

Girls' education and HIV risk: Evidence from Uganda[☆]Marcella M. Alsan, David M. Cutler^{*}

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ABSTRACT

Uganda is widely viewed as a public health success for curtailing its HIV/AIDS epidemic in the early 1990s. The period of rapid HIV decline coincided with a dramatic rise in girls' secondary school enrollment. We instrument for this enrollment with distance to school, conditional on a rich set of demographic and locational controls, including distance to market center. We find that girls' enrollment in secondary education significantly increased the likelihood of abstaining from sex. Using a triple-difference estimator, we find that some of the schooling increase among young women was in response to a 1990 affirmative action policy giving women an advantage over men on University applications.

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While the AIDS epidemic has exacted a terrible price in sub-Saharan Africa, Uganda is widely viewed as a success story and a model for the rest of the continent (Schoepl, 2003). The reduction in AIDS in Uganda was rapid: HIV prevalence fell from an estimated 15 percent of the general population in 1990 to 5 percent in 2007 (UNAIDS, 2008). The steepest decline occurred in the early 1990s: between 1990 and 1995 the prevalence of HIV among urban pregnant women dropped from approximately 30 to 15 percent. This fall in HIV prevalence was most impressive for women under the age of 25 and corresponds to fewer pregnancies and less risky sexual behavior in this cohort as reported in the Demographic and Health Surveys (DHS).

Although there were likely several factors that contributed to Uganda's success (Green et al., 2006; USAID, 2002), the aim of this paper is to understand whether behavior change and education among women had a role to play.¹ We are motivated to explore the role of education both because of a national policy that gave women

preferential treatment in higher education (described below) as well as for theoretical reasons. On the one hand, theory predicts fertility should fall with rising female education as the opportunity cost of a woman's time increases (Becker, 1960). To the extent that increased female education leads to positive assortative matches in the marriage market or raises bargaining power within the household, these should also have implications for reducing coercive sexual behavior.² On the other hand, education and the increased socioeconomic status it affords may increase mobility and demand for consumer goods, including transactional sex. Thus the effects of education on sexual behavior are theoretically ambiguous.

Several papers have investigated the causal effect of female education on fertility in Sub-Saharan Africa. Osili and Long (2008) and Keats (2012) use the natural experiment of universal primary education in Nigeria and Uganda, respectively, to show that additional education of young women reduced fertility in the affected cohorts relative to those who were unaffected. Evidence from randomized controlled trials corroborates the findings from natural experiments but show the theoretical effects, which presumably occur over the life-cycle, occur much quicker in practice – inviting alternative interpretations of the results. For example, the contemporaneous correlation between enrollment and pregnancy of

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¹ The working paper of this article (Alsan and Cutler, 2010) included an epidemiological section incorporating behavioral changes reported in several waves of the Uganda Demographic and Health Surveys into a generalized model of the HIV epidemic. The results indicate that reduction in premarital sex among women was

the most important factor contributing to the overall decline in HIV over the time period and motivate the emphasis on that channel in this paper.

² Furthermore, studies have shown that maternal education reduces child mortality (see Schultz, 2002 for a review), which may also influence fertility decisions if households have a target family size.

young women documented in Baird et al. (2011), Bandiera et al. (2012) and Duflo et al. (2011) might be due to an incarceration effect to schooling (as suggested in Black et al., 2008). Alternatively, women could obtain better knowledge about contraception or develop different aspirations as a result of school exposure (Lavy and Zablotsky, 2011).³

In our context, the time period of rapid HIV decline among young women in Uganda coincided with a notable rise in secondary school enrollment. The percent of never married females between the ages of 15–24 who ever attended secondary school jumped by 12 percentage points, from 24 to 36 percent (DHS 1988, DHS 1995).⁴ To identify whether there is a causal relationship between these contemporaneous trends (e.g., schooling and postponed sexual debut), we instrument for enrollment in school with distance to secondary school, conditional on a rich set of demographic and locational controls. There are two obvious problems with the use of this measure to identify exogenous variation in schooling: endogeneity of the location of the index respondent and of the school itself. Regarding the former, we use the usual approach of restricting the sample to nonmovers and note that it is not distance of the individual, but distance from a village or group of small villages to secondary school that is used as the instrumental variable in this study. Regarding the latter, we argue and present qualitative evidence that placement of schools in rural Uganda was determined primarily by Missionaries whose focus was on converting the hinterland population and is orthogonal to many omitted variables usually of concern when using distance as an instrument for services. As further evidence on this point, we document that distance to market center does not have a strong first stage (in other words, it does not predict schooling attainment). Moreover, there are no significant differences on observables between individuals near versus far from a secondary school after conditioning on district fixed effects. Our instrumental variable estimates imply a girl enrolled in secondary education is 80–90 percentage points more likely to abstain from sex than one who is not.

What was driving the trend towards increased secondary schooling among young Ugandan women over this time period? One could argue that girls stayed in school because they were fearful of contracting HIV. Although this may be partly true, we find that some of the schooling increase among young women was in response to a 1990 affirmative action policy giving women an advantage over men on University applications. Using men as a control group and exploiting heterogeneity in birth year and distance of birthplace to public Universities, we show that the University preference policy was effective in recruiting women into higher levels of education. This, in turn, reduced HIV among young girls.

The rest of the paper is structured as follows. First we review details of Uganda's HIV epidemic and the trends in sexual activity among young women. Next we turn to the data on why and how education and sexual activity are related. Finally we present the triple-difference estimates of the effects of the affirmative action policy and conclude.

³ Baird et al. (2011) test the use of conditional versus unconditional cash transfers for educational outcomes among 13–22-year-old never married females in Malawi. They find that though conditional cash transfers (CCT) improved attendance and scores relative to unconditional transfers (UCT), rates of pregnancy and marriage were lower in the UCT arm.

⁴ This figure is 6 percentage points for women of any marital status in the same time period.

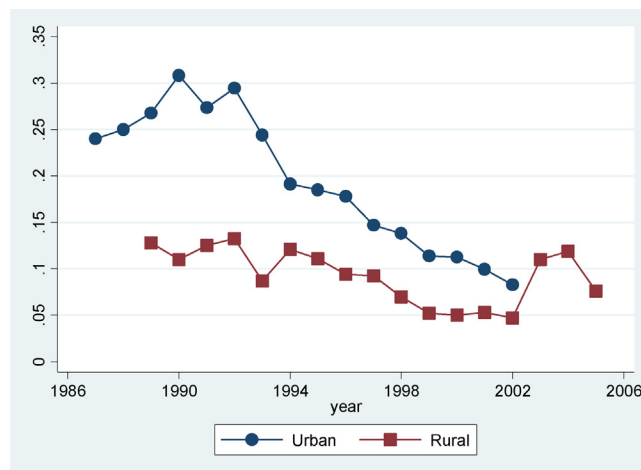


Fig. 1. Median HIV prevalence among pregnant women, Uganda. Notes: Data are from the UNAIDS Uganda Epidemiological Fact Sheets on HIV/AIDS from 2004, 2006 and 2008. Median annual prevalence is from antenatal clinics that performed surveillance HIV testing.

1. Uganda's generalized HIV epidemic and behavior change in young women

Uganda's early control of its generalized HIV epidemic has been pointed to as a model for the rest of the Sub-Saharan Africa.⁵ In this section, we review the evidence on the HIV reduction over the early to mid-nineties.

The most complete data on HIV status over the time period of interest comes from antenatal clinics (ANC); most pregnant women attend such clinics, and many Ugandan clinics have standard HIV screening (UNAIDS, 2007).⁶ Although the ANC data have been widely criticized for not being representative of the trends in the general population (for example, among nonpregnant women) we cross-check estimates of prevalence in the ANC with those from a population based survey on HIV prevalence in Uganda in 1989 (Konde-Lule et al., 1989). We verify that the rates of HIV among young women were remarkably high – 16 percent for women between 15 and 24 years of age compared to eight percent for men – suggesting the trends in the ANC are relevant for the wider population in our context.⁷ Fig. 1 shows HIV positive rates in Uganda between 1987 and 2005. In 1987, about one-quarter of pregnant women in urban areas in Uganda tested positive for HIV. Between 1987 and 1990, the HIV positive rate rose by 5 percentage points. It then fell markedly. The cumulative reduction in HIV in urban areas of Uganda was approximately 20 percentage points, or about two-thirds of the pre-reduction peak. The majority of this decline occurred between 1990 and 1995. This is the time period of focus in our analysis. Notably, the decline in HIV in Uganda was not restricted to urban areas suggesting that “epidemic burn out” from exceedingly high mortality was not the primary driver of the decline.

⁵ Despite the recent uptick in prevalence, the startling decrement in HIV prevalence in the mid-nineties still is regarded as a major public health success.

⁶ In the 1980s, the majority of Kampalan women attended an antenatal clinic at least once during their pregnancy.

⁷ The screened prevalence rates from antenatal clinics are typically sent to the Joint United Nations Programme on HIV/AIDS (UNAIDS), which compiles them. In compiling the data, UNAIDS uses the median percentage rate of all antenatal clinics reporting in a given year, since some of the clinics do not include the number of women tested. The trends are the same, however, when looking at clinics present over the entire time period or forming a chain index linking clinics in adjacent years.

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