Title: Effects of Expanded Legal Grounds for Abortion on the Schooling of Girls and Young Women in Sub-Saharan Africa: A Cross-Country Analysis

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Abstract

Policy reforms that expand legal grounds for abortion may allow girls and young women to stay in school longer by offering the option to delay marriage and parenting responsibilities, but such high-level policy changes alone might not empower women and girls to pursue their education goals due to institutional barriers or lack of access to health services. Using the Demographic and Health Survey data from 18 countries, this study analyzes whether the liberalization of abortion laws was associated with increased schooling among girls and young women through delaying marriage and childbearing during the period 1996 to 2015. Preliminary results suggest that while abortion laws did not affect schooling, expanded grounds for abortion were associated with a 9% decrease in marriage and births and the effects were stronger among the very young girls. These findings highlight the importance of reproductive health policies to women's and girls' development potential in low-resource settings.

Extended Abstract

Introduction

Early childbearing impedes girls' educational achievement in sub-Saharan Africa (SSA).[1,2] In countries such as Tanzania and Sierra Leone, pregnant girls are often expelled from school.[3] Expanding the legal grounds for abortion provides an alternative when continuing one's education is not an option otherwise and makes pregnancy termination safer.[4] However, it is not clear whether such high-level policy changes alone can empower women and girls to pursue their education due to implementation issues, institutional barriers, and lack of access to reproductive health services in SSA.[5–7]

Abortion is common in SSA, but it is unclear whether reproductive health policies affect individuals' fertility decisions, which in turn would affect education opportunities. In 2010-2014, an estimated 15% of all pregnancies ended in abortion in Africa, ranging from 12% in Western Africa to 24% in Southern Africa.[8,9] However, the relationship between abortion laws and abortion incidence can be complicated. On one hand, more liberal abortion laws may increase induced abortion, a proximate determinant of fertility,[10] by providing better access to abortion services. Although there is no direct evidence, the percentage of unintended pregnancies that ended in abortion increased from 31% to 38% from 1990 to 2014 in Africa, against the backdrop of a 17% decline in unintended pregnancy rate.[11] In addition, previous research has suggested that liberalized access to abortion, instead of access to birth control pills, allowed women to delay marriage and motherhood in the U.S. in the 1970s and the abortion legal reform in 2007 contributed to lower fertility in Mexico.[12,13] On the other hand, unmet need for family planning is usually higher in countries with restrictive abortion laws and women often undergo unsafe procedures to terminate unintended pregnancies, which might contribute to abortion incidence.[4,8]

This study aims to disentangle the relationship between abortion laws, marriage, childbearing, and schooling decisions and examine whether more liberal reproductive health policies are associated with greater development opportunities for young women and girls in SSA.

Methods

I used a difference-in-differences (DID) approach to compare trends in schooling in countries that expanded abortion legal grounds to trends in countries that did not between 1996 and 2015. The regression models controlled for underlying differences between countries and secular trends. Linear probability models were used to examine marriage, births, and schooling outcomes. The main analyses were repeated in key sub-groups to examine heterogeneous treatment effects.

Data sources and sample. Data on abortion legality from 1996 to 2015 were obtained from the World Population Policies Database maintained by the Department of Economic and Social Affairs at the United Nations.[14] Data on educational attainment were extracted from the Women's Questionnaire in the Demographic and Health Surveys (DHS) conducted between 1997 to 2018 in 18 countries from SSA harmonized by the IPUMS-DHS project.[15] I excluded five countries that already had relatively liberal abortion laws in 1996. Data on primary school starting age were obtained from the UNESCO Institute for Statistics to calculate the outcome variable discussed below.[16] The data were used to calculate the number of years before primary school for each birth-year cohort by country.

Using the DHS data, I constructed a longitudinal cohort with repeated observations for all female respondents that were at most 22 years of age in 1996 and at least 13 years of age in 2015. The analytical dataset consisted of a binary variable to indicate school enrollment for each person-year (i.e., in school or not) together with other individual and household characteristics.

Key variables and measures. Abortion legal reforms in individual countries were measured as a binary indicator of whether abortion was allowed on all three grounds in a specific year: to save women's life, to preserve women's physical health, and to preserve women's mental health. Although truly liberal laws in the abortion legality continuum should permit abortion for socioeconomic reasons or without restriction as to reason, my definition of "liberal" abortion laws accommodated the fact that Zambia was the only country with DHS data where abortion was broadly legal as of December 2017.[5] Among the 15 countries that had restrictive abortion laws in 1996, ten countries had expanded the legal grounds for abortion by 2015 while the abortion laws in eight countries remained highly restrictive.

Schooling was measured as a binary indicator of whether a woman or girl is still in school each year before she turned 22. This variable was created based on an individual's age, year of interview, total years of education, and country-specific primary school starting age. Using similar methods, I created two binary variables that were closely associated with schooling, indicating whether a woman or girl was married and gave birth in each year before she turned 22.

Statistical methods. My main hypothesis is that expanding the legal grounds for abortion is associated with higher likelihood of schooling for women and girls. To test this hypothesis, I used a DID design to fit a linear probability model specified below:

$$Y_{ijt} = \alpha + \beta Treat_{jt} + c_j + y_t + Z_{ijt}'\gamma + \varepsilon_{ijt}$$

where Y_{ijt} is the outcome variable set to 1 if individual *i* from country *j* in year *t* was in school, $Treat_{jt}$ is set to one if individual *i* resided in country *j* that had expanded legal grounds for abortion laws in year *t*, c_j is a full set of country dummies to control for baseline country characteristics, y_t is a full set of year dummies to account for secular trends, and Z_{ijt} is a vector of descriptive characteristics including age, rurality, religion, and household wealth index quintiles. The coefficient of interest is β, which represents the DID estimate of the abortion policy change, or the average annual change in the likelihood of schooling among women and girls in countries with more liberal abortion laws. I conduct secondary analysis to estimate the effects of abortion reforms on marriage and births, intermediate outcomes between abortion laws and schooling. In separate specifications, one-year treatment lead and lag are added to estimate the anticipation or delayed effects of the policy change.

The DID design relies on the "parallel trend" assumption that countries with more liberal abortion laws would have identical trends in schooling as countries with more restrictive abortion laws in the absence of any legal reform. To test this assumption, I fit a linear probability model specified below that exclude observations from treated countries in years after the policy change:

$$Y_{ijt} = \alpha + \beta Changed_j + \delta Year_t + \gamma Changed_j * Year_t + c_j + Z_{ijt}'\lambda + \varepsilon_{ijt}$$

where the interaction of changed country indicator and linear time trend γ indicates whether the trends differed between treated countries and comparison countries prior to policy change.

Preliminary Results

The full sample included 2,295,292 person-year observations, of which 1,283,208 (56%) were from 10 countries that expanded abortion legal grounds between 1996 and 2015 and the remaining 1,012,084 (44%) from eight comparison countries. Among the 270,424 individuals in the sample, 23% were in school, 3.0% were married, and 0.8% gave birth at the age of 15; at age 22, 1.8% of the individuals were in school, 58.7% were married, and 10.5% gave birth.

The average annual likelihood of marriage was 2.8 percentage points or 9.7% lower immediately after the policy change (Table 1; 95% confidence interval [CI]: -0.05 – -0.01). The average annual likelihood of giving births was 0.8 percentage point or 8.5% lower with the policy change (95% CI: -0.01 – .00). The abortion policy change was not associated with any statistically significant immediate effect on schooling. The effects on marriage and births are stronger in urban areas and among the very young girls; for example, the policy change was associated with 42% and 24% reduction in the annual likelihood of marriage among those aged 13 and 14 respectively.

The test for parallel trends showed that while marriage and birth rates were declining in all countries during this time period, the trends in marriage, birth, or schooling did not differ between the treatment and comparison countries prior to policy change (Table 2).

Discussion

By focusing on the decision between childbearing and education, this study adds to our understanding of the beneficial effects of more reproductive choices for women and girls in SSA beyond saving lives from unsafe abortion practices. Preliminary findings suggest that expanding legal grounds for abortion was associated with a decline in marriage and birth but had no effect on schooling. I am currently conducting fortification tests to evaluate the effects of abortion policy changes on boys and young men, evaluate how sensitive the effects are by country, and explore the heterogeneous effects by age group.

Table 1. Association between abortion legal reform and marriage, births, and schooling among young women and girls aged 13 – 22 years in 18 sub-Saharan African countries

	Marriage		Birth		Schooling	
F.treat		-0.006		0.006		0.010
		(0.007)		(0.003)		(0.009)
treat	-0.028*	-0.009*	-0.008**	-0.013**	0.008	-0.016*
	(0.011)	(0.004)	(0.003)	(0.004)	(0.021)	(0.007)
L.treat		-0.013		0.002		0.014
		(0.008)		(0.005)		(0.023)
Age	0.070***	0.074***	0.023***	0.025***	-0.097***	-0.097***
	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)	(0.003)
Rural	0.031**	0.031**	0.010**	0.009**	-0.047***	-0.054***
	(0.009)	(0.010)	(0.003)	(0.003)	(0.009)	(0.010)
Christian	-0.092***	-0.097***	-0.024**	-0.025**	0.071***	0.082***
	(0.023)	(0.024)	(0.006)	(0.006)	(0.010)	(0.010)
Poorer	-0.024**	-0.027**	-0.008***	-0.009***	0.033***	0.040***
	(0.007)	(0.008)	(0.002)	(0.002)	(0.007)	(0.008)
Middle	-0.052***	-0.056***	-0.019***	-0.020***	0.081***	0.099***
	(0.011)	(0.012)	(0.004)	(0.004)	(0.012)	(0.014)
Richer	-0.080***	-0.086***	-0.031***	-0.033***	0.135***	0.163***
	(0.011)	(0.012)	(0.006)	(0.006)	(0.017)	(0.020)
Richest	-0.152***	-0.160***	-0.057***	-0.059***	0.265***	0.310***
	(0.013)	(0.013)	(0.007)	(0.007)	(0.017)	(0.019)
Constant	-0.790***	-0.877***	-0.246***	-0.291***	1.813***	1.746***
	(0.092)	(0.107)	(0.030)	(0.036)	(0.036)	(0.052)
Observations	1929465	1506631	1929465	1506631	1929465	1506631
Adjusted R^2	0.2838	0.2410	0.0755	0.0674	0.4172	0.3321
mean	0.287		0.094		0.351	

Standard errors in parentheses. Included country and year fixed effects. Standard errors clustered at country level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2. Test for parallel trend assumption

	(1) Married	(2) Gave birth	(3) In school
Changed country	-0.095	-0.937	-10.187
	[-9.244,9.053]	[-5.045,3.170]	[-21.851,1.476]
Linear year	-0.003***	-0.001***	0.000
	[-0.005,-0.002]	[-0.002,-0.001]	[-0.004,0.005]
Changed country # Linear year	0.000	0.000	0.005
	[-0.005,0.005]	[-0.002,0.003]	[-0.001,0.011]
Age	0.074***	0.024***	-0.098***
	[0.062,0.086]	[0.020,0.028]	[-0.102,-0.094]
Rural	0.035***	0.012***	-0.049***
	[0.020,0.050]	[0.008,0.015]	[-0.070,-0.028]
Christian	-0.080***	-0.021***	0.072***
	[-0.112,-0.049]	[-0.030,-0.012]	[0.048,0.097]
Poorer	-0.029**	-0.009**	0.034**
	[-0.048,-0.011]	[-0.014,-0.004]	[0.015,0.053]
Middle	-0.053**	-0.018**	0.075***
	[-0.084,-0.023]	[-0.028,-0.008]	[0.048,0.102]
Richer	-0.081***	-0.029***	0.121***
	[-0.110,-0.052]	[-0.041,-0.017]	[0.093,0.149]
Richest	-0.156***	-0.055***	0.251***
	[-0.179,-0.134]	[-0.065,-0.044]	[0.222,0.281]
Constant	5.907***	2.502***	1.424
	[2.847,8.967]	[1.357,3.648]	[-7.511,10.359]
Observations	1224771	1224771	1224771
Adjusted R^2	0.3016	0.0787	0.4273

95% confidence intervals in brackets. Changed country variable indicates whether a country eventually changed abortion policy. The coefficient of interest is the interaction of changed country indicator and linear time trend. Included country fixed effects. Standard errors clustered at country level. Excluded observations from changed countries after the abortion policy was changed.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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