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Social Change and the Relationships between Education and Employment

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Abstract

The relationships between education and employment have long been of interest to social scientists. During the transition from a completely agricultural economy to one that is developing nonfarm opportunities, however, the relationships between education and employment may dramatically change. We examine how two components of education—schooling enrollment and attainment—affect the transition to employment for men and women in the Chitwan Valley of Nepal. Using discrete-time event history models, we find that school enrollment tends to delay employment, while school attainment accelerates employment. We also test how these effects may have changed across successive cohorts. Over time, the effects of enrollment have become stronger, while the effects of attainment appear to have weakened. These shifts in the nature of education may be related to increasing conflict between student and employee roles, as well as changes in the types and availability of employment.

Introduction

The change from a purely agricultural subsistence economy to an economy that has nonfarm labor opportunities is an important transition. This transition is likely to have significant consequences for many domains of life. Previous research has shown that as these frontier areas gain schools, health clinics, markets, and transportation infrastructure, there are subsequent changes in individuals' marriage rates (Yabiku 2004), fertility and contraceptive use (Korinek, Chen, Alva, and Entwisle 2006; Frankenberg and Thomas 2001; Axinn and Yabiku 2001; Axinn and Barber 2001; Entwisle et al. 1996), family and nonfamily relationships (Miguel, Gertler, and Levine 2006; Korinek, Entwisle, and Jampaklay 2005; Ghimire et al. 2006; Hoelter, Axinn, and Ghimire 2004), and attitudes towards family life (Barber 2004).

Less research has examined the changing role of education in areas that are undergoing rapid social change. Of course, many researchers have examined how education is related to a variety of outcomes in developing settings. Past research has also invoked a life course perspective in which to frame their questions, so that researchers examine how educational experiences early in life delay some transitions while accelerating others. Most prior research, however, has not examined how the impact of education may differ across

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historical time periods. Although the life course perspective is frequently used to study individuals' behaviors (Elder 1994), most researchers study only the timing of events within individual lives. This approach, however, often neglects the equally important context of the individual within history (Elder 1994). When studying time at both levels, researchers can more thoroughly understand how individual behavior and social change are linked.

We contribute to the literature by examining how nonfamily employment is related to two components of education: schooling enrollment and schooling attainment. In addition, we focus on cohort differences and what these differences suggest for larger shifts in historical transformations in the expansion of mass schooling and nonfamily employment. The data for testing our hypotheses come from the Chitwan Valley Family Study, a project located in rural south central Nepal.

Setting

The Chitwan Valley is 450 feet above sea level about 100 miles southwest of the capital city of Kathmandu. Chitwan is located in the Terai region of Nepal—low-lying plains along the southern borders of the country. Until the end of the 1950s, the Chitwan area was largely uncultivated jungle until the Nepali government, with assistance from the United States Agency for International Development, introduced the Rapti Valley Land Development Project to eradicate malaria and deforest the land (Ghimire 1992; Shivakoti et al. 1999; Axinn and Yabiku 2001). What was once jungle became prime farmland by the end of the 1960s, and migration to the area increased dramatically (KC and Suwal 1993; Guneratne 1996; Axinn and Yabiku 2001). The Chitwan Valley soon became a major farming region, and services and infrastructure expanded across the area (Axinn and Yabiku 2001).

Among these immense changes in the study area has been the expansion of schooling and employment opportunities. Before the area was cleared as part of the Rapti Valley Land Development Project, there were no schools and few employers. Over time, however, these organizations have now become prominent in the daily lives of residents. Figure 1 shows the minutes walk, averaged across each of the study neighborhoods, to the nearest school and employer (an employer was defined as any place that employed 10 or more people for pay). These data come from neighborhood history calendars that were collected as part of the Chitwan Valley Family Study. In 1955, employers and schools averaged more than a 2 hour walk away, but these times quickly decreased as the study area was developed and its population grew. Schools spread more quickly, and by the late 1960s, the neighborhoods were on average a 15 minute walk to the nearest school. By 2004, however, both schools and employers were very close. Neighborhoods averaged about an 8 minute walk to the nearest school, and an 11 minute walk to the nearest employer. An additional change has been the kinds of schools. Data from the Chitwan Valley Family Study show that from 1954 (when the first schools in the study area opened) until 1981, all schools in the study area were founded by local community members, the government, or by a combination of the two. In 1981, however, the first private, for-profit school opened, and by 2005, 28 of these private schools existed. Private schools often charge higher tuition and fees, offer instruction in English, and thus represent yet another important expansion and development of educational institutions in this area.

This large expansion in social organizations has been accompanied by similar transformations at the individual level. Although detailed, historical individual-level data focusing solely on the Chitwan Valley study area are not available, useful trends can be obtained from 1976 Nepal World Fertility Study (WFS) and 1996 and 2006 Demographic and Health Survey (DHS) data. In the Terai region of Nepal (in which the Chitwan study area is located), in 1976 the education of married women aged 15–49 averaged only .24

years, and their husbands averaged 1.75 years. Only 6% of the women stated an employment activity outside of farm labor, as did 24% of the men. In 1996, this group of women averaged 1.04 years of education and 7% worked outside of farm labor; the men averaged 3.65 years of education and 37% worked outside of farm labor. By 2006, the women averaged 2.04 years of education and 8% worked outside of farm labor, and the men averaged 4.89 years of education and 53% worked outside of farms. These trends show growth in educational attainment for both men and women, though women still lagged far behind men. Men also show large increases in non-farm occupations. Women's participation in non-farm occupations, however, has remained low. Note that these measurements of occupation are imprecise because respondents were allowed to indicate only one occupation. It is very likely that many respondents who indicated a non-farm occupation also worked in agriculture, either concurrently or at another time in their lives. Nevertheless, the consistent measurement over time allows useful, though rough, trends to be calculated.

Focusing on the education, employment, and social changes in Chitwan is important for several reasons. First, the transformation in social organization has been particularly rapid. The modes of production encompassed over the past fifty years include indigenous jungle-dwelling peoples, migrants practicing subsistence agriculture, and a growing class of people who are employed in nonfamily organizations such as shops, factories, and government offices. Second, the Chitwan Valley is located across the border from the Indian states of Uttar Pradesh and Bihar, and the population of Chitwan shares many social characteristics with areas of Northern India, Western Bangladesh, and Eastern Pakistan. Thus the findings from the Chitwan Valley may provide insight into other areas in South Asia experiencing rapid increases in nonfamily organization and educational systems. Third, very detailed life histories have been collected from a wide age range of respondents in this setting. These data facilitate a thorough life course analysis of education and employment that improves upon previous research.

Theories and Hypotheses

Previous research on education and life course transitions has separated the components of education into two distinct mechanisms: schooling enrollment and schooling attainment. Among young people, schooling enrollment usually delays life course transitions because the role of the student frequently is seen as incompatible with other roles (Blossfeld and Huinink 1991; Thornton, Axinn, and Teachman 1995; Raymo 2003). Normative expectations sometimes view the completion of education as a prerequisite to adulthood and adult roles: spouse, parent, and employee (Hogan 1978; Rindfuss, Swicegood, and Rosenfeld 1987). Furthermore, if parents are paying for school expenses, they may encourage children not to make transitions into other roles. Becoming a parent or obtaining a job can interrupt schooling and waste parental resources. Thus school enrollment is hypothesized to be negatively associated with obtaining employment.

School accumulation, on the other hand, often increases subsequent life course transitions into adult roles among young people because the schooling has increased an individual's human capital and attractiveness as a marriage partner or employee (Becker 1991; Blossfeld and Huinink 1991; Thornton, Axinn, and Teachman 1995; Raymo 2003). School accumulation, therefore, is hypothesized to increase the rate at which a young person takes a first job.

While previous research has extensively explored these twin aspects of education (enrollment, attainment), these investigations have focused primarily on Western settings where there has not been rapid social change (e.g., Blossfeld and Huinink 1991; Thornton, Axinn, and Teachman 1995), or on Asian countries with modern industrial economies (e.g.,

Raymo 2003). The nature of educational enrollment, attainment, and employment may be very different in rapidly changing societies, and these relationships are likely to change across historical time.

Some prior research suggests key differences in transitional economies, such as those rapidly changing from completely agrarian to a mix of farm and nonfarm opportunities. In these settings, people's desires to obtain schooling may be based on an "ideology of progress" about the value of education (Craig 1981), and not so much on actual job opportunities. Thornton's thesis of developmental idealism proposes that the mere belief in the benefits of a "modern society" can stimulate individuals to pursue higher education and other "modern" behaviors (Thornton 2001). It is quite possible that individuals seek education with the goals of betterment and obtaining a place in a workforce that may not actually exist.

Research suggests the returns to schooling can decline when the educational system expands more quickly than the demand for skilled labor (Bartlett 1978). Angrist (1995) showed that as education increased rapidly in the West Bank and Gaza Strip from 1981–1987, wage premiums for the most educated men dropped, apparently because the labor market had an oversupply of skilled workers. Similar patterns have been observed in Peru (Post 1990) and Kenya. After Kenya received its independence in 1963, the Kenyan government began a large scale expansion and promotion of the educational system, and they devoted a large share of the country's resources to schooling (Buchmann 2000; Godia 1987). This was done with the expectations that a more educated population was the answer to solving the country's economic problems and that education would lead to economic growth, but these educated job-seekers had no labor positions to enter into upon culmination of their studies. The result was a high number of unemployed and underemployed educated individuals. Many of the educated that had completed secondary school and received employment were employed in the lower levels of the job market as unskilled manual workers (Buchmann 2000; Godia 1987). Other rapidly changing countries, such as Ghana and Sri Lanka, also have populations whose educational credentials outstrip the available jobs (Foster 1963; Rado 1972; Malhotra and Tsui 1996). In Sri Lanka, the problem is especially acute for women. The women in this population have a strong desire to participate in the labor force, and have a slightly higher enrollment in secondary education than males, but due to gender inequity available job opportunities are limited (Malhotra and Tsui 1996; Malhotra and Mather 1997).

Declining returns to formal education have been found in several studies that look at settings undergoing rapid economic deterioration. Morgan and Morgan (2004) found that a severe economic decline in the 1980s in Kano, Nigeria, negatively impacted the professional and skilled workers the most. Individuals with apprenticeship education in trades, however, continued to do well. A study in Burkina Faso also found that the link between education and employment can be weakened (Calves and Schoumaker 2004). In fact, urban educated youth had higher unemployment that less educated youth (Calves and Schoumaker 2004). Alva and Entwisle (2002) also point to a link between higher schooling and lower employment in Nang Rong, Thailand, following the 1997 economic crisis. Overall, it seems that when an area's economy is not equipped to employ a surplus of educated individuals, returns to schooling dwindle, and schooling is less likely to be associated with levels of employment.

Given that transitioning societies are often able to improve their educational system before their economy can absorb an educated labor force, one hypothesis is that over time, the effect of educational attainment in Chitwan, Nepal, might remain static or become weaker. More and more individuals may accumulate higher levels of education, but many will be

unable use that education to obtain jobs, and thus more educational attainment is less effective at securing employment.

On the other hand, previous research suggests that as economies experience market growth and begin to transition out of purely agricultural to at least some nonfarm labor, the composition of jobs in the labor market changes so that there is an increase in more jobs that require formal education (Anderson and Leiserson 1980). Over time, this demand for more educated workers manifests itself as the economy begins to rely more on service and technology, and more of the labor market will shift into jobs such as those in clerical, managerial, and technical fields (Farrag 1964). More complex jobs require more schooling (Rosenzweig 1995). As technology becomes more widespread, workers with more education are required to fill these jobs, and thus the returns to schooling increase (Rosenzweig 1990). Another example is primary school teachers; in a less developed country the educational requirements for a primary school teacher is often less than that of a fully developed country (Farrag 1964). The education industry is a particularly relevant example because not only does the education level increase for positions in this industry over time, but it becomes a larger composition of the workforce as countries develop (Harbison and Myers 1964). Development and prosperity can also increase the returns to schooling (Dostie and Jayaraman 2006). In a study in Zambia, Nielsen and Westergard-Nielsen (2001) found that in urban areas, there were substantial returns to schooling for education above primary school, whereas in rural areas there were no benefits to education beyond primary level. This suggests that there needs to be a demand for skilled, educated workers in order for higher levels of educational attainment to be rewarded in employment. Thus there is also good reason to hypothesize that the relationships between educational attainment and employment in Chitwan, Nepal, might become stronger over time, as long as the economy develops at a pace equal to or more rapid than the educational system.

With respect to the effects of school enrollment, we hypothesize that these negative effects on employment will become stronger (more negative) over time. Prior literature has consistently shown that as societies develop nonfarm labor markets, education is seen as increasingly valuable (Post 1990; Buchmann 2000; Godia 1987). Parents encourage their children to obtain more education as long as the benefits of this educational are visible (Punch 2002). In Nang Rong, Thailand, Alva and Entwisle (2002) found delayed entry into the work force and higher schooling participation among young people as economic opportunities continued to develop. Thus as roles become more differentiated in these societies, there is likely to be stronger role conflict between the student role and the employee role. Research suggests that in rapidly transitioning societies, an important change is that parents begin to view adolescence as a time for education and not other duties, such as employment or family formation (Caldwell et al. 1998; Lassonde 1996).

In sum, we expect schooling enrollment to have negative effects on the transition to employment, but we expect schooling attainment to have positive effects on the rate at which individuals obtain jobs. These effects are well-established in the prior literature for several life course transitions and outcomes (Blossfeld and Huinink 1991; Thornton, Axinn, and Teachman 1995; Raymo 2003). What is less known—and is the primary contribution of this paper—is how the effects of enrollment and attainment on employment change across time in rapidly developing settings, such as the Chitwan Valley of Nepal. There are good reasons to believe these relationships may become stronger over historical time, yet other expectations suggest these relationships may become weaker. As described below, we analyze retrospective life history calendar data with discrete-time event history methods to test these divergent hypotheses.

Data and Methods

The data for the analysis comes from the Chitwan Valley Family Study (CVFS), a probability sample of 5,271 respondents in the Chitwan Valley, in rural south central Nepal. The study area encompasses about 93 square miles of mostly rural communities, although there has been a growing presence of nonagricultural activities and organizations, such as schools, nonfarm employers, transportation infrastructure, cinema, and markets.

In 1996, respondents aged 15–59 (and their spouses, regardless of age) were administered an individual questionnaire that measured a variety of schooling, family, and attitudinal issues. Respondents also completed a life history calendar (Axinn, Pearce, and Ghimire 1999) that captured the timing of important events in the life course, including marriage, childbearing, contraceptive use, schooling, and employment.

Because our dependent outcome is a process that develops over time (the transition to employment) not all respondents have experienced the event. For these outcomes, event history models are appropriate. Because the data measured schooling and employment dates to the nearest year, the time unit of analysis is the person-year. We use logistic regression to estimate our discrete-time event history models. An additional consideration in event history models is the parameterization of time, sometimes called the baseline hazard. Unlike a Cox proportional hazard, which allows the baseline hazard to be left unspecified, in a discrete-time hazard model the baseline hazard must be specified (Allison 1995). To avoid making assumptions about the parametric form of this baseline hazard, we parameterize it with a series of dummy variables for different time periods of risk across the respondents' life courses: ages 0–9, 10–14, 15–19, 20–24, 25–29, 30–34, and 35 and above.

Dependent variable

Employment. The outcome of interest is the rate of transition to first employment outside the family, including family-owned business outside the home and salaried employment. The dependent variable is coded 0 for every year in which the respondent is not employed. Once the respondent experiences employment, the dependent variable is coded 1, and respondents no longer contribute person-years to the dataset. In the analysis, individuals become at risk of employment when they are born, and they are removed from risk after they are first employed. Individuals who have never experienced employment by the time of the 1996 survey are censored.

Education

Education is measured with two variables. Schooling enrollment is measured with a time-varying variable that is coded either 1 or 0, depending on if the respondent is enrolled in school for a given year. Schooling attainment is a time-varying variable that accumulates the number of years the respondent has been in school. This variable starts at 0 and increments by 1 for every year of school. Both of these time-varying measures are lagged by one year so that prior schooling is used to predict employment.

Controls

There are several control variables included in the models to lessen the chances of spurious associations between education and the transition to employment. A time-varying indicator of marriage is coded 1 if the respondent has ever been married, and 0 otherwise. Several parental background measures are also controlled: father's schooling, mother's children ever born (family size), parental work experience, and parental exposure to media (movies).

Ethnicity is controlled through dummy variables that represent the five major ethnic subdivisions in the valley (Axinn and Yabiku 2001). The first two groups are Hindus: Upper Caste Hindus, such as Brahmins and Chhetris, and Lower Caste Hindus, known as the occupational castes. Being Hindu in a historically Hindu state, these two groups have had the most advantages in Nepal, but the Upper Caste Hindus benefited most (Pearce 2000). The third caste group in Chitwan is the Newars, who are of Tibetan origin and have gradually assimilated many Hindu practices into their religious and civil life (Bista 1972). Their people have been merchants, shopkeepers, and businessmen, and education of Newars often equals that of Upper Caste Hindus (Axinn and Yabiku 2001). The fourth and fifth groups most prevalent in Chitwan are also of Tibeto-Burman origin, but unlike the Newars these last two groups have not been assimilated into Hinduism as thoroughly and have not had the advantages the Newars enjoyed. The Hill Tibetoburmese and Terai Tibetoburmese generally have lower education and poorer life outcomes than other, more advantaged groups (Axinn and Yabiku 2001).

Cohort indicators are used in the interaction models to test if the effects of education have changed over time. Individuals were divided into the following birth cohorts: born between the years 1937–51, 1952–61, 1962–71, and 1972–81. In addition, because the process of schooling and employment may differ between men and women, models are estimated separately by sex.

A final aspect of the analysis is the clustered nature of the data. There is some dependence between individuals in the same neighborhood. We use multilevel modeling techniques to protect against deflated standard errors and potentially biased hypothesis tests (Barber, Murphy, Axinn, and Maples 2000). The GLIMMIX macro in SAS is used to estimate variance components models, which allow for a random term in the intercept. This lets the intercept vary randomly by neighborhood. These models have been used successfully in prior analyses of neighborhood clustered data from the Chitwan Valley Family Study (Yabiku 2004; Axinn and Yabiku 2001; Axinn and Barber 2001).

Results

Before examining the multivariate results, we briefly examine some descriptive statistics in Table 1. Note that time-varying measures have their mean taken at the last observed year, which is either the year of employment or censoring. If the means of all person-years were taken, then the descriptive statistics would have been unequally weighted to individuals who had longer durations until employment or censoring.

One noticeable difference between men and women in the sample is that many more men than women made the transition to employment: 52% of the men in the sample took a job outside the home, whereas only 7% of women did. Note that the lifetime prevalence of employment in the sample will be higher since non-employed respondents were censored in 1996. Nevertheless, there is a substantial gap in men and women's employment participation. This substantial gap is not surprising, since men in Nepal are far more likely to work outside the home than women, especially when it comes to non-agricultural jobs. As estimated by the UN Food and Agriculture Organization, in 2000 10% of the male economically active population in the entire country of Nepal was currently employed outside of agriculture, but only 2% of women were (United Nations Food and Agriculture Organization 2006).

Another difference between the sexes was education: at the time of employment or censoring, 34% of men were in school, but only 18% of women were. Also, at that time, men averaged 7.5 years of schooling, but women averaged only 4.4 years. More women

than similarly-aged men had married, but this is to be expected because women marry at earlier ages than men. There were little notable differences between men and women in the remaining control variables—father's education, mother's children ever born, if the parents ever worked outside the home, and if the parents ever saw a movie. The ethnic distribution of the sample was also nearly identical for men and women.

In Table 2, we examine the relationship between education and the rate of transition to first employment. The results of the hazard models are presented as odds ratios, which are the antilogs of the logistic regression coefficients. A coefficient greater than 1 represents a positive effect that accelerates the rate of employment, while a coefficient less than 1 is a negative effect that delays employment. Because effects are multiplicative, an effect equal to 1 is a null effect that does not influence the rate. In model 1, there are strong relationships between education and employment. If men were enrolled in school, they took jobs at rates that were 51% lower than non-enrolled men (1.00 − .49 = .51). This result is consistent with the hypothesis that school enrollment creates role conflict with the employee role, and thus this transition is delayed. The years schooling accumulated, however, is positively associated with the rate of employment. For each year of schooling attained, the rate of employment increases by 11% (1.11 − 1.00 = .11). This is consistent with a human capital explanation, where men—once they exit schooling—enter employment at higher rates because they are more valued to employers than non-educated men.

The effects of control variables are generally as the previous literature would expect. There is a strong intergenerational component in employment: if a parent worked outside the home, then men's rates of employment were 23% higher. Family size also increased the rate of employment, with each child increasing employment rates by 3%. Lastly, there are strong cohort effects—the youngest cohort of men entered employment at rates that were almost 2.5 times that of the oldest cohort. There were no significant differences in the transition to first employment by ethnic group.

Model 2 of Table 2 replicates the models for women. Despite women's lower levels of employment and schooling displayed in the descriptive statistics, the effects of schooling for women have similar patterns to those of men. Enrollment decreased the rate of employment by 63%, and each year of schooling increased the rate of employment by 21%. Note that the magnitude of these effects is even larger (further away from 1.00) than the comparable schooling measures for men. Another difference between the models is that for women, the effect of marriage is significantly negative. This is not surprising, given that gender roles in Chitwan, Nepal, are highly segregated, and marriage is likely to cause women to focus on home labor.

The results in Table 2 have given support for the role conflict mechanism of enrollment and the human capital mechanism of attainment. These two mechanisms of education are significantly associated with the transitions to first employment for both men and women. To further apply a life course framework, however, requires that we examine that context of these relationships within historical time (Elder 1994). One way to do this is to test how the effects of enrollment and attainment vary across cohorts (Ryder 1965;Blossfeld and Huinink 1991;Raymo 2003).

We expect the role conflict dimension to become stronger as education becomes more widespread and valued. Thus we expect the effect of enrollment to become more negative for more recent cohorts. For the human capital dimension, effects of attainment becoming more positive would be consistent with the view that educational attainment is becoming a stronger precursor to employment. This might mean that employment in Chitwan is becoming increasingly oriented to jobs that require more skills and credentials. On the other

hand, if the effects of attainment were to become weaker over historical time, it could mean that educational attainment is less successful in securing jobs. This might be due to a population becoming more educated at the same time as the number of jobs needing more education could not keep pace.

Table 3 tests how the effects of enrollment and attainment vary across cohorts. Note that in Table 3, all the controls from Table 2 are estimated, but only the coefficients for enrollment, attainment, and their interactions with cohort are displayed. This is to reduce the amount of information in Table 3 and ease interpretation. Model 1 examines men. Although there is not a significant main effect of enrollment, there is a significant interaction between enrollment and the 1972–81 birth cohort. This means that the negative effect of enrollment (i.e., an odds ratio less than one) becomes even more negative for the 1972–81 cohort (compared to the reference cohort, which is born 1937–51). These findings are consistent with the idea that role conflict between schooling and employment has increased over time in Chitwan, perhaps as the student and employee role have become more distinct.

The effects of schooling attainment, however, have not significantly changed over time. There are no significant interactions between attainment and cohort. Note, however, that the interaction between years schooling attained and the cohort born between 1972–81 is almost significant ($t = -1.90$; $p = .06$). Thus there is some weak evidence for the effects of school attainment becoming less strongly associated with employment.

In model 2, the same models are estimated for women. The results are similar. For women, too, the effects of enrollment became significantly more negative for the youngest cohort (born 1972–81), supporting increased role conflict among younger cohorts of women. There is also strong support for changing effects of years schooling attained across cohorts. Compared to the oldest cohort of women, the effects of schooling attainment weakened, as shown by the significant negative interactions of attainment with the cohort indicators. In more recent cohorts, the effects of years schooling were less strongly associated with the rate of employment than for the oldest cohort.

Discussion

In this paper we have taken a life course approach to studying the relationships between education and employment in a setting of rapid social change. Note only have we examined the role of education in an important life course transition, we have also placed these individual-level transitions within the broader historical context. We found that, overall and averaged across cohorts, enrollment tended to delay the rate of first employment, while attainment increased the rate of employment. Across cohorts, however, there was significant variation in these effects. For both men and women, the effects of enrollment became significantly more negative on rates of taking a first job in younger cohorts. In other words, enrollment became increasingly more associated with delayed labor market entry. These results would be consistent with the explanation that role conflict with the employee and student role grew. In other words, parents and young people were starting to believe that childhood and adolescence were the time for education, not employment (Caldwell et al. 1998; Lassonde 1996).

For men, the effects of attainment slightly weakened across cohorts, though this was of borderline significance. For women, attainment significantly weakened for younger cohorts of women. These results are consistent with a situation in which subsequent cohorts become more and more educated, yet there may not have been enough jobs available that would use their education to their full potential. In other words, young people’s educational credentials may have outstripped the available jobs (Foster 1963; Rado 1972; Malhotra and Tsui 1996).

Another finding of this study was the differences by gender. Although the general trends were similar for men and women, the effects of enrollment and attainment were heightened for women. In addition, evidence for changing effects of education over time was stronger among women. These findings may be related to a higher degree of selectivity into education and employment for these women. When deciding to pursue education and employment outside the home, women are more likely to face greater opportunity costs through lost home production activities, such as household labor and child care (Behrman, Wolfe, and Blau 1985). Many developing settings also have values systems that discourage women from working outside the home (Glick and Sahn 1997). Accordingly, in Chitwan, levels of educational enrollment and attainment, as well as employment, were lower for women. Women who pursue education and obtain subsequent employment despite these factors may be more selected than men with apparently similar observed patterns of education and employment. These women, or their families, may have higher levels of unobserved motivation or aspiration for more education and nonfamily experiences.

There are several limitations to our study. First, although we examined the changing effects of educational enrollment and attainment across time—and we proposed explanations for what these changing effects meant—we did not directly observe changes in the supply of education, the demand for skilled labor, or the rate of technological change. These factors have been discussed in prior literature as important mechanisms that link educational and employment processes (Glick and Sahn 1997; Angrist 1995; Rosenzweig 1990). Thus while these explanations are consistent with our empirical models, we cannot conclusively specify which mechanisms, if any, underlie these results. Second, we operationalized the returns to schooling as the rate at which individuals obtained nonfarm jobs outside the home. This is an imperfect measure, as it obscures differences within these very broad categories of employment. We also lacked any measure of wages or job income, which further makes our measurement of returns to schooling only a rough indicator. And, like most studies, we lack measures of the quality of schooling (Behrman and Birdsall 1983). Finally, although we allow the effects of enrollment to vary across cohort, there may still be additional contingencies in these enrollment effects that complicate cross cohort comparisons. More recent cohorts have greater educational attainment and are enrolled in school at older ages. Thus, enrollment effects may interact not only with cohort, as has been modeled in the analyses, but also with attainment and age. These contingencies would probably vary by sex, as well. These multiple interactions would be complex to interpret simultaneously, but they would provide additional insight into the cross cohort comparisons and thus represent a fruitful direction for future research.

Despite these shortcomings, we believe this paper makes a contribution. In a context such as Chitwan an individual’s decision to take a nonfarm job represents a significant shift in the modes of production. Thus, modeling these decisions provides insight into how educational attainment and enrollment have been involved in this important societal transformation. The retrospective life history data across 45 years of schooling and employment activities are a rich resource. The data have allowed us to examine cohort differences in the transition to employment across a time period long enough that fundamental changes in the nature of schooling and employment have occurred. Future work is needed to examine in depth some of the mechanisms why the relationships between schooling and employment have steadily transformed across time.

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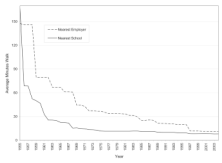

Figure 1.
Average Minutes Walk from 171 Sample Neighborhoods to Nearest Employer and School, 1955–2004

Table 1

Descriptive Statistics

	Men		Women	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev**
Made Transition to Employment	.52	.50	.07	.25
Enrolled in School †	.34	.47	.18	.38
Years Schooling Accumulated †	7.50	5.46	4.38	5.14
Ever married †	.46	.50	.75	.43
Father ever went to school	.29	.45	.32	.47
Mom's children ever born	5.54	2.47	5.95	2.63
Parents worked outside home	.53	.50	.48	.50
Parents ever saw movie	.41	.49	.46	.50
Cohort				
Born 1972–81	.33	.47	.40	.49
Born 1962–71	.26	.44	.24	.42
Born 1952–61	.20	.40	.19	.40
Born 1937–51	.20	.40	.17	.38
Ethnicity				
Upper Caste Hindu	.47	.50	.47	.50
Lower Caste Hindu	.11	.32	.11	.32
Newar	.06	.24	.07	.25
Hill Tibetoburmese	.17	.38	.17	.38
Terai Tibetoburmese	.18	.39	.17	.38
N	2307		2614	

† Time-varying variable

Note: means of time-varying measures are evaluated at the last observed year

Table 2

Schooling Effects Constrained Across Cohorts

	Men	Women
	1	2
Enrolled in School	0.49***	0.37***
	(−8.34)	(−5.24)
Years Schooling Accumulated	1.11***	1.21***
	(12.30)	(10.87)
Cohort ‡		
Born 1972–81	2.44***	5.94***
	(7.37)	(5.69)
Born 1962–71	2.22***	3.28***
	(7.65)	(4.02)
Born 1952–61	1.61***	1.58
	(4.78)	(1.63)
Ever married	0.87	0.63*
	(−1.62)	(−2.49)
Father ever went to school	0.89	1.04
	(−1.49)	(0.29)
Mom's children ever born	1.03*	1.07**
	(2.07)	(2.58)
Parents worked outside home	1.23**	1.44**
	(3.18)	(2.69)
Parents ever saw movie	0.94	1.19
	(−0.92)	(1.18)
Ethnicity †		
Lower Caste Hindu	1.12	0.59
	(1.01)	(−1.69)
Newar	0.84	0.57
	(−1.28)	(−1.89)
Hill Tibetoburmese	0.84	1.02
	(−1.75)	(0.08)
Terai Tibetoburmese	0.96	2.01**
	(−0.39)	(2.98)
Intercept	0.01***	0.001***
	(−27.06)	(−18.86)
Person Years (N)	61257	78563

Coefficients are odds ratios, with significance statistics in parentheses

Parameters for the baseline hazard are estimated, but are not displayed

† Reference group is Upper Caste Hindu;

‡Reference group is born 1937–51

*p<.05,

**p<.01,

***p<.001, two-tailed tests

Table 3

Schooling Effects Unconstrained Across Cohorts

	Men	Women
	1	2
Enrolled in School	0.76	3.34
	(−1.11)	(1.31)
Enrolled in School * Born 1972–81	0.41**	0.08**
	(−3.06)	(−2.64)
Enrolled in School * Born 1962–71	0.79	0.20
	(−0.88)	(−1.68)
Enrolled in School * Born 1952–61	0.92	0.16
	(−0.29)	(−1.52)
Years Schooling	1.12***	1.43***
	(6.47)	(5.27)
Years Schooling * Born 1972–81	0.95	0.85*
	(−1.90)	(−2.23)
Years Schooling * Born 1962–71	0.97	0.82**
	(−1.43)	(−2.80)
Years Schooling * Born 1952–61	1.02	0.83*
	(0.87)	(−2.49)
Cohort ‡		
Born 1972–81	5.26***	8.81***
	(7.85)	(5.64)
Born 1962–71	2.78***	4.99***
	(6.43)	(4.66)
Born 1952–61	1.37*	2.23*
	(1.97)	(2.42)
Ever married	0.86	0.64*
	(−1.61)	(−2.47)
Father ever went to school	0.91	1.05
	(−1.12)	(0.31)
Mom's children ever born	1.02	1.07**
	(1.37)	(2.60)
Parents worked outside home	1.22**	1.43**
	(2.85)	(2.63)
Parents ever saw movie	0.94	1.16
	(−0.86)	(1.01)
Ethnicity †		
Lower Caste Hindu	1.09	0.58
	(0.73)	(−1.73)

	Men	Women
	1	2
Newar	0.83	0.57
	(−1.24)	(−1.85)
Hill Tibetoburmese	0.84	0.97
	(−1.66)	(−0.15)
Terai Tibetoburmese	0.91	1.97**
	(−0.89)	−2.86
Intercept	0.01***	0.001***
	(−24.24)	(−18.48)
Person Years (N)	61257	78563

Coefficients are odds ratios, with significance statistics in parentheses

Parameters for the baseline hazard are estimated, but are not displayed

† Reference group is Upper Caste Hindu;

‡ Reference group is born 1937–51

* p<.05,

** p<.01,

*** p<.001, two-tailed tests