schools to test if community-level education change may affect individual behavior independently of individual education.

I use data from the Chitwan Valley Family Study (CVFS) in Nepal for this paper. The CVFS is ideal to examine the questions in this study as it provides detailed individual data collected with life history calendars, as well as extensive information on changes in community-level institutions and social change. The data covers the past five decades which have been witness to vast economic and social change in Nepal. Using the CVFS is a particular strength of this study for its rich and detailed data on individual behaviors, as well as the context of community-level social change over several decades that it documents.

This research has clear implications for better understanding and designing rural development interventions in poor countries. Rural development programs seek to improve the standard of living as well as revitalize rural economies, and often to decrease rural out-migration (Rhoda 1983). Provision of formal education is very often an integral component of rural development programs in pursuing these goals. Empirical research

on the situations and mechanisms through which education in rural areas may encourage or discourage out-migration can thus provide a scientific basis for designing these programs to better achieve their goals without unintended consequences.

Theoretical Framework

With the aim to design a comprehensive overview of the mechanisms through which education is believed to affect migration, the theoretical framework for this study incorporates a broad range of theories about the relationship of economic, social, and ideational change to migration. I also discuss how these mechanisms may affect men's and women's migration behavior differently.

Economic theories of the relationship between education and migration are some of the oldest in the field. Both the neo-classical and new economics of migration theories conceptualize education as a form of human capital that leads an individual to expect better outcomes from migration (Harris and Todaro 1970; Massey and Espinosa 1997; Stark and Bloom 1985). The skills, knowledge, and credentials gained from formal education increase the possibility of gaining employment outside the household as well as advancing an individual to higher pay scales. This may lead an individual to expect better (economic) outcomes from migration. The knowledge and skills gained from school may also increase the ability of an individual to complete a journey and cope in a new place, thereby decreasing the costs and risks of migration (Stark and Bloom 1985). Through these mechanisms, economic theories predict that educational attainment is positively related to migration.

The predictions of these theories change based on several contingencies. First, not all destinations award human capital and education in the same way. In particular, varying skills, knowledge, and credentials (including second languages) are awarded

differently in particular domestic and international destinations. For example, some research has found positive effects of education on *domestic* migration, while other studies have even found negative effects of education on *international* migration from Mexico to the US (Massey et al. 1998).

Secondly, we might also expect very different predictions from these economic theories if an individual is enrolled in school. The process of migrating forces a student to quit their current schooling, it can interrupt their studies, and in many cases preclude them from re-enrolling. This truncates the knowledge and skills they are able to gain from education and can prevent them from earning credentials. Thus migration has high opportunity costs for the student. There may also be opportunity costs for parents who have already invested in their children's education, particularly if they expect their children to care for them in older years. Thus, the neo-classical and new economic theories of migration would lead us to predict that enrollment in school would decrease the likelihood of migration, independent of the effects of educational attainment.

Third, gender may also mediate the economic link between education and migration. In many places, cultural norms and expectations dictate that men are more likely than women to seek employment outside the home. In this context, we would expect educational attainment to have stronger effects on migration for men, and weaker effects for women. Similarly, the opportunity costs of quitting school may be higher for men. The skills, knowledge and credentials that a migrant effectively loses from quitting school are more likely to impact men because they are more likely to need them to seek employment outside the home. Thus we would expect the negative effects of enrollment on migration to be stronger for men and weaker for women.

Theories linking education to migration through social mechanisms do not have the historical legacy of economic theories, but have received strong support in the past two decades.

Social networks theory (Massey et al. 1987) adapts Bourdieu's concept of social capital to migration, arguing that social contacts with individuals who have migrated, or are currently resident at a destination, provide information and assistance to the new migrant, thereby decreasing the costs and risks of migration. Thus social networks may increase the probability of migration. Empirical research has consistently found social contacts to be a strong determinant of migration. (De Jong 2000; Donato 1993; Massey and Espinosa 1997; Zlotnik 1995). Education enters this causal relationship through expanding social networks. Participation in formal education increases the number of non-family social relationships of an individual, regardless of whether they have gained any knowledge, skills, or credentials from school. Additionally, social networks may in fact relate synergistically with economic theory. Not only does formal schooling provide an individual with wider social networks, but these social networks are selectively comprised of educated individuals who may be more likely to migrate in the first place. Thus, we would expect education, or more years spent in formal schooling, to increase an individual's social network and thereby increase the likelihood that they will migrate.

Theories linking ideational change to individual behavior appear more often in other areas of study (particularly in the fertility and family literature). However, they are also applicable to the study of migration, and especially the relationship of education to migration. Education is a conduit of new ideas, and new ideas in turn can influence individual desires, expectations and behavior. The link between ideational change and individual behavior has been documented in both non-Western and Western countries

(Axinn and Barber 2001; Barber and Axinn 2004; Thornton 2005). In many non-Western settings, educational materials are based on Western texts and materials. Students in these places are often exposed to Western ideas about individualism, "modern" economic life, and consumerism, and different gender roles and norms (Axinn and Barber 2001; Caldwell, Reddy and Caldwell 1985). In effect, these concepts promote the economic benefits of migration and decrease the interdependence of the individual and the family, which in turn creates greater possibility of individual migration. Based on these general theories and evidence linking ideational change and behavior, we can predict that education, particularly if it is influenced by Western systems, will affect migration behavior through changing ideas, values, expectations, and social norms. Additionally, we can predict that this relationship will be stronger for women, who will be affected more by changing perceptions of gender roles and norms.

It is also possible that not just individual education, but also the presence of schools in a community may affect individual migration behavior, independent of whether or not an individual attends the school. In general, schools are harbingers of social change. They are conduits of new ideas into the community as a whole and can affect how individuals in the community view life stages and perceptions of family and individual independence (Axinn and Barber 2001). The presence of schools may also be an indicator of the presence of other services in the community (such as banks or employers) that may in turn affect migration. Thus, either directly as a source of community ideational change, or as a proxy indicator of other sources of community change, we can expect that the presence of a school in the community may increase the likelihood that individuals will move away from the community.

Setting

The setting of this study is in the western side of the Chitwan Valley, a flat, fertile valley in south-central Nepal. The study area covers 93 square miles. Chitwan Valley is classified in the inner terai zone and lies between two low mountain ranges. At an average altitude of 450 feet above sea-level and about 27 degrees north, Chitwan is a warm, tropical area and is subject to yearly monsoons.

The Chitwan Valley was originally inhabited by the Tharu people, however vast structural changes have now rendered the valley home to a wide range of peoples from all over Nepal and even India. Since the mid-1950's, the Government of Nepal has undertaken an intensive campaign to populate the terai, and in particular Chitwan Valley, with peoples from the hill regions of the country. Since 1979, paved roads have been built connecting Chitwan's largest town to Kathmandu in the north and to the east and west of the country. As a result of these changes, provision of land, services, and transportation opportunities, large numbers of people from across Nepal have moved into the Chitwan Valley, as planned. More than half of the migrants to the study area came from the hill districts adjacent to Chitwan. However, significant and increasing proportions of in-migrants come from other districts across Nepal and border areas of the Indian terai. The Tharu are now a minority group in their native region. The in-migrants since the 1950's have represented almost all ethnic groups in Nepal.

In conjunction with the rapid population growth and provision of basic government services to initially attract settlers, Chitwan has experienced extensive social changes. Roads, markets, schools, and health posts have proliferated across the valley. The town of Narayanghat on the northern edge of the study area is now a large urban area and hosts a hospital, movie theaters, a national highway and other services. Traveling

south from Narayanghat, the study area is increasingly rural, villages are smaller, and government services such as schools, markets, road, hospitals, and health posts are increasingly fewer. Figure 1, which shows the mean walking distance to a variety of public social institutions, demonstrates how accessibility of public institutions has increased since the 1950's. In particular, the late 1950's witnessed a huge influx of government services. Institutions that had previously been functionally inaccessible, became accessible within 50 to 100 minutes walk. After the late 1950's, service provision continued, but at a slower rate.

[Figure 1 about here]

Similarly, Figure 2 shows the mean walking distance to private institutions, such as markets, employers, bus stops, and banks. The pattern in this graph is similar, there was a large proliferation of private institutions from the late 1950's through the mid-1960's that made them generally accessible to most neighborhoods, after which there was a slower but continued increase in accessibility.

[Figure 2 about here]

Education

There has also been a large increase in educational opportunities and participation in Nepal in recent decades. Before the 1950's a public education system did not exist in Nepal and the majority of rural Nepali people were illiterate. Formal public schooling was instituted in the 1950's, and the first school in the Chitwan Valley was established in 1954. Since the 1950's there has been a continuous and steady increase in the number of schools in Chitwan, from only 10 in 1960, to over 100 in the early 1990's. The content of education is also changing. The Nepalese public school system is patterned after the British education system and many books and materials are also brought in from abroad.

Notably, these foreign materials are often based on Western values of individuality and Western conceptions of the family and family integration (Beutel and Axinn 2002).

The provision of schools alone has not necessarily been paralleled by an increase in students; consequent increases in literacy rates have also lagged behind the increase in schools. There was slow, steady improvement in enrollment until the 1970's, when there was a more dramatic increase in enrollment. This large increase in enrollment did not occur until about 15 years after the proliferation of schools. By 1996, 100% of children ages 5 and 6 in the study area had attended school for at least one day, more than half attended over three years of school, and adult literacy had reached about 50% (Beutel and Axinn 2002).

Gender

Nepalese society is strictly stratified by gender. Men and women experience very different opportunities and expectations regarding work, relationships, and personal autonomy. In this context, migration may be instigated through very different mechanisms for men and women. Although Nepal is very ethnically, economically, and geographically heterogeneous, in general it is a patrilineal patrilocal society (Niraula and Morgan 1996). Upon marriage, young couples most often reside with the groom's parents for many years (Bennett 1983; Reed and Reed 1968; Shrestha and Bhattarai 2003; Yabiku forthcoming). In a minority of cases, the couple moves to their own house, or they live with the bride's parents. Functionally, marriage instigates women to migrate to a much larger extent than men. The rates of marriage are very high in Nepal, the singulate mean age of first marriage for women is 18.1 and 87.9% of women are married by the age of 49. Thus it is likely that most women will marry and consequently migrate at least once. In analyzing the likelihood of first migration for some women, we may

actually be analyzing the likelihood of first marriage. On the other hand, men in Nepal have much higher rates of employment outside the home (78% of all employees are men), school attendance (72% of higher secondary school attendees are men (WHO online, 2005)), and military service; thus they are much more likely than women to move for these reasons.

Women in Nepal also experience restricted autonomy and decision-making abilities (Yabiku forthcoming). This may ultimately limit individual women's ability to decide to migrate and to build a life in a destination community as well as their decision-making power with regard to family moves. However, gender norms differ and are rapidly changing in many Nepali communities. Studies show that women of higher status families and ethnic groups from the hill regions enjoy more autonomy and decision-making ability (Niraula and Morgan 1996). Niraula and Morgan have also linked higher education to greater female autonomy, and show that female autonomy is dictated more by community level structures than individual or family characteristics (Niraula and Morgan 1996). Thus, I propose that female autonomy, decision-making abilities, and ultimately the ability of women to migrate are changing as ideas and institutions in communities change in Nepal.

Gender differences in Nepal also affect educational outcomes, and likely the relationship between education and migration. Overall, boys attend school at a much higher rate and achieve higher educational outcomes than girls. Of the most recent cohort in the study that has completed schooling age (those born between 1962 and 1971), men completed an average of 9.38 years, and women completed a much lower average of 5.66 years. However, these averages are heavily affected by the much higher percentage of women who have never attended school and the gender gap in educational

attainment drastically decreases for those who have attended some school. Of this same cohort, 10 percent of men have never attended school, while 37 percent of women have never attended school. Among individuals in this cohort who have completed at least 2 years of school, men completed an average of 10.74 years, while women completed an average 9.71 years. In this select group, the gender gap in attainment is (surprisingly) only about one year. Furthermore, as shown in Table 1, this gender gap in education is consistently decreasing with time; the most recent cohorts exhibit the smallest gender gaps in attainment. Currently in Chitwan, there are still significant proportions of the female population that do not attend any school, and also significant proportions that achieve very high educational outcomes.

[Table 1 about here]

For the proceeding reasons, the relationship between education and migration in this setting may be very different for men and women. The opportunities, expectations, decision-making process may result in very different mechanisms through which education affects migration for women and men. To reflect these differences, I create separate models for women and men and address possible gender differences in the hypotheses below.

The vast changes in migration, public and private services, and education make the Chitwan Valley an ideal place to study the relationship between education and migration. The majority of the changes have occurred within the past 50 years, within the lifetime of the study residents. This allows us to measure changes over time and differences across birth cohorts. In addition, the gender divisions in opportunity, norms, and behavior as well as the variety of ethnic groups and different rates of change across neighborhoods in the study area provide another dimension for comparison.

Based on the theoretical framework and the specific social structures and gender prescriptions of the setting of this study, I hypothesize the following:

Hypothesis 1. *Educational attainment will have a positive impact on out-migration from Chitwan Valley.*

Hypothesis 1a. *The effect of educational attainment will be stronger for men than for women.*

Hypothesis 2. *Current enrollment in formal education will have a negative impact on out-migration.*

Hypothesis 2a. *The effect of current enrollment will be stronger for men than for women.*

Hypothesis 3. *Presence of schools in the childhood community will have a positive impact on out-migration, independent of the effects of educational attainment and current enrollment.*

Hypothesis 3a. *The effect of schools in the community will be stronger for women than for men.*

Research Design, Measurement and Analytic Approach

Study Design

To study these relationships, I use data from the Chitwan Valley Family Study (CVFS). The CVFS is an on-going longitudinal survey of individual and community change in the western part of the Chitwan Valley. It measures individual characteristics, attitudes, behaviors, and place of residence as well as changes in community infrastructure and services. The CVFS uses multiple methods of data collection, including structured surveys, unstructured interviews, and archival research.

5271 individuals living in 171 separate communities (called neighborhoods, or "tols" in Nepalese) are included in the survey. Neighborhoods in the study were selected by an equal probability, systematic sample; all individuals between the ages of 15 and 59 and their spouses within these neighborhoods were included in the survey. At 97%, response rates are exceptional. Life history calendars were used to record detailed measures of individual characteristics and life events, from the interview date back until the date of their birth.

This study of migration used a sub-sample of 4825 individuals from the CVFS sample. I included only individuals who were living in the study area during the initial interview in 1996 and measured migration retrospectively using the life history calendar. Logistically, migration is a difficult subject to measure as it extends beyond simple geographic sample areas. In this study, I include a select group of migrants- those who moved away from Chitwan for at least six months and subsequently moved back to appear in the sample in 1996. The migrants I am studying can be defined as "return" migrants, they moved away from Chitwan for a longer period of time than seasonal migration would prescribe, but did return to Chitwan after a semi-permanent move. Although they would have been eligible for the study in all other ways, the survey did not include "permanent migrants"- individuals who lived in Chitwan, but moved away and did not return to be present for the survey in 1996.

Measures

Migration

My measures of migration come from the life history calendar. Respondents were asked to record their primary place of residence for each year of their life. Primary place of residence for a year was defined as the place the individual lived for over 6

months during that year. If an individual was absent from their residence in the study area for six months or more, this was coded as an out-migration from Chitwan in that year. I used the date of the first migration out of Chitwan for this study. 24% of survey respondents migrated away from the study area after the age of 12. Of those who migrate, age at first migration is young. 78% of out-migrants left the study area by the age of 24, and the average age of first migration is 21.

Education

My dependent variables for education include measures of *Current Enrollment* and *Attainment*. For *Current Enrollment*, respondents were asked if they attended school in each year of the survey. For *Attainment*, respondents were asked "What is the highest grade in school or year of college you have completed?" for each year of the study. Answers ranged from 0 to 25 years for men and 0 to 24 years for women. Table 2 shows descriptive statistics for this and other variables.

I created a dichotomous variable *School Access* to measure access to schools in the childhood community. *School Access* was coded "1" if the respondent reported that there was a school within a 45 minute walk of their community before they were 12 years old and "0" if there was not a school within this distance.

Control variables

I included several control variables that we have theoretical and empirical reasons to believe may affect the relationship between education and migration, including measures of childhood community context, parental characteristics, and individual characteristics.

I used measures of the presence of markets, employers, bus services, and income-generation programs in an individuals' community before they were 12 years old to

operationalize the concept of 'childhood community economic change'. Markets were the most common service available in childhood among survey respondents. 80% reported "Yes" to the question on proximity to markets, 60% for employers, 56% for bus services, and 39% for income-generating programs. Alone, any of these four individual variables may not represent community-wide economic change, or induce measurable behavior change through the mechanisms I am studying. Therefore I created an index variable of the total number of the above services available within a one hour walk of an individual's home before the age of 12, as a proxy measure of economic change. I divided the variable by four, so that values of the variable *Economic Services* ranged from 0 to 1. The mean value was 0.59, with a standard deviation of 0.35.

Similarly, I constructed an index variable *Social Services* with measures for the presence of health centers, temples, police, women's groups, and cinemas in an individual's community before they were 12 years old. 79% of survey respondents answered yes to the question on access to temples, 61% for health centers, 47% for police stations, 15% for women's groups, and 16% for cinemas. I added the number of these five services that were available to an individual in childhood, then divided the total by five. The range of values for *Social Services* was 0 to 1, the same as the range for *Economic Services*. The mean value for *Social Services* was 0.58, and the standard deviation was 0.27.

[Table 2 about here]

Ethnicity and caste are also salient factors in all aspects of Nepali life, including place of residence, livelihood strategies, economic circumstances, political relationships, and, most notably, opportunities. For this study, the 53 different castes were coded into five functional ethnic groups: Upper-Caste Hindu, Lower-Caste Hindu, Newar, Hill

Tibeto-Burmese, Terai Tibeto-Burmese. Upper-Caste Hindu was the largest ethnic group represented in the CVFS; 45% of survey respondents classified themselves in this group. Terai Tibeto-Burmese represented 18% of the survey respondents, 17% were Hill Tibeto-Burmese, 11% Lower-Caste Hindus, and 6% were Newar.

I included the place of birth as a dichotomous variable to differentiate those who were born in Chitwan from those who were not. The dependent variable of this study is the first move away from Chitwan, as opposed to the first move of an individual's life. Earlier migrations, before an individual moved to Chitwan could have a large effect on their subsequent propensity to move away from Chitwan. Thus by separating those who were born in or outside the study area, I am effectively controlling for previous migrations. Additionally, outside Chitwan there is likely greater heterogeneity in community contexts to which individuals were exposed in childhood. Including place of birth also provides a degree of control for this heterogeneity. 47% of survey respondents were born in Chitwan and 53% elsewhere.

Time of Birth is an important control variable to account for the vast changes Chitwan has seen over the past 50 years. Migration rates have not been stable over the past 50 years. There has been an increase in the number of people migrating from Chitwan; however, because the total population of the area has also increased, the *percentage* of migrants in the population has actually decreased. Similarly, participation in education has not been independent of time (Beutel and Axinn, 2002; Axinn and Barber, 2001). To reflect these temporal changes, I created five birth cohorts: 12-20 years old, 21-30 years old, 31-40 years old, 41-50 years old, and 51-60 years old at the time of survey.

Parental characteristics are also likely to affect migration or childhood community context. Parents' education and work outside the home affect the economic circumstances of the family and their choice of place of residence. Prosperous families have greater opportunities to live in or travel to areas where more services are available. Parents' travel accustoms a child to travel and may in fact indicate that the child grew up in a household whose livelihood was predicated on migration- such as trading, or seasonal labor migration. I created dichotomous variables to control for parental characteristics: *Parents' school* measured if the respondent's mother and/or father ever attended school, *Parents' work* measured if the respondent's mother and/or father ever worked outside the home, and *Parents' travel* measured if the respondent's mother and/or father ever traveled (including short trips or longer term moves) outside Chitwan.

Finally, I created a variable to designate individuals who initially moved into Chitwan after the age of 12. For these individuals, the hazard of moving away from Chitwan did not begin until after the age of 12, thus effectively setting them apart from the bulk of respondents for whom the hazard began at age 12. 35% of respondents were latecomers and 65% resided in Chitwan before the age of 12.

I lagged all the time-varying variables by one year, in order to assure that the result I measured (migration) occurred chronologically after the independent variables.

Analytic Strategy

I use a series of nested discrete-time event history models to test the likelihood of an individual to move out of Chitwan Valley in any given year. I use person-years as the unit of exposure to risk. The models test the yearly hazard of moving out of the Chitwan Valley study area, after the age of 12, contingent upon individual and childhood community characteristics. I use the logistic regression equation given below:

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

where p is the probability of migrating out of the Chitwan study area, $\frac{p}{(1-p)}$ is the odds of migrating out, a is a constant term, B_k is the effect of independent variables in the model, and X_k is the value of these independent variables.

I created a separate set of nested models for males and females to allow me to analyze how education may affect migration differently for men than for women. I created a base model by using a spline function to separate four distinct periods of time after the beginning of the hazard of migration (12 years old). This allowed different slopes of the model for different periods, to better reflect the different overall rates of migration that appeared in the data for these ranges of years. Models 1 and 2 (for men and women, respectively) test the dependent variables *Educational Attainment* and *School Access*, along with the timing, controls, and childhood community context variables. Models 2 and 4 (again for men and women, respectively) test all three of my independent variables: *Current Enrollment, Educational Attainment,* and *School Access*.

Results and Discussion

The results of my event-history models, presented in Table 3, include several significant and interesting relationships. The control variables in this study show strong, statistically significant, and consistent effects across Models 1 and 2 for men and Models 3 and 4 for women.

Birth cohort is a significant predictor of out-migration for women and men. The models show a decreasing propensity to migrate away from Chitwan with age; younger individuals are more likely to migrate out of Chitwan than older individuals. Compared

to the youngest birth cohort (ages 12-20), the next cohort (ages 21-30) of women are about twice as likely to migrate and the same cohort of men is about two and a half times as likely to migrate away. While on the older end of the spectrum, individuals in the age 51-60 age group have about 0.75 the odds of migrating away as the youngest birth cohort. This is consistent with theory and other empirical studies that have shown the vast majority of migrants are between the ages of about 20-40, in the marriageable and economically productive ages.

Ethnicity also produces similar effects for men and women. Compared to the Upper-Caste Hindu reference group, Lower-Caste Hindus and Hill Tibeto-Burmese are more likely to migrate away from Chitwan, while Terai Tibeto-Burmese people are much less likely to migrate away. The Newar ethnic group showed no significant difference in migration from the Upper-Caste Hindu.

Parental characteristics affect the migration behavior of their female and male children; parents' travel experience was particularly significant. If either of a woman's parents had ever traveled outside Chitwan, she subsequently has 1.34 higher odds of out-migration; if a man's parents had traveled, he has 1.21 higher odds of out-migration. This is consistent with the results of several other studies of migration, some of which show that previous migration experience is the strongest predictor of the likelihood of additional migration (Massey et al. 1987; Massey and Espinosa 1997).

Of the main variables of interest in this study, only access to a school in the childhood community did not produce statistically significant effects on the odds that an individual will migrate in adulthood. This data does not support my hypothesis based on the theory that community change may affect individual behavior through changing perceptions of family, opportunities, or gender roles. Similarly, the results for almost all

the childhood community context variables were not significant. Only the *Social Services Index* was significant for women. Independent of all other community context variables; women who had access to all five of the social services in their childhood community have 1.54 higher odds of migrating in adulthood than women who had access to none of these services.

The other education variables I tested did produce significant effects on out-migration from Chitwan. Educational attainment is positively related to the likelihood of out-migration for both women and men, as hypothesized. The coefficient for *Educational Attainment* (as operationalized in most previous migration research) in Model 4, for women, shows that for each additional year of education that a woman completes, the odds that she will migrate away increase by an additional 1.04. Model 2, for men, shows that for each additional year of education, the odds of migration increase by 1.08. Odds-ratios are multiplicative, thus a man who has completed one year of school will have 1.08 higher odds of out-migration than a man who has completed no school; a man who has completed five years of school will have $1.08^{\wedge 5}$ or 1.47 higher odds of out-migration; and a man who has completed 10 years of school (at which point he will earn a school leaving certificate) will have $1.08^{\wedge 10}$ or 2.16 higher odds of out-migration. Similarly, a woman who has completed 5 years of school will have 1.22 higher odds of out-migration; and a woman who has completed 10 years of school will have 1.48 higher odds of out-migration. This is consistent with my first hypothesis, based on economic, social, and ideational theories of migration.

The affect of attainment is statistically stronger for men than for women (as tested in a pooled model with a dichotomous variable for gender and an interaction term for attainment and gender). In fact, the positive effect of *Attainment* for men (1.08) is

exactly twice the effect for women (1.04). This is also consistent with economic theories. Increased attainment can lead to knowledge, skills, and credentials that will help an individual on the labor market, as well as possibly increasing the social network of the individual. As discussed earlier, men in Chitwan (and all of Nepal) are much more likely to migrate to seek employment outside the household and thereby utilize the human capital benefits gained from educational attainment. A proportion of women also seek employment outside the household, but at a much smaller number than men. Thus, men may have more to gain than women from the skills, knowledge, and credentials gained through educational attainment.

Enrollment is negatively related to the likelihood of out-migration for both women and men. Women who are enrolled in school in any particular year have 0.35 the odds of migrating away as women who are not enrolled. Men who are enrolled have 0.58 the odds of migrating away compared to other men who are not enrolled. In another sense, women who were not enrolled during any particular year are almost three times (2.86) as likely to migrate away as those who were enrolled, and men who were not enrolled are almost twice (1.72) as likely to migrate away. This again is consistent with my hypothesis that the opportunity costs of truncating education may indeed be a mechanism through which enrollment depresses migration and lends credence for economic theory of migration. This assertion is also supported by the strong effects of attainment on migration.

However, the difference in the effect of enrollment for women and men is not statistically significant. This is contrary to my hypothesis. Economic theory leads us to hypothesize that the negative effects of enrollment are directly tied to attainment, through the loss of knowledge, skills, and credentials from truncating education. If this were to

reflect reality, then the relation between the effects of enrollment and attainment should be proportional for men and women. Given that educational attainment appears to have a stronger affect on men, we would expect that the negative affect of enrollment would also be stronger for men. This is not the case. This unexpected result leads us to examine alternative mechanisms that may relate enrollment to migration for women. For women, the association between marriage and migration may be the pathway through which enrollment acts. In the Chitwan study area, research shows a strong negative association between enrollment and marriage- women who are enrolled in school are much less likely to marry (Yabiku forthcoming). Marriage in turn is strongly culturally associated with migration for women in Nepal, as I discussed earlier. Thereby, enrollment may decrease the likelihood of marriage and thus the likelihood of migration for women. This causal chain is completely different from that proposed to explain the effects of enrollment on migration for men, but it may in fact produce the same empirical results.

The effects of educational attainment are stronger when enrollment is included in the models, for both men and women. This difference is larger for women. The odds ratio for *Attainment* for women is not significantly different from zero when *Enrollment* is not controlled in Model 3, and increases to 1.04 (per year completed) when *Enrollment* is controlled in Model 4. For men, the effect of *Attainment* increases, but only slightly from Model 1 to Model 2 when *Enrollment* is controlled. These results indicate not only that enrollment in school has a strong and significant effect on out-migration, but also that we may actually underestimate the effects of educational attainment if we exclude enrollment from analyses.

Conclusion

In general, the results of this study support some of the main theories that explain how education relates to migration. Educational attainment is positively associated with migration for both men and women. This is consistent with economic, social networks, and ideational change theories of migration that predict a relationship between human capital, social capital, gender roles and migration. Current enrollment on the other hand is negatively associated with migration for both men and women. This again is consistent with theory that the high cost of truncating education (and the associated human and social capital) can decrease the likelihood of migration.

The different magnitudes of the effect of attainment but not enrollment on migration for women and men, combined with the cultural context in Nepal, also support the proposition that different mechanisms affect the relationship of education to migration for women and men. This ultimately reflects the different decision-making processes, gender roles, norms, opportunities and expectations within which men and women conduct their lives. In this particular setting, it appears likely that employment plays a larger role in the migration of men, and marriage plays a larger role in the migration of women. Specifically, for women enrollment in formal education decreases the likelihood of marriage, which in turn decreases the likelihood of migration. Essentially, it appears that the hazard of first migration, for many women, is actually a hazard of first marriage.

Evidence of the opposite effects of attainment and enrollment on migration is a particular contribution of this study to the migration literature. These results may help to explain why research has found different and even opposite effects of education on migration, if both educational attainment and enrollment have not been included as

separate predictors. This can guide future migration studies to include enrollment as well as attainment as possible causal factors to accurately predict migration.

One of the limitations of this study is that due to data constraints I am not able to classify migrants by destination. As discussed earlier, human capital and in this case educational skills, knowledge, and credentials may be rewarded differently at domestic and international destinations. In the case of Nepal, most international migrants go across the nearest border to India. Education is likely rewarded very similarly in Nepal and India. The larger difference, and more applicable to the discussion of differential reward of human capital, may be between those who migrate to other rural areas (in Nepal or India) and those who migrate to cities. Still, I am not able distinguish these two groups. It is likely that differentiating between these two groups would make my results even stronger, similar to the effect from disaggregating the effects of attainment and enrollment.

With regard to gender differences in migration, this study has confirmed previous work showing that women likely migrate for different reasons than men (Donato 1993; Zlotnik 1995), based on the cultural context, and associated norms, roles, expectations, and opportunities of women. However, the empirical support for ideational change as a catalyst of migration, particularly for women, as well as increasing enrollment of women in formal education may likely change the male-female dichotomy in migration rates and mechanisms in the future. We can expect that both the rates at which women migrate may increase, and the mechanisms that encourage or discourage them to do so may shift more towards economic and away from marriage explanations in the future. This projection relates not just to Nepal, but to other poor, agrarian countries around the world

where female education rates are increasing sharply, and where marriage may also be tied to education.

Finally, this evidence that education likely affects migration, and particularly *out-migration* from rural areas bears relevance to rural development programs. Many rural development programs view education as one pathway to increasing the abilities of rural residents and stimulating rural economies. Education changes not only the skills, knowledge, and abilities of rural residents, but can also change economic circumstances as well as socialization and ideas within the community. All of these may in fact result in higher rates of out-migration and a brain drain in rural communities.

This discussion is in no way intended to discourage the provision of schools and teachers in rural development programs. Instead it is intended to advocate for comprehensive programs that include economic and political opportunities, along with education, through which educated individuals can use their skills and abilities within and to the benefit of their rural communities.

Tables and Figures

Figure 1- Accessibility of public services across the Chitwan Valley over time – Health centers, schools, temples, police

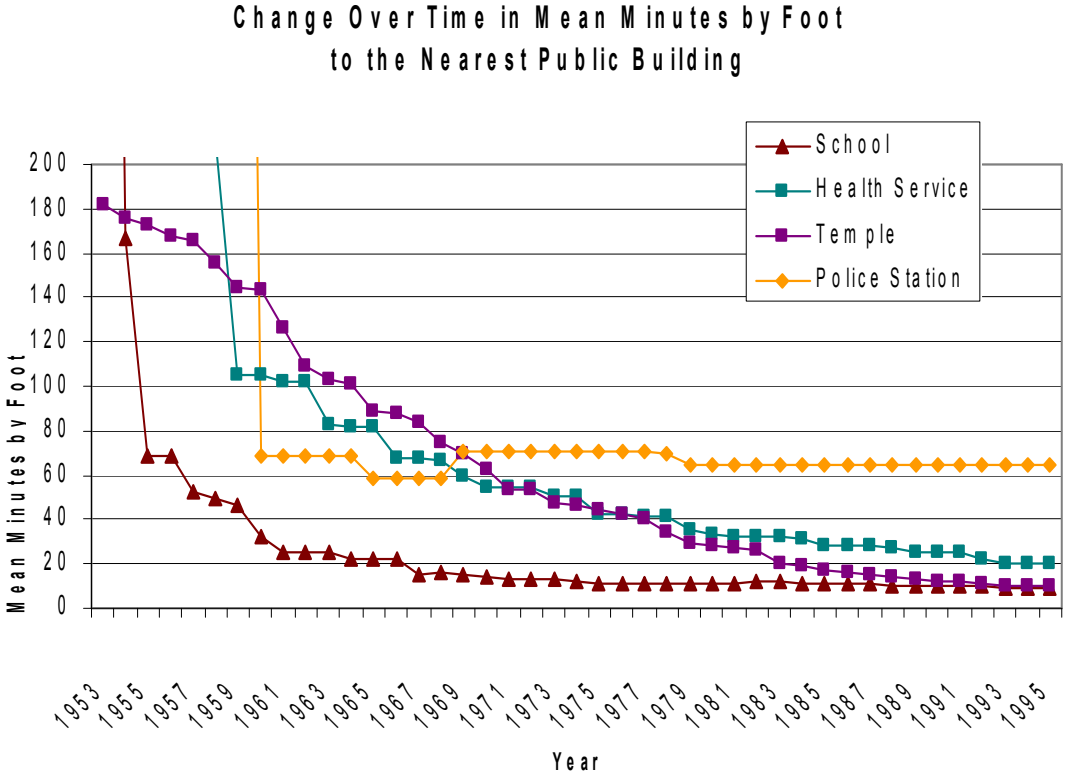

Figure 2- Introduction of private enterprise across the Chitwan Valley- market, bus, employer, bank

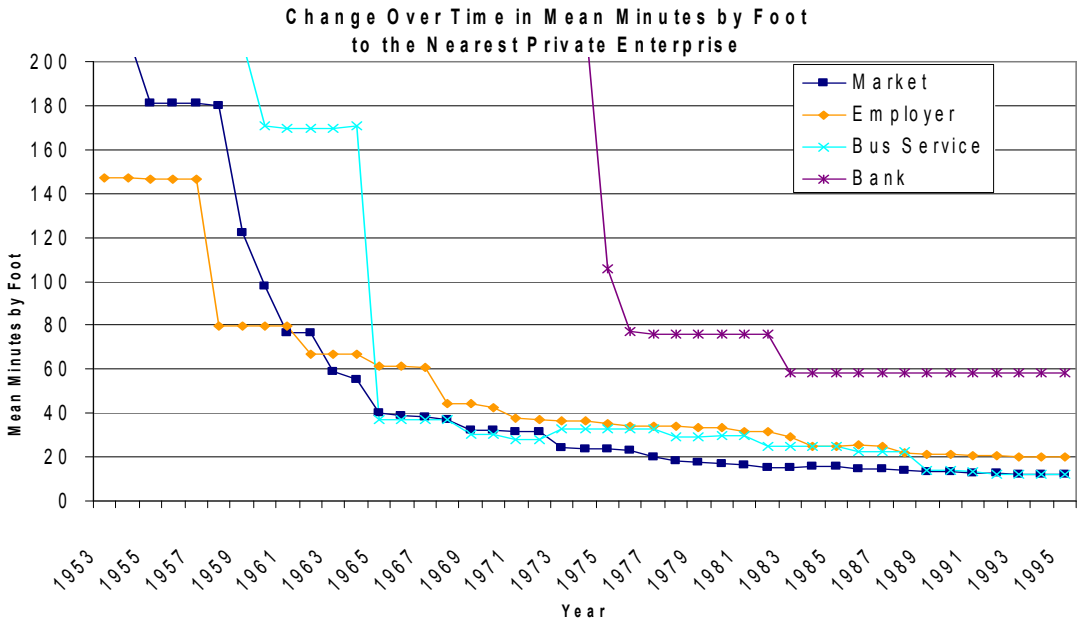

Table 1. Education statistics by gender of Chitwan Valley Family Study.

	% never attended school		Mean years of school completed		Mean years of school completed (of those who finished at least 2 years)	
	Men	***Women***	***Men***	***Women***	***Men***	***Women***
Cohort 1 (born after 1971)	3	11	9.57	8.21	9.96	9.47
Cohort 2 (born 1952 – 1961)	10	37	9.38	5.66	10.74	9.71
Cohort 3 (born 1942 - 1951)	22	68	6.79	1.77	9.03	6.49
Cohort 4 (born 1932 – 1941)	38	84	4.96	0.83	8.54	6.51
Cohort 5 (born before 1932)	63	92	2.57	0.21	7.7	3.80
Note- A large portion of Cohort 1 (age 12-20 at the time of survey) may have not yet completed their schooling. Thus, mean years of school completed may not be an accurate measure of completed education for this cohort. This is reflected in the lower mean years of school completed for Cohort 1 than for Cohort 2.						

Table 2. Descriptive Statistics of Independent Variables Used in Analysis

Variable					
Education	**Mean**	**Median**	**S.D.**	**Min**	**Max**
Highest grade ever completed (men)	7.38	8	5.36	0	25
Highest grade ever completed (women)	4.31	1	5.11	0	24
Childhood Community Context (before age 12)		**Mean**	**S.D.**	**Min**	**Max**
School Access		0.76	0.43	0	1
Economic Services Index		0.59	0.35	0	1
Market		0.80	0.40	0	1
Employer		0.60	0.49	0	1
Bus		0.56	0.50	0	1
Development Program		0.39	0.49	0	1
Social Services Index		0.44	0.27	0	1
Health Center		0.61	0.49	0	1
Temple		0.79	0.41	0	1
Police Station		0.48	0.50	0	1
Women's Group		0.15	0.36	0	1
Cinema				0	1
Individual Characteristics					
Gender (Female?)		0.52	0.50	0	1
Born in Chitwan		0.47	0.50	0	1
Moved to Chitwan after 12 yrs old		0.35	0.48	0	1
Birth Cohort					
Cohort 1 (12-20 yrs old at survey)		0.24	0.43	0	1
Cohort 2 (21-30 yrs old at survey)		0.28	0.45	0	1
Cohort 3 (31-40 yrs old at survey)		0.22	0.41	0	1
Cohort 4 (41-50 yrs old at survey)		0.17	0.37	0	1
Cohort 5 (51-60 yrs old at survey)		0.09	0.29	0	1
Ethnicity					
Upper Caste Hindu		0.45	0.50	0	1
Lower Caste Hindu		0.11	0.31	0	1
Newar		0.06	0.24	0	1
Hill Tibeto-Burmese		0.17	0.37	0	1
Terai Tibeto-Burmese		0.18	0.38	0	1
Other Ethnicity		0.03	0.16	0	1
Parental Characteristics					
Parents' Education		0.32	0.46	0	1
Parents' Work		0.50	0.50	0	1
Parents' Travel		0.36	0.48	0	1

Table 3. Logistic Regression Estimates of Discrete-Time Hazard Models of Out-Migration from Chitwan Valley

Variable	**Model 1** Males Attainment	**Model 2** Males Attainment & Enrollment	**Model 3** Females Attainment	**Model 4** Females Attainment & Enrollment
Education				
Attainment	**1.07** ***	**1.08** ***	**1.01**	**1.04** *
(time varying)	(7.25)	(8.59)	(0.39)	(2.16)
Current Enrollment		**.58** ***		**.35** ***
(time varying)		(5.48)		(4.63)
School Access	**1.08**	**1.04**	**1.23**	**1.20**
Within 45 mins walk	(0.68)	(0.35)	(1.26)	(1.14)
Control Variables				
Childhood Community Characteristics				
Economic Services Index	**1.06**	**1.10**	**.77**	**.81**
# of services w/in 60 mins walk (market + employer + bus + income program)/4	(0.34)	(0.58)	(0.95)	(0.77)
Social Services Index	**.92**	**.88**	**1.64** ^	**1.54** ^
# of services w/in 60 mins walk (hlth + women grp + temple + police + cinema)/5	(0.45)	(0.68)	(1.62)	(1.42)
Parental Characteristics				
Parents' school	**.94**	**.98**	**1.11**	**1.14**
	(0.66)	(0.25)	(0.74)	(0.89)
Parents' work	**1.18**	**1.14** *	**1.12**	**1.12**
	(2.16)	(1.74)	(0.86)	(0.84)
Parents' travel	**1.19**	**1.21** **	**1.34** *	**1.34** *
	(2.28)	(2.47)	(2.14)	(2.15)
Ethnic Group [a]				
Low-caste Hindu	**1.56**	**1.48** ***	**2.01** ***	**1.85** ***
	(3.66)	(3.24)	(3.88)	(3.38)
Newar	**.89**	**.88**	**1.30**	**1.29**
	(0.67)	(0.77)	(1.11)	(1.06)
Terai Tibeto-Burmese	**.87**	**.79** *	**.58** *	**.51** **
	(1.16)	(1.82)	(2.24)	(2.75)
Hill Tibeto-Burmese	**1.43**	**1.38** ***	**1.78** ***	**1.72** ***
	(3.49)	(3.15)	(3.56)	(3.34)
Birth Cohort [b]				
Cohort 2 (born 1952-1961)	**2.66**	**2.47** ***	**2.69** ***	**1.95** **
	(6.77)	(6.21)	(4.66)	(2.99)
Cohort 3 (born 1942-1951)	**2.11**	**1.34** ***	**1.92** **	**1.32**
	(4.67)	(3.79)	(2.53)	(1.06)
Cohort 4 (born 1932-1941)	**1.19**	**1.07**	**1.61** ^	**1.21**
	(0.91)	(0.35)	(1.62)	(0.64)
Cohort 5 (born before 1932)	**.80**	**.74**	**.95**	**.75**
	(.92)	**(1.28)**	(0.13)	(0.71)

Table 3 continued on next page.

Table 3 continued. Logistic Regression Estimates of Discrete-Time Hazard Models of Out-Migration from Chitwan Valley

Variable	**Model 1** Males *Attainment*	**Model 2** Males *Attainment & Enrollment*	**Model 3** Females *Attainment*	**Model 4** Females *Attainment & Enrollment*
Timing				
0-7 years after age 12	**1.07**	**1.05 ***	**1.02**	**.98**
	(2.98)	(1.91)	(0.49)	(0.46)
8-11 years after age 12	**1.00**	**.97**	**.83 ****	**.81 ****
	(0.08)	(0.80)	(2.70)	(2.98)
12-14 years after age 12	**.80**	**.79 *****	**.91**	**.92**
	(3.96)	(4.16)	(0.81)	(0.70)
15+ years after age 12	**.96**	**.96 ***	**.91 ***	**.91 ***
	(2.35)	(2.24)	(2.27)	(2.17)
Birthplace				
Born in Chitwan	**.86**	**.87 ^**	**.95**	**.99**
	(1.56)	(1.48)	(0.32)	(0.05)
Moved to Chitwan after age 12	**.91**	**.76**	**.79 ^**	**.68 ***
	(0.82)	(2.37)	(1.35)	(2.24)

Note: Estimates are presented as **odds ratios.** Asymptotic z-statistics are given in parentheses.
^ p<.10 *p<.05 **p<.01 ***p<.005
[a] reference category is- Upper-Caste Hindu.
[b] reference category is- the birth cohort 1 age 12-24 (at survey).

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