Education and the timing of sexual initiation and marriage in rural Malawi: a longitudinal analysis of the effect of school participation, school dropout and cognitive ability

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The prevalence of early marriage has declined in sub-Saharan Africa in the last couple of decades; women aged 15-24, particularly those 15-19, are less likely to be married than in the past, as are men aged 20-24. At the same time that prevalence of early marriage has declined throughout the region, the prevalence of premarital sex has increased. An analysis of Demographic and Health Survey (DHS) data from sub-Saharan Africa indicates that in the vast majority of countries in which the prevalence of early marriage has declined, the prevalence of premarital sex has increased. In Malawi, premarital sex by age 18 has risen from 25 percent among women 40-44 years old to 32 percent among 20-24 year olds while marriage by age 18 has declined from 55 percent to under 50 percent. However, no significant change has occurred in the percentage of young women initiating sex prior to age 18 because the rise in the percentage engaging in premarital sex has been offset by an increase in age at marriage (Mensch, Grant, and Blanc 2006).

Women's level of education has been widely documented to be strongly and positively associated with age at first marriage throughout sub-Saharan Africa. Moreover girls who are enrolled in school are less likely to engage in premarital sex than their out-of-school peers. While few studies examine age at marriage among men, recent analyses suggest a weaker association between men's schooling and the timing of marriage and no clear association at all between schooling and age at first sex (Mensch, Singh, and Casterline 2005).

The empirical literature in this area, however, suffers from two methodological problems. First, few studies have attempted to capture the causal link between schooling and the transitions to sexual initiation and marriage despite the fact that both schooling and family formation decisions reflect behavioral choices that depend on both measured and unmeasured characteristics of young people and their families. Indeed, studies have shown that individuals from a higher socioeconomic background are more likely to achieve higher levels of education and to postpone marriage. That said, individuals with more education may also have "unobserved" characteristics such as increased motivation that may be correlated with both their success in school and their decision to postpone marriage. Two studies that have explored the potential endogeneity between education and age at first marriage using different estimation techniques—Brien and Lillard (1994) who estimate a joint model for education and timing of first marriage using data from Malaysia, and Behrman and colleagues (2006) who follow a two-step instrumental variable approach using data from a longitudinal study in Guatemala—demonstrate that results that ignore this unobserved heterogeneity are likely to be biased.

In this study we will examine the association between education and sexual initiation and marriage using a unique longitudinal survey conducted among young people in rural Malawi. Specifically we will explore the effect of school participation, school dropout and cognitive ability on the timing of sexual initiation and marriage.

Data

The data come from the first two rounds of a longitudinal study of approximately 1,770 in-school and 890 out-of-school Malawian adolescents aged 14–16 who were first interviewed in 2007. The study achieved a re-interview rate of 91% in 2008. Fifty nine primary schools in two southern districts of Malawi (Machinga and Balaka) were visited in the second term of the 2007 school year and again during the second term in 2008. The 30 schools visited in Machinga represent nearly 20 percent of the primary schools in the district, whereas those in Balaka represent nearly 25 percent of the primary schools in that district. The probability of a particular school being included in our study was proportional to its enrollment in 2006.[1] At each school we interviewed approximately 30 students in standards 4-8, the last 4 years of primary school, stratified by gender and age.[2] Our in-school adolescents were randomly selected from registers recording enrollment at the beginning of the 2007 school year. Adolescents were classified as out-of-school if they had not attended in the second term of the school year. Out-of-school adolescents were identified through key informants located at the school and within the randomly selected school catchment villages.

The adolescent instrument included an extensive set of questions on household and family characteristics, educational attainment, schooling history and experiences, household labor and employment, sexual behavior, marriage, and health. The majority of questions were asked in 2007 and again in 2008. In addition, in 2007 all sampled adolescents were asked to read two sentences in Chichewa (the national language) and two sentences in English, tasks at which they should have been proficient by standard 4. Adolescents also completed a short mathematical evaluation consisting of 12 questions drawn from the Malawi Institute of Education (MIE) achievement tests for standard 3.[3] In 2008, these assessments were repeated for comparability and expanded. A reading comprehension section (in both English and Chichewa) was added to further measure cognitive ability, while a selection of questions from the MIE mathematical tests for standard 5 was included to capture more recently acquired knowledge.

To obtain more accurate reporting from students on sexual behavior, we employed audio computer-assisted self-interviewing (ACASI) implemented on handheld computers. With ACASI, the respondent hears both the question and the response categories through headphones connected to a computer. The respondent answers each question by pressing a number on the computer screen associated with a response option. The advantage of ACASI over face-to-face interviews is that the respondent is afforded greater privacy and confidentiality when answering questions and interviewer influence in the survey is minimized. Computerized interviewing has been used successfully by the investigators in household-based surveys in Kenya and Malawi (Hewett et al. 2004; Mensch et al. 2003; Mensch et al. 2008).

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[1] The number of schools in each district was based on estimates of (1) the proportion of students in the age group attending primary school, (2) estimated attendance rates (3) estimated attrition rates, (4) estimates of transitions to secondary school and school dropout.

[2] The overwhelming majority (93%) of 14-16 year olds attend standards 4-8 (National Statistical Office and ORC Macro 2003).

[3] The Malawi Institute of Education is a para-statal organization that is charged by the Ministry of Education with curriculum development, assessment and teacher training programs.

Preliminary estimates of premarital sex based on life table analyses of Round 1 data indicate that in and out-of-school boys have virtually the same likelihood of having sex by their 16th birthday, around 46 percent. While school status is also unrelated to premarital sex among girls through age 16—around 25 percent of in- and out-of-school girls are estimated to have had premarital sex by that age—the behavior of in- and out-of-school girls begins to diverge after age 16, with those in school significantly less likely to initiate premarital sex. As for marriage, while only eight males in the entire sample are married and virtually no female currently enrolled in school is married, about 37 percent of the out-of-school female sample have been married.

Analysis

The analysis will consist of three stages and will be conducted separately for males and for females since we expect gender differences in the effect of education on the timing of these transitions and because for males we will only investigate the transition into first sex as too few young men have transitioned into marriage.

First, we will estimate a multiple decrement life table looking at two competing risks: sexual initiation prior to marriage and sexual initiation within marriage.

Second, we will look at the association between the education variables and each of the transitions—first sex and first marriage—separately, using discrete time multivariate survival analysis models. Formally, we will estimate the following equations using a Cox proportional hazards model:

Age sex first time:

$$h^s(t) = h_0^s(t) \exp[a_1 Educ(t-1) + a_2 Married(t-1) + a_3 X(t) + u^s] \qquad (1)$$

Age at first marriage:

$$h^m(t) = h_0^m(t) \exp[b_1 Educ(t-1) + b_2 Sexinit(t-1) + b_3 X(t) + u^m] \qquad (2)$$

where:

$h^s(t)/ h^m(t)$: hazard rate for sexual initiation (s)/marriage (m)
$h_0^s(t)/ h_0^m(t)$: baseline hazard
Educ(t-1): selected education variables at time t-1
Married(t-1): indicator variable for being married at time t-1
Sexinit(t-1): indicator variable for having had a first sexual experience at time t-1
X(t): vector of exogenous individual and time varying covariates, for example adolescents' age and parents' education and occupation
u^s/u^m: unobserved heterogeneity

In equations (1) and (2) we introduce the schooling and marriage/sexual initiation terms lagged one year to lessen the possibility of reciprocal causality, as schooling may be affected by the transition to marriage (or the expectation of it) as well as sexual debut.

In addition to reverse causality we cannot directly control for the unobserved heterogeneity (us/um) terms; if these are also correlated with the in-school and educational attainment variables the estimated coefficients for these two explanatory variables will be biased. To address this issue, in the third stage we will adapt the approach used by Lillard (1993) and Brien and Lillard (1994) to estimate a joint model for the probability of continuing in school/schooling attainment and sexual initiation, and, in the case of females, we will also address the interrelation between sex and marriage by simultaneously estimating the probability of continuing in school/schooling attainment and equations (1) and (2).

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