

THE IMPACT OF EDUCATION ON WOMEN'S PREFERENCES FOR GENDER EQUALITY: EVIDENCE FROM SIERRA LEONE

COLIN CANNONIER

Belmont University

NACI MOCAN

Louisiana State University, NBER and IZA

Abstract: We use data from Sierra Leone where a substantial education program provided increased access to education for primary-school age children but did not benefit children who were older. We exploit the variation in access to the program generated by date of birth and the variation in resources between various districts of the country. We find that an increase in schooling, triggered by the program, has an impact on women's attitudes toward matters that impact women's health and on attitudes regarding violence against women. An increase in education reduces the number of desired children by women and increases their propensity to use modern contraception and to be tested for AIDS. While education makes women more intolerant of practices that conflict with their well-being, increased education has no impact on men's attitudes toward women's well-being. Thus, it is unclear whether the change in attitudes would translate into behavioral changes. Consistent with this finding, education (on this margin) has no impact on women's propensity to get married, their age at first marriage or age at first birth.

Keywords: Health, education, empowerment, violence against women

1. INTRODUCTION

Individuals with more education command higher earnings in the labor market, and the return to education is higher in developing countries [Psacharopoulos

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(1994); Schultz (2002)]. Education has a positive impact on other outcomes as well, such as the health status of individuals [Chou, Liu, Grossman and Joyce (2010); Grossman (1972a, 1972b); Lleras-Muney (2005)]. Although low-income countries struggle with low levels of human capital as a barrier to development, many of these countries exhibit substantial discrepancies in education acquired by men vs. women. For example, school life expectancy is 0.5 years higher for men compared to women in countries where per capita income is less than \$8,000.¹ The difference in expected schooling is about 1 year in favor of men among countries where per capita income is less than \$4,000, and it goes up to 1.4 years in countries where per capita income is less than \$2,000.

Gender difference in education is not an isolated phenomenon. Similar differences between men and women exist in developing countries in many other dimensions ranging from life expectancy to participation in politics, to the propensity for being exposed to violence.² Eradicating these inequalities is important for a number of reasons, ranging from human rights to economic development. For example, following Galor and Weil (1996), Lagerlöf (2003) shows that long-run economic development in Europe is related to the long-term trend in gender equality. Knowles, Lorgelly and Owen (2002) find that female schooling increases labor productivity across countries.

In this paper, we use data from Sierra Leone to investigate whether education alters women's preferences in the direction of empowerment and self-determination. Empowerment is usually understood as an exogenous change in the social or institutional structure to provide opportunities that were not previously available. Examples include changing the inheritance laws, providing property rights and voting rights, enacting laws, and implementing quotas to increase participation in the labor market and in politics [see Duflo (2012) for a detailed discussion].

We define empowerment as having the knowledge along with the power and the strength to make the right decisions regarding one's own well-being. Because of social norms or lack of economic power, women may feel obligated to submit to the wishes of others (e.g. their husband or father) even though doing so would clearly decrease their well-being in some circumstances. An example is the belief that the husband is justified in beating the wife if she refuses to have sex. We argue that women are empowered internally when they can take positions to protect their own well-being. In the example above, if a woman changes her belief and declares that violence against women in the form of wife beating is not justified, we call this an indication of empowerment.³ Another example is the attitudes toward the violent practice of female genital mutilation (FGM), which is physically and psychologically harmful to the woman affected. FGM is considered an extreme form of discrimination against women as well as a human rights violation [World Health Organization (2008)].⁴ If a woman, who lives in an FGM-practicing society, alters her position on the appropriateness of the practice of FGM as a social norm, and supports its abolition, we consider this an indication of empowerment.⁵

We investigate the impact of education on seven outcomes, four of which are attitudes regarding violence toward women. The issue is important, especially because a recent comprehensive report of the World Health Organization documented that 35% of women worldwide have been victims of physical and/or sexual intimate partner violence or non-partner sexual violence since age 15 years [World Health Organization (2013)]. We also analyze the extent to which education alters women's behaviors such as the use of modern contraceptives, whether she is tested for AIDS, as well as her desired number of children.

We exploit variations in schooling that were generated by an exogenous education policy reform in Sierra Leone, implemented in 2001. The program increased access to primary education, and its intensity varied between different districts of the country. We employ the Sierra Leone Demographic and Health Survey (SLDHS), administered in 2008, to investigate the extent to which exposure to enhanced educational resources had an impact on acquired schooling. Using instrumental variables, we then estimate the impact of schooling on women's preferences regarding their own health and well-being.⁶ The identification strategy employed in the paper is similar to that used by Duflo (2001) and Osili and Long (2008), where differences in program intensity between districts, and differences in the exposure to the program across age cohorts are exploited. Specifically, individuals who were of the primary school age (6 to 11 years) when the policy began in 2001 were exposed to the free and compulsory primary education, while older individuals could not benefit from the program.

An increase in education can modify individuals' behavior through a number of different mechanisms. Literacy could be one such mechanism. For example, when a woman becomes literate, she can read and learn about the health risks of unprotected sex. Alternatively, education can alter preferences by influencing people's time discounting [Becker and Mulligan (1997)], which can in turn impact behavior. Education can also improve the bargaining power of women in the household by increasing potential labor market earnings. The improved bargaining position may help women to take positions which do not conflict with their well-being. For example, in the model of Iyigun and Walsh (2007), husband and wife bargain over household decisions, and the marital bargaining power depends on the relative income of the spouses. An increase in women's education generates higher earnings potential and more marital power, which leads to lower fertility. Basu (2006) presents a similar household model in which husband and wife can have different preferences. Household decisions, including the supply of child labor, are determined by the power balance between the spouses and that the power balance can be impacted by the decisions made. Chiappori, Iyigun and Weiss (2009) formulate a model where investment in schooling allows individuals to earn higher wages, and it also allows them to extract a larger share of the marital surplus.

We are unable to test all possible mechanisms. But, we show that literacy is not the mechanism that changes women's preferences in Sierra Leone. Similarly,

we find access to health facilities is not the reason for the change in women's attitudes. We find that the change in attitudes that is empowering for women is not likely to be driven by migration or exposure to war violence either. Although we cannot determine the particular channel through which education alters attitudes, we demonstrate that there is a strong net effect of education.

It should be noted that even if increased internal empowerment could be a necessary condition to improve the well-being of women, it may not be sufficient to actually achieve a tangible change in outcomes, at least in the short-run, if external obstacles remain. We find indirect evidence on this when we analyze how education impacts *men's attitudes* toward *women's* well-being. More specifically, we show that an increase in men's education does *not* alter men's attitudes toward women's well-being. Furthermore, we find that outcomes such as women's age at first marriage and age at first birth are not impacted by an increase in education on this margin.

Although there is a large literature that investigates the impact of education on women's marriage and fertility behavior, there exist only a few papers on the impact of education on women's preferences as defined in this paper. Friedman, Kremer, Miguel and Thornton (2011) find that an increase in schooling reduces young women's acceptance of male violence against women in Kenya. Samarakoon and Parinduri (2015) find no impact of education on women's decision-making authority in the household, asset ownership, or community participation in Indonesia. No paper we know of has analyzed the issue by investigating the impact of education on men and women simultaneously.

The remainder of the paper is organized as follows. Section 2 provides some background information on the educational system in Sierra Leone and the Free Primary Education (FPE) policy. Section 3 describes the data used in the analysis. Section 4 describes the empirical strategy; Section 5 presents the results. Section 6 discusses potential mechanisms. Section 7 presents the results for men and Section 8 provides extensions. Section 9 is the conclusion.

2. FREE PRIMARY EDUCATION (FPE) POLICY IN SIERRA LEONE

Sierra Leone is one of the poorest countries in the world. In 2010, per capita gross national income was \$340. About 70% of females and half of males of the country are illiterate, and life expectancy at birth is 46 years. The population is about 5.5 million, and the fertility rate is five births per woman. The civil war, which broke out in March 1991 and lasted for about a decade, killed at least 50,000 individuals [World Bank (2007)].⁷ Even before the civil war, children faced challenges in having access to education. For example, parents were responsible for the payment of tuition and fees, teaching and learning materials, and other expenses such as textbook purchases and exam fees. One consequence of the civil war was the destruction of infrastructure, including schools. By the end of the war, 1,270 primary schools had been destroyed, representing over 70% of all schools estimated to have been in existence before the conflict started [International

Monetary Fund (2001)]. As a result, more than half of the primary schools had disappeared and this led to almost 70% of school-age children being out of school [International Monetary Fund (2001)].

In 2001, Sierra Leone started implementing a policy of providing FPE for all pupils in government-owned and government-assisted schools.⁸ Financed largely by domestic public funds, donor contributions from international financial institutions, and foreign governments, the FPE was part of an overall universal primary education policy aimed at constructing and rehabilitating basic education facilities as well as providing free access to education. The specific goal was to increase basic education (comprising 6 years of primary education and 3 years of secondary education) by making it free and compulsory.

By far, this has been the largest education funding initiative to be undertaken in Sierra Leone since its independence in 1961. During the period from 2001 to 2005, the government committed almost 20% of its expenditures (equivalent to 4% of the GDP) toward education. Almost half of all education expenditure was devoted to primary education [UNDP (2007)]. Consequently, the number of schools grew rapidly and by the end of 2005, there were at least 4,300 primary schools, approximately 30% of which was newly constructed since 2001.

Sierra Leone spans about 72,000 square kilometers (about 28,000 square miles, or roughly the size of South Carolina). The country consisted of 14 districts in 2001 (see Figure 1).⁹ With the implementation of the FPE program, each district received new funding for education, and the program was associated with a pronounced change in primary school enrollments. The number of students doubled from 0.6 million to 1.3 million children between 2001 and 2004, and the primary school gross enrollment rate exceeded 100% in 2004.¹⁰ In 2004, Sierra Leone had the highest primary school enrollment rates among all Sub-Saharan countries [World Bank (2007)].

3. DATA

We use data from the 2008 SLDHS. The SLDHS is part of a broader program of demographic and health surveys conducted in other developing countries. The SLDHS is a cross-sectional nationally representative household survey and is the first of this kind in Sierra Leone.¹¹ Interviews for the SLDHS were conducted from April to June 2008.¹² The data contain information for over 10,000 individuals who were aged 15–49 years (females) and 15–59 years (males) in 2008. Using the age reported in 2008 and the reported birth dates, we identified individuals who were 8 to 11 years old in 2001. This particular group was exposed to the FPE policy.¹³ At the start of the policy in 2001, those who were above the primary schooling age (e.g. those who were 12 or 13 years) were nevertheless allowed to enroll in school. Because these older children have returned to school, the primary school gross enrollment rate rose above 100% [World Bank (2007)]. Even in 2004, more than half of the children enrolled in the first grade of the



FIGURE 1. Sierra Leone divided by districts in 2004.

Notes: The 14 districts are as follows: Eastern region consists of Kailahun, Kenema, and Kono; Western region consists of the Western Urban Area (comprising mainly the capital Free Town) and the Western Rural Area; Northern region consists of Bombali, Kambia, Koinadugu, Port Loko, and Tonkolili and the Southern region comprises Bo, Bonthe, Moyamba, and Pujehun.

Source: Sierra Leone Demographic and Health Survey 2008 Report.

primary school were older than 6 years. This was true of the other grade levels of the primary school as well [World Bank (2007)], which means that children who were older than 11 years of age in 2001 could have also benefitted from the program. Therefore, we chose as the control group those who were 15 to 21 when the implementation of the FPE started. These individuals were beyond the primary school age during the implementation of FPE and could not benefit from the policy. We provide more details on the identification strategy and its variations in the next section, including variations in the composition of the control group.

Because district level information on the amount of education funding is not available, we impute funding received by each of the 14 districts by multiplying the total government spending on the FPE program in 2004 (which was about 14 billion Le, or about \$6 million at the prevailing exchange rate) with the share of each district in local government development grants. Information on the district-level share of local government development grants and matching grants was for fiscal year 2006 [see UNDP (2007), p.79], while total funding allotment for primary education came from the Government of Sierra Leone Budget and Statement of Economic and Financial Policies for the financial year 2004. The resource variable per district is the logarithm of funding received by the district per 100 teachers. Over the period 2004–2011, Local Government Development Grants were distributed based on a formula which was initially determined by population and the infrastructure damage index. Later, this distribution of grants was based on population and the poverty index.

We employ four variables as measures of women's empowerment. As discussed in the introduction, we adopt the definition of empowerment as one's ability to make correct decisions about the issues that impact one's own well-being. We consider affirmative answers to the following questions as being consistent with a woman's well-being: (i) whether a wife is justified in refusing to have sex when she is tired or not in the mood; (ii) whether a wife is justified in refusing to have sex with her husband if she knows he has a sexually transmitted disease (STD); (iii) whether FGM should be stopped as a custom. The fourth question asks the respondent "whether a husband is justified in hitting or beating his wife if she refuses to have sex with him". If the woman's answer to this question is negative (disapproval of husband beating the wife), we consider her beliefs being consistent with her well-being.

We also gauge the preference toward fertility, measured by the number of desired children. An alternative measure would have been the number of children ever born, but because we focus on young individuals (who are 15 to 28 years old in 2008), their fertility is unlikely to be completed. Furthermore, desired fertility is conceptually different from completed fertility, where the latter may diverge from the former for a variety of reasons. Two additional variables gauge whether the woman uses modern contraceptive methods and whether she has ever been tested for AIDS.

Column (2) of [Table 1](#) displays the means and standard deviations of the full sample of females who were either 8 to 11 years old or 15 to 21 years old in 2001. The information provided in the table pertains to 2008 when the individuals were aged 15 to 28 years. Of this group, those who were 8 to 11 years old in 2001 were exposed to the FPE. This is the "treatment" group, the descriptive statistics of which are provided in column (3). Those who were 15 to 21 years old in 2001 constitute the "control" group, listed in column (4).

On average, women desire to have 4.7 children over their lifetime. The number of desired children for women in the treated group is 4.2, while it is 4.9 for those who are not exposed to the FPE program. The rate of modern contraceptive use is

TABLE 1. Summary statistics: 2008 SLDHS sample (individual level data) – females

Variables	Variable definition (1)	All Mean (std) (2)	Treated group (ages 8–11 years in 2001) Mean (std) (3)	Control group (ages 15–21 years in 2001) Mean (std) (4)
Desired number of children	Number of children desired	4.703 (2.118)	4.197 (2.113)	4.953 (2.076)
Modern contraceptives	Equals one if respondent uses modern contraceptives, zero otherwise	0.172	0.084	0.216
Tested for AIDS	Equals one if respondent has ever been tested for AIDS, zero otherwise	0.130	0.052	0.169
Wife justified in refusing sex when tired	Equals one if respondent thinks a wife is justified in refusing to have sex with her husband when she is tired or not in the mood, zero otherwise	0.559	0.498	0.590
Wife justified in refusing sex with STD husband	Equals one if respondent thinks a wife is justified in refusing to have sex with a husband who has a sexually transmitted disease, zero otherwise	0.487	0.444	0.508
Wife beating not justified in refusing sex	Equals one if respondent thinks that wife beating is NOT justified if she refuses to have sex with husband, zero otherwise	0.640	0.736	0.591
Stop female genital mutilation	Equals one if respondent thinks the practice of female genital mutilation should be discontinued, zero otherwise	0.296	0.374	0.258

TABLE 1. Continued

Variables	Variable definition (1)	All Mean (std) (2)	Treated group (ages 8–11 years in 2001) Mean (std) (3)	Control group (ages 15–21 years in 2001) Mean (std) (4)
Schooling	Years of schooling completed	2.845 (3.954)	4.368 (3.467)	2.095 (3.964)
Literate	Equals one if respondent is able to read all of a sentence, zero otherwise	0.255	0.434	0.168
Literate2	Equals one if respondent is able to read all of a sentence or some parts of a sentence, zero otherwise	0.318	0.574	0.193
Age	Age in years	22.531 (4.473)	16.544 (1.170)	25.484 (1.670)
Employed	Equals one if employed, zero otherwise	0.662	0.459	0.761
Married	Equals one if married, zero otherwise	0.558	0.210	0.730
Radio	Equals one if respondent's household has a radio, zero otherwise	0.603	0.620	0.595
Fridge	Equals one if respondent's household has a refrigerator, zero otherwise	0.082	0.101	0.073
TV	Equals one if respondent's household has a television, zero otherwise	0.129	0.149	0.119
Urban	Equals one if resides in an urban area, zero otherwise	0.384	0.453	0.349
Wealth 1 (poorest)	Percentage of respondents within the first wealth quintile	0.177	0.151	0.190
Wealth 2 (poorer)	Percentage of respondents within the second wealth quintile	0.168	0.150	0.177
Wealth 3 (middle)	Percentage of respondents within the third wealth quintile	0.197	0.181	0.204
Wealth 4 (richer)	Percentage of respondents within the fourth wealth quintile	0.212	0.222	0.207

TABLE 1. Continued

Variables	Variable definition (1)	All Mean (std) (2)	Treated group (ages 8–11 years in 2001) Mean (std) (3)	Control group (ages 15–21 years in 2001) Mean (std) (4)
Wealth 5 (richest)	Percentage of respondents within the fifth wealth quintile	0.246	0.296	0.221
Popshare	Percentage share of respondent's age group	4.862 (2.464)	3.818 (1.156)	5.377 (2.758)
<i>Religion</i>				
Christian	Equals one if belong to Christian religion, zero otherwise	0.215	0.256	0.195
Islam	Equals one if belong to Islam, zero otherwise	0.774	0.732	0.794
Other religion	Equals one if belong to another religion, zero otherwise	0.011	0.012	0.011
<i>Ethnicity</i>				
Temne	Equals one if belong to Temne ethnic group, zero otherwise	0.367	0.330	0.383
Mende	Equals one if belong to Mende ethnic group, zero otherwise	0.308	0.329	0.298
Other ethnicity	Equals one if belong to another ethnic group, zero otherwise	0.325	0.341	0.317
Observations (max.)		2,661	923	1,738
Education Resources (<i>R</i>)	Funding for primary education in the district measured as the logarithm of funding per 100 teachers in 2004. (<i>N</i> = 14)	Mean = 1.294, Std = 0.637		

Note: The descriptive statistics are calculated using sample weights from the SLDHS.

lower for those in the treatment group, but this is likely because the average age in this group is lower (16.5) in comparison to the average age in the control group (25.5). This is also the likely reason for the difference in the rate of having been tested for AIDS between the two groups.

The proportion of women who indicates that a wife is justified in refusing sex when she is tired, is higher among the control group. The same is true for the question that asks whether a wife is justified in refusing to have sex with her husband if he has a STD. It is somewhat puzzling that the proportion of affirmative answers is higher for the control group which has less education. On the other hand, the proportion of married women is larger in the control group. To the extent that married women have better information and experience on the issues raised by these two questions, it could be reasonable to have higher proportion of affirmative answers among the control group. The proportion of women who thinks that wife beating cannot be justified is higher in the treatment group. Similarly, the proportion of women who thinks that FGM should be discontinued is higher among the treatment group.

Although the individuals who are exposed to the FPE are younger than those who are not exposed, the former group has more schooling on average than the latter as expected (4.4 years vs. 2.1 years). The data set contains information on religious affiliation and ethnic background. Islam and Christianity are the two dominant religions in Sierra Leone; and Temne and Mende are the two largest ethnic groups. We also have information on whether the person resides in an urban or rural area. The wealth of the person is measured by dummy variables titled *Wealth1*, *Wealth2*, and so on, to indicate the wealth quintile to which the individual's household belongs. Total wealth is calculated using all household assets, including cars and television sets, as well as dwelling characteristics such as flooring material, type of drinking water source, and toilet facilities.¹⁴ *TV*, *Radio*, and *Fridge* indicate whether the household of the individual has these consumer durables. These variables are correlated with wealth. In addition, TV and radio may have a direct impact on attitudes because they may enable the person to have access to information. For example, Jensen and Oster (2009) show that the introduction of cable television into rural India has changed the reported acceptability of domestic violence toward women and the preference for sons. Chong and la Ferrara (2009) report that access to a particular TV channel, which has monopoly over soap operas (which typically contain themes related to criticism of traditional values and female empowerment and emancipation) is associated with increased divorce rates.

The data set does not contain information on the region of birth, childhood place of residence, or the place of education. As a result, we cannot determine whether the individual has received her education in a given district and then moved and was surveyed in 2008 while living in a different district of the country. The basic assumption behind our empirical analyses is that individuals have received their education in the same district where they were interviewed in 2008. However, later in the paper, we identify those who have lived in the same residence continuously since the school years. Using this sub-sample of individuals, who have clearly not relocated since the elementary school age, we obtain similar results. We also demonstrate that the district migration rates do not differ by treatment status and the level of education funding in the district. Similarly, we show that exposure to

war violence is not the driver of the results and that results do not change when we modify the age composition of the control group.

4. EMPIRICAL STRATEGY

We estimate the impact of the education policy on schooling acquired by women using the specification depicted by [equation \(1\)](#) below:

$$S_{ijt} = \varphi_0 + \varphi_1 (\text{FPECohort}_i * R_j) + \mathbf{X}_i \Psi + \gamma_j + \delta_t + \varepsilon_{ijt}, \quad (1)$$

where S_{ijt} stands for years of education (measured in 2008) of individual i , in district j , who was born in year t . FPE Cohort_i is a dichotomous indicator which takes the value of one if the cohort of the individual was exposed to the FPE policy, and zero otherwise. As described in the introduction, because of the devastation of the infrastructure during the civil war, there was significant damage to school buildings. While the government could not increase the number of teachers at the end of the civil war in 2001, it started repairing damaged classrooms and building new schools. The intensity of this effort, which differs between districts, measured as log spending per 100 teachers in 2004, is represented by R_j .

The primary school age in Sierra Leone is 6 to 11 years. Those who were 6 years old in 2001 when the FPE policy started were 13 years old in 2008 when they answered the survey questions. However, the minimum age of those who were part of the survey in 2008 is 15 and these individuals were 8 years old in 2001. Therefore, we consider those individuals who were 8 to 11 years old in 2001 (who were 15 to 18 in 2008) as part of the treatment group; and FPE Cohort takes the value of one for these individuals. As mentioned in the data section, when the program started in 2001, those who were above the primary schooling age (older than 11 years) were nevertheless allowed to enroll in school, which means that children who were older than 11 years of age in 2001 could have also benefitted from the program. Therefore, the control group consists of those who were 15 to 21 in 2001. We also entertain alternative classifications of the control group which do not alter the results appreciably.

The vector \mathbf{X}_i includes attributes of the individuals such as religion, ethnic background, marital status, employment status, residence in an urban area, the proportion of population in the age group of the person in the district, and indicators of wealth. The equation includes district fixed effects γ_j , year of birth fixed effects δ_t , and a standard white noise error term ε_{ijt} .¹⁵

To investigate the extent to which schooling had an impact on women's preferences, we estimate [equation \(2\)](#).

$$Y_{ijt} = \alpha_0 + \alpha_1 S_{ijt} + \mathbf{X}_i \Phi + \mu_j + \lambda_t + \tau_{ijt}, \quad (2)$$

where Y_{ijt} represents the response of individual i who was born in year t , and who resides in district j to questions on health, sexual activity and husband-wife relations, shown in [Table 1](#). S_{ijt} stands for the level of schooling of the individual;

μ_j and λ_t represent district fixed effects and year of birth fixed effects, respectively. Because unobservable characteristics of the person, represented by the error term τ_{ijt} , have an impact on her preferences (Y) and because these unobservables could be correlated with her level of schooling (S), Equation (2) is estimated using instrumental variables, where schooling is instrumented by exposure to the FPE and intensity of the program in the district ($FPECohort_i * R_j$). The factors that may be correlated with schooling as well as with the outcomes analyzed in the paper (Y) may include unobservable attributes of the families and the communities.

A central assumption is that any district attributes that may impact the attitudes of people who reside in those districts are unrelated to the distribution of the funds to districts. Lack of correlations between funds received by districts and some district characteristics in 2004 supports this claim. For example, the biggest ethnic minorities in Sierra Leone are the Temne and the Mende. Correlations between district funding and the proportion by Temne and Mende in the district are 0.085 and -0.145 , respectively, while the correlation between funding and population per square kilometer is 0.90. Similarly, the allocation of funds was not influenced by the leadership style of district leaders (e.g. whether or not district leaders have a more progressive social attitude).¹⁶ If variation in access to schooling between districts due to the FPE program is related to funding of other local public goods, such as health facilities and clinics, then our instrument may impact attitudes through the influence of the provision of such public goods. However, we show in the paper that access to clinics and health services are not related to education.

5. RESULTS

Column (1) of Table 2 displays the result obtained from estimation of equation (1), which is the first-stage regression of the impact of the FPE program on schooling. Column (2) reports the same specification after dropping all covariates other than ($FPECohort * R$). The estimated impact of the program remains the same.¹⁷ These specifications imply that doubling the education spending per teacher in a district increases young women's education by an average of 0.7 years.

In Table 3, we provide the results of the instrumental variables regressions where women's behavior regarding using modern contraceptives and testing for AIDS is analyzed, along with the analysis of their preferences regarding physical violence against them, and the issues that impact their health. The top panel of Table 3 reports the results of the regressions that do not include any control variables. The bottom panel displays the results obtained from the models that include all control variables. In the interest of space, the estimated coefficients of the control variables are not reported in the paper, but the full results of the bottom panel of Table 3 are provided in Appendix Table B.1. Regressions employ sampling weights, and standard errors are clustered in two ways. First, we classify the treatment cohort into two groups as younger and older (those who were 8–9

TABLE 2. The impact of the FPE program on schooling – females

	Dependent variable: Years of schooling	
	(1)	(2)
FPE Cohort * <i>R</i>	0.704** (0.287)	0.700* (0.360)
Christian	0.905*** (0.304)	
Temne	-0.333 (0.251)	
Mende	0.253 (0.302)	
Urban	0.925*** (0.207)	
Married	-2.155*** (0.400)	
Employed	-0.763*** (0.198)	
Radio	0.302** (0.124)	
Fridge	1.255 (0.789)	
TV	0.610 (0.387)	
Wealth 1	-0.298** (0.131)	
Wealth 2	-0.023 (0.143)	
Wealth 4	0.649*** (0.174)	
Wealth 5	1.526*** (0.400)	
Popshare	-0.002 (0.036)	
District fixed-effects	Yes	Yes
Birth year fixed-effects	Yes	Yes
Observations	2,661	2,661
<i>R</i> -square	0.452	0.281

Notes: Standard errors in parentheses are clustered at the treatment-district level. Statistical levels of significance: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. The sample comprises the FPE cohort (those born during the period 1990 to 1993) as the treatment and those females born during the period 1980 to 1985 as the control group. FPE Cohort**R* is the product of the FPE Cohort dummy and the logarithm of district-level funding allocated for primary school education for every 100 teachers in 2004. Regressions are weighted by sample weights from the SLDHS.

TABLE 3. The impact of schooling on preferences – instrumental variables regressions – females

	Dependent variable:						
	Modern contracep-tives (1)	Tested for AIDS (2)	Desired number of children (3)	Wife justified in refusing sex when tired (4)	Wife justified in refusing sex with STD husband (5)	Wife beating NOT justified in refusing sex (6)	Stop female genital mutilation (7)
<i>Panel A: No Control variables</i>							
Schooling	0.124 (0.041) [0.078] [0.118]	0.123 (0.006) [0.008] [0.000]	-0.340 (0.026) [0.037] [0.008]	0.039 (0.453) [0.556] [0.746]	0.102 (0.080) [0.140] [0.198]	0.090 (0.030) [0.016] [0.006]	0.093 (0.013) [0.026] [0.086]
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	No	No	No	No	No	No
First stage (F-stat.)	6.362	6.099	6.362	6.549	6.155	6.258	6.362
Observations	2,661	2,615	2,661	2,624	2,640	2,655	2,661
<i>Panel B: Control Variables added to the models</i>							
Schooling	0.108 (0.032) [0.060] [0.216]	0.102 (0.005) [0.007] [0.012]	-0.303 (0.052) [0.053] [0.100]	0.039 (0.429) [0.525] [0.710]	0.116 (0.027) [0.053] [0.152]	0.078 (0.055) [0.054] [0.116]	0.090 (0.031) [0.056] [0.140]
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First stage (F-stat.)	9.987	9.692	9.987	10.303	9.818	9.881	9.987
Observations	2,661	2,615	2,661	2,624	2,640	2,655	2,661

Notes: p -values of the estimated coefficients with 56 clusters are in (parentheses), p -values with 28 clusters and bootstrapped p -values with 28 clusters [in brackets] are shown in rows 2 and 3 below the coefficients. Regressions are weighted by sample weight from the SLDHS. Regressions include controls for religion, ethnicity, urban residence, marital status, whether respondent's household has a radio, whether respondent's household has a television, and a set of wealth status indicators and the percentage share of the respondent's age group.

years old in 2001 and those who were 10 or 11 in 2001). The same was done for the control group (those in the control group who are younger than 18 years in 2001, and those who are older than 18 years). We clustered the standard errors by old/young in treatment/control and district. This specification provides 56 clusters (14 districts; and two age-groups each in treatment and control). The p -values of the estimated coefficients are provided in parentheses under the coefficients. Alternatively, we created clusters by treatment status and district. Because this formulation provides only 28 clusters, we also calculated the bootstrapped p -values for this method of clustering. These are reported in two rows of [brackets] under the coefficients.

Neither the point estimates nor their statistical significance change appreciably between the two panels of Table 3, although the bootstrapped standard errors are larger. Columns (1) and (2) of the bottom panel of Table 3 show that an additional year of education increases women's propensity to use modern contraception by about 11 percentage points and the propensity for being tested for AIDS by 10 percentage points.¹⁸ These are substantial impacts as the proportion of women who use modern contraception in the sample is 17%, and 13% of the women in the sample has been tested for AIDS. Column (3) demonstrates that an additional year of schooling generates a decrease in the desired number of children by 0.30. The fertility rate in Sierra Leone is five children per woman and the desired number of children in our sample is 4.7. Thus, according to our estimate, the desired number of children of a woman who completes primary schooling and receives 6 years of education will be 1.8 fewer children than the sample average (or a total of three children). Whether this decrease in desired fertility would translate into an actual decline in the number of children born depends on the interplay between the woman's and her husband's preferences along with other social expectations and pressures.¹⁹ As we demonstrate below, an increase in schooling for *men* does *not* translate into a significant change in men's preference for their desired number of children, and education does not impact two behavioral outcomes: women's age at first marriage and age at first birth.

Columns (4) to (7) present the results where we investigate the impact of education on women's attitudes regarding their own health and well-being. Columns (4) and (5) display the results of the models where the dependent variable measures whether the woman believes it is justified to refuse sex with the husband if the wife is tired (column 4), or if the husband has an STD (column 5). In both cases, an increase in schooling makes women more likely to answer in the affirmative, although the impact is far from being statistically significant in case of the "refusing sex when tired" question. An increase in education by 1 year increases a woman's propensity by about 12 percentage points to declare that a wife is justified to refuse sex when the husband has an STD. At the sample mean, this translates into an increase in the attitude by 25%.

Columns (6) and (7) present the results where the attitudes toward physical violence against women are analyzed. Column (6) shows that one additional year of schooling increases women's propensity to disapprove wife beating by about 8

percentage points. About 77% of all women in the sample believe that wife beating is not justified (see [Table 1](#)). Thus, the result reported in column (6) represents a sizable impact on the attitudes regarding acceptability of violence against women. [Table 1](#) shows that about only 30% of women in the sample believe that FGM should be discontinued. An increase in education by 1 year, triggered by the FPE program, increases women's propensity to declare that FGM should be stopped by about 9 percentage points (column 7 of [Table 3](#)).²⁰

These results indicate sizable gains in attitudes that reflect women's empowerment. Similarly, large impacts are reported by Jensen and Oster (2009) in a different domain. Their results showed that in India, access to cable TV reduces the number of situations in which women consider it acceptable for a man to beat his wife by 10%, and women's reported preference to have the next child be a boy by 22%.

Estimating these models ([Equation 2](#)) using OLS instead of instrumental variables generated results that are qualitatively similar to those reported in [Table 3](#). More specifically, these OLS specifications produced coefficients for education that had the same signs as those reported in [Table 3](#), and that were always significant at the 1% level or better, but the OLS coefficients were smaller in absolute value in comparison to the instrumental variables coefficients. These OLS results are reported in [Appendix Table B.2](#).

In summary, the results demonstrate that an increase in schooling alters women's preferences in favor of protecting their own well-being. An increase in education makes women more likely to declare that a woman is justified in refusing sex when there is a health risk or when she is tired.²¹ An increase in education also makes women more likely to disapprove acts of physical violence against them.²² These results indicate that education changes women's preferences toward self-determination.

6. POTENTIAL MECHANISMS

It is possible that districts which received greater resources for education spending also received more funding for other public goods such as local health clinics. In this case, the use of modern contraception and getting tested for HIV can be impacted by increased access to health care facilities and health services. In other words, if education captures a general increase in local public good spending, then education would also impact access to local health facilities.²³ In the data set, we identified two questions that help gauge access to health services. The first question asks women if they gave birth in a government hospital, government health care center, government health post, or other public health facility (the main alternative is to give birth at home). Running the IV regression as in [Table 3](#) showed that education had no impact on the propensity to give birth at a government facility since the end of the civil war (coef. of education = -0.096 , se = 0.086 , $N = 983$; mean of the dependent variable = 0.25 for the treatment group, = 0.27 for the control group). Second, we created a dichotomous indicator that takes

the value of one if the last source of contraceptive was a government hospital, government health center, family planning clinic, mobile clinic, field worker, or other public source. Education had no impact on the propensity to use one of these government-provided sources for contraception (coef. of education = 0.001, $se = 0.033$, $N = 253$). These results indicate that education has no impact on using government health services, which implies that the impact of education on attitudes is unlikely to be driven by access to government provided health services.

6.1. Potential Migration

The data set does not allow us to identify the district in which the individuals received their education. There is, however, one question in the survey that asks individuals how long (in years) they have been living in their current residence. For each individual, we calculate the number of years since they completed their schooling. If the number of years in the current residence is greater or equal to the years since the highest grade completed, the individual has not moved to another district since completing schooling. We call such people “non-movers”. Note that the question about residence pertains to the location of the physical dwelling and not to the city or the district of residence. This means, for example, that a person who has completed her schooling 10 years ago but lived in the same residence continuously for only 9 years is considered a “mover”. In reality, this particular individual may have moved to another residence in the same district – thus, her place of current residence and her place of schooling may be the same. However, there is no way to distinguish between the cases in which the move was to a new residence and where the move was to a new district. Put differently, this crude measure forces us to classify anybody as a “mover” who has not lived in the current place of residence longer than the number of years since schooling is completed. As a result, we end up with those who definitely went to school in the same district as where they were surveyed in 2008, but we omit those who have moved to a different residence in the same district. Consequently, we lose more than 1,000 observations, some of which are non-movers who had to be classified as movers. Nevertheless, the regression results obtained from the sample of imputed “non-movers” revealed that the point estimates of schooling were smaller in comparison to those reported in [Table 3](#), but the main inference did not change.²⁴

Our imputed district-level migration rates are higher in the control group (48%) in comparison to the treatment group (20%).²⁵ To investigate whether the district-level migration rates differ by treatment cohort and by the amount of education funding received by district, we classified each district into above-median resource or below-median resource district based on the education funding (R in [equation 2](#)) received by the district. We calculated the migration rates (the proportion of movers) in each district among those who are treated by the reform and those who are in the control group. Running a

dif-in-dif regression on this sample revealed that the migration rates were not different between the treatment and control groups by the level of education funding.²⁶

6.2. Is Literacy a Mechanism?

In the SLDHS, literacy was evaluated based on the ability of the respondents to read a sentence placed in front of them. We created a dummy variable, titled *Literate*, which takes the value of one if the individual was able to read the whole sentence. We defined a second variable, *Literate2*, which identifies those who could read the entire sentence as well as those who could read only parts of the sentence placed in front of them. This second variable determines those who are literate or semi-literate. As shown in Table 1, 26% of the women in our sample are literate, and 32% are literate or semi-literate. This is consistent with the 30% literacy rate for females who are 15 years of age and older in 2009, reported by the World Bank [UNESCO Institute for Statistics (2011)].²⁷

We investigated the relationship between reported schooling and literacy among those who are part of the control group (those who are not exposed to the FPE program) as well as for those who are treated by the program. Among those with no schooling, the literacy rate is essentially zero in both groups. Among the group of women who have 1 to 3 years of schooling, the literacy rate is zero if they are part of the control group, and 7.5% of this group is semi-literate or literate. Of women who have 1 to 3 years of education and who are part of the treatment cohort, the literacy rate is about 9%; and about 46% of this group is semi-literate or literate. The same pattern emerges among those with 4 to 6 years of schooling: the literacy (semi-literacy) rate is 29 (72)% in the treatment group and 6 (27)% in the control group. The fact that the literacy rate is extremely low among the control-group women who have some primary education (1 to 6 years) may be attributable to the fact that some of these women went to school during the civil war years and therefore it is likely that they did not receive high-quality instruction during those years. On the other hand, the FPE program started post-civil war. Therefore women, who are part of the treatment cohort and who went to school under the FPE program, are not impacted by the interruptions of the civil war.²⁸ It is remarkable that less than one-third (28.9%) of those who received 4 to 6 years of schooling under the FPE program can read a complete sentence.²⁹

To investigate more formally the relationship between education and literacy, we estimated regressions where literacy is explained by education and all control variables, and education is instrumented as before. The results have shown that an increase in education on this margin has no statistically significant impact on literacy in Sierra Leone.³⁰ This implies that literacy is not the mechanism through which education impacts the attitudes of women.

6.3. Exposure to War Violence

The civil war in Sierra Leone started in 1991 and ended in 2001. The schooling reform started at the end of the war in 2001. This means that people in the control group, who were 15 to 21 years old in 2001, were 5–11 years old when the war started in 1991. On the other hand, people in the treatment group were not yet born, or they were at most 1 year old when the war started. This regularity suggests that the results reported so far may not be due to the impact of education, but they may be because of exposure to war. In other words, the control group is exposed to war while the treatment group is not; and if exposure to violence during the war has “hardened” the older cohorts, we might be capturing the thoughts and attitudes of these hardened individuals in comparison to those who did not experience war violence.

The hypothesis that those who are exposed to violence during the civil war in Sierra Leone are “hardened” is not supported by data. Bellows and Miguel (2009) find that individuals who experience violence during the civil war in Sierra Leone display higher levels of political mobilization and engagement and they make more local public goods contributions in comparison to non-victims. If this finding carries over to attitudes toward violence, then women who were exposed to the civil war would be less tolerant of violence, rather than more tolerant.³¹ Nevertheless, to address this concern, we used detailed data on war atrocities compiled by the Sierra Leone Truth and Reconciliation Commission (TRC). The TRC was initiated in 2000 by the Parliament of Sierra Leone under Section 6(1) of the TRC Act which states that the objective of the Commission, among other things is “to create an impartial record of violations and abuses of human rights and international humanitarian law related to the armed conflict in Sierra Leone, from the beginning of the conflict in 1991...” [Truth (2004a) pp. 3–4]. Creation of this commission is provided for under Article XXVI of the Lomé Peace Agreement of July 1999.³²

The general function of the Commission is to “investigate, report on the nature and extent of the human rights violations and abuses, and on the context in which these violations and abuses occurred” [Truth (2004c)]. In carrying out this function, the Commission provided an opportunity for both victims and perpetrators to share their experiences. Although not every possible victim or perpetrator was interviewed, information was collected from almost all of the chiefdoms,³³ the purpose of which was to record the experiences of the population, paying attention to specific groups such as women, children, and amputees. It is important to note that victims were not compensated for providing an account of their experiences to the Commission.

A total of 7,706 detailed statements made by Sierra Leoneans (living at home as well as refugees in Gambia, Guinea, and Nigeria) were collected by the Commission. Approximately, one-third of the statements were given by women while two-thirds were given by men. Of those women providing statements, roughly 79% were victims of violations while about 84% of the men were victims. Another 16%

of the females indicated they were witnesses to violence against family members while 10% of the men witnessed violence against one or more family members. This detailed account of these individuals was compiled, processed, and presented in a statistical appendix to the Commission's report [see Truth (2004b)].

The commission identified a variety of atrocities during the war ranging from torture to rape, from amputation to assault/beatings, from sexual slavery to forced labor. A total of 40,242 violent acts took place during the war. These incidents are identified by gender of victim, year, and district in which they took place. Using these data, we calculated the number of atrocities against females per 1,000 females in each district. Using this variable as "treatment", we ran the basic models as in Table 3, instrumenting education by this treatment. In these regressions, the coefficient of education was never statistically different from zero.³⁴

We also investigated whether accounting for the possible direct impact of violence changes the results obtained from the basic model, reported in Table 3. This is done by adding to the models the variable that measures district level per capita war atrocities, described above, as an additional control variable. The estimated impact of education remained the same. As an alternative measure of exposure to violence, we used each person's age and location at the end of the war to determine *exposure to years of violence* since she was 2 years of old.³⁵ This measure of exposure to war violence did not alter the estimated coefficients of schooling in any meaningful way either.

Taken together, the results indicate that an increase in schooling changes the attitudes of women regarding the issues that matter for their well-being but that this effect is not due to women's improved reading ability due to increased schooling. The results are not due to access to health services or because of the impact of war violence either. Thus, the mechanism through which education impacts attitudes is unclear. Education's impact could be due to the exposure to teachers/lectures even though such exposure does not significantly enhance literacy. It could also be due to some other channel such as socialization experiences while in school; it could also be the result of multiple influences.

7. THE IMPACT ON MEN

In this section, we investigate the extent to which the increase in educational attainment due to the FPE program has impacted *men's attitudes* regarding *women's well-being*. Table 4 displays the descriptive statistics for men. A comparison between men and women reveals an interesting and surprising picture. For example, while 56% of women indicated that a wife would be justified in refusing sex when she is tired (see Table 1), 68% of men believe that such a refusal is justified. Similarly, the proportion who thinks that a wife is justified in refusing sex if the husband has an STD is *higher* among *men* than women. Along the same lines, the proportion of men who thinks that wife beating is justified is *lower* than the proportion of women who thinks the same (0.23 vs. 0.36), and the proportion of individuals who thinks that FGM should be discontinued is higher among men than

TABLE 4. Summary statistics: 2008 SLDHS sample – males

Variables	Variable definition (1)	All Mean (std) (2)	Treated group (ages 8–11 years in 2001) Mean (std) (3)	Control group (ages 15–21 years in 2001) Mean (std) (4)
Desired number of children	Number of children desired	4.440 (2.975)	4.125 (2.745)	4.685 (3.077)
Modern contraceptives	Equals one if respondent uses modern contraceptives, zero otherwise	0.230	0.073	0.353
Tested for AIDS	Equals one if respondent has ever been tested for the AIDS virus, zero otherwise	0.071	0.025	0.102
Wife justified in refusing sex when tired	Equals one if respondent thinks a wife is justified in refusing to have sex with her husband when she is tired or not in the mood, zero otherwise	0.685	0.620	0.736
Wife justified in refusing sex with STD husband	Equals one if respondent thinks a wife is justified in refusing to have sex with a husband having an STD, zero otherwise	0.581	0.528	0.623
Wife beating NOT justified in refusing sex	Equals one if respondent thinks that wife beating is justified if she refuses to have sex with husband, zero otherwise	0.768	0.758	0.775
Stop female genital mutilation	Equals one if respondent thinks the practice of female genital mutilation should be discontinued, zero otherwise	0.373	0.332	0.405
Schooling	Years of schooling completed	4.942 (4.687)	5.265 (3.566)	4.691 (5.392)

TABLE 4. Continued

Variables	Variable definition (1)	All Mean (std) (2)	Treated group (ages 8–11 years in 2001) Mean (std) (3)	Control group (ages 15–21 years in 2001) Mean (std) (4)
Literate	Equals one if respondent is able to read all of the sentence, zero otherwise	0.470	0.569	0.392
Literate2	Equals one if respondent is able to read all of the sentence or some parts of the sentence, zero otherwise	0.563	0.727	0.436
Age	Age in years	21.592 (4.727)	16.557 (1.174)	25.521 (1.858)
Employed	Equals one if employed, zero otherwise	0.704	0.523	0.845
Married	Equals one if married, zero otherwise	0.239	0.005	0.421
Radio	Equals one if respondent's household has a radio, zero otherwise	0.652	0.628	0.671
Fridge	Equals one if respondent's household has a refrigerator, zero otherwise	0.097	0.105	0.092
TV	Equals one if respondent's household has a television, zero otherwise	0.157	0.137	0.172
Urban	Equals one if resides in an urban area, zero otherwise	0.438	0.466	0.416
Wealth 1(poorest)	Percentage of respondents within the first wealth quintile	0.167	0.168	0.166
Wealth 2 (poorer)	Percentage of respondents within the second wealth quintile	0.161	0.155	0.166

TABLE 4. Continued

Variables	Variable definition (1)	All Mean (std) (2)	Treated group (ages 8–11 years in 2001) Mean (std) (3)	Control group (ages 15–21 years in 2001) Mean (std) (4)
Wealth 3 (middle)	Percentage of respondents within the third wealth quintile	0.160	0.151	0.168
Wealth 4 (richer)	Percentage of respondents within the fourth wealth quintile	0.209	0.217	0.203
Wealth 5 (richest)	Percentage of respondents within the fifth wealth quintile	0.303	0.309	0.297
POPSHARE	Percentage share of respondent's age group	3.842 (1.721)	4.158 (1.775)	3.596 (1.637)
<i>Religion</i>				
Christian	Equals one if belong to Christian religion, zero otherwise	0.224	0.211	0.235
Islam	Equals one if belong to Islam, zero otherwise	0.774	0.789	0.763
Other religion	Equals one if belong to another religion, zero otherwise	0.002	0.000	0.002
<i>Ethnicity</i>				
Temne	Equals one if belong to Temne ethnic group, zero otherwise	0.386	0.355	0.412
Mende	Equals one if belong to Mende ethnic group, zero otherwise	0.283	0.280	0.285
Other ethnicity	Equals one if belong to another ethnic group, zero otherwise	0.331	0.366	0.303
Observations (max.)		883	397	486

Note: The descriptive statistics are calculated using sample weights from the SLDHS.

women (0.38 vs. 0.30). These are surprising findings because one would expect that the rate of support for the statements in favor of women's well-being would be higher among women. This outcome, however, is not an artifact of the data we employ. It is consistent with a health report on Sierra Leone [Statistics Sierra Leone and ICF Macro (2009b)] and could be a reflection of a culture that fosters particular behavioral patterns for women and promotes a subservient attitude to men. Similarly, El Feki writes that in Egypt, where FGM is a custom, mothers, rather than fathers, decide on whether to circumcise their daughters and that men are traditionally not involved in this decision-making process (El Feki 2013).

Table 5 presents the instrumental variables regressions for men. This table is the counterpart to the bottom panel of Table 3, which presented the same information for women. Table 5 shows that, as was the case for women, an additional year of schooling increases the likelihood to use modern contraceptive and to have been tested for AIDS among men. The point estimates are smaller than those estimated for women, but the baselines are lower for men. Thus, the impact of education on AIDS testing is similar between men and women, but the impact on modern contraceptive use for men is half of the impact on women (65% vs. 30%). On the other hand, an increase in education on this margin (the mean years of schooling is 5 years among men) has no impact on men's attitudes toward women's well-being.

That education does not impact men's attitudes could be because average education of men was higher before the initiation of the program (average education of the control cohort of men is 4.7 years, while it is 2.1 years for women), and therefore the program might not be as impactful on men. On the other hand, there is other evidence (from a middle-income country) that an increase in education, due to an education reform, does not generate a change in religious beliefs and religiosity of men at a higher education margin (from 5 to 8 years), even though the same reform does change women's beliefs [Cesur and Mocan (2013)].

Although increased education changes women's attitudes in matters that impact women's well-being, the fact that an increase in education (on this margin) has no influence on men's preferences may suggest that the impact of education on changes in behavior may be unclear.

It should also be noted that in the sample the average age difference between husbands and wives is 11 years. Thus, husbands' attitudes, who are for the most part, members of an older generation, are less likely to be impacted by the reform. This suggests that the change in women's attitudes, due to an increase in women's education, may not register a change in behavior such as age at marriage and age at child birth.

To investigate this point, we ran the main regressions by using three other outcome variables for women: whether they are married, age at first marriage and age when they gave birth to their first child.³⁶ The results show that an increase in women's education, due to the FPE policy, has no impact on the propensity of marriage (coef. of education = 0.04, se = 0.06). Similarly, education does not influence women's age at first marriage (coef. of education = 0.41, se = 0.29), or their age at first birth (coef. of education = 0.03, se = 0.48). These results support

TABLE 5. The impact of schooling on preferences – instrumental variables regressions – males

	Dependent variable:						
	Modern contracep- tives (1)	Tested for AIDS (2)	Desired number of children (3)	Wife justified in refusing sex when tired (4)	Wife justified in refusing sex with STD husband (5)	Wife beating NOT justified in refusing sex (6)	Stop female genital mutilation (7)
Schooling	0.069 (0.005) [0.000] [0.000]	0.048 (0.000) [0.000] [0.000]	-0.107 (0.599) [0.535] [0.606]	-0.033 (0.578) [0.540] [0.654]	-0.056 (0.168) [0.111] [0.140]	0.022 (0.527) [0.464] [0.550]	0.011 (0.692) [0.660] [0.756]
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First stage (F-stat.)	13.562	13.133	13.562	11.026	12.814	12.436	13.562
Observations	883	723	883	859	863	879	883

Notes: p -values of the estimated coefficients with 56 clusters are in (parentheses); p -values with 28 clusters and bootstrapped p -values with 28 clusters [in brackets] are shown in rows 2 and 3 below the coefficients. Regressions are weighted by sample weight from the SLDHS. Regressions include controls for religion, ethnicity, urban residence, marital status, whether respondent's household has a radio, whether respondent's household has a television and a set of wealth status indicators and the percentage share of the respondent's age group.

the hypothesis that the change in attitudes (on this margin) may not translate into actual behavioral changes.

8. EXTENSIONS

As mentioned earlier, those who were 8 to 11 years old in 2001 were exposed to the FPE policy. Individuals who were 15 to 21 years in 2001 constitute the “control group” because at the start of the implementation of the policy, those who were older than the primary schooling age (e.g. children who were 12 or 13 years) were still allowed to enroll in school. Nevertheless, we also estimated models by using those who were 12 to 16 years in 2001 as the control group. Because some individuals in this group have benefitted from the FPE, the estimated impact of education is expected to be weaker. The results show that this is in fact the case. The point estimates are smaller, and the impact of schooling is statistically significant only for contraceptive use, having been tested for AIDS, and reporting that a wife is justified in refusing sex if the husband has an STD. Finally, we experimented with yet another specification. Here, instead of dropping the individuals who were 12 to 14 years old in 2001, and therefore who might or might not have benefitted from the FPE policy, we kept them in the sample but assigned them a value of 0.5. Put differently, in this specification those who are in the treatment group (ages 8 to 11 years in 2001) are assigned the value of one, those who are in the control group (15 to 21 years) are assigned a value of zero and the questionable middle group (ages 12 to 14 years) is assigned a value of 0.5. The point estimates were smaller than those reported in [Table 3](#) as expected; but they were not substantially different.

The models include the employment status of the individual, but employment is a choice variable which could be impacted by education. Similarly, wealth could be endogenous as well. To investigate the sensitivity of the results, we re-estimated the models without employment and wealth. The results remained the same. Similarly, the results were insensitive to the exclusion of year-of-birth fixed effects.³⁷

9. CONCLUSION

The impact of schooling on earnings is well-documented and an increase in education improves health outcomes. These direct impacts of education on human capital and labor productivity are important ingredients for economic development. Increased education can produce other benefits for the individuals and the society by changing attitudes and preferences.³⁸ In this paper, we investigate whether an increase in schooling changes women’s preferences regarding the issues that are directly related to women’s well-being.

We use data from Sierra Leone, where a substantial education program was started in 2001. The program provided increased access to education for children who were primary-school age, but did not benefit children who were older. We

exploit the variation in access to the program generated by date of birth and the variation in resources between various districts of the country. We analyze whether an increase in schooling, triggered by the program, had an impact on women's attitudes toward matters that impact women's health and on attitudes regarding violence against women.

The household survey includes health-related questions on the *acceptability* of attitudes such as whether a wife is justified in refusing to have sex if the husband has an STD, or whether a wife is justified in refusing sex when she is tired. It also includes questions gauging *attitudes* toward violence against women such as whether beating a wife is justified if she refused to have sex and whether the custom of FGM should be eradicated. Attitudes for violence against women are particularly important as the World Health Organization recently declared that more than one-third of all women around the world have been victims of physical or sexual violence [World Health Organization (2013)]. We also employ questions that involve health behaviors such as the use of modern contraceptives and whether the person has been tested for AIDS, as well as the desired number of children.

We find that an increase in education changes women's preferences. Specifically, an additional year of schooling makes women more likely to declare that a wife is justified in refusing sex when she is tired or when the husband has an STD. The same increase in schooling makes women more likely to disagree with the statement that wife beating is justified and more likely to declare that the practice of FGM should be stopped. These results indicate that education empowers women because an increase in education makes women more intolerant of practices that conflict with their well-being. An increase in education also reduces the number of desired children and increases the propensity to use modern contraception and to be tested for AIDS.

We can determine a respondent's literacy based on their ability to read a sentence as asked in the survey. We find that a switch from being illiterate to being literate is not the source of the change in attitudes. This is because an increase in education has no strong impact on women's literacy in Sierra Leone. The results are not driven by differential exposure to violence during the civil war of those who did and did not benefit from the education program. The results are not driven by access to health services either.

It is unclear through which particular mechanism education alters women's preferences. The impact could be due to a variety of factors ranging from the influence of teachers and peers as role models to socialization experiences in school. Nevertheless, an increase in education has a causal effect on preferences, much like the causal effect of education on health, although the exact mechanism remains also unclear in case of health outcomes [Mocan and Altindag (2014); Chou, Liu, Grossman and Joyce (2010); Cutler and Lleras-Muney (2010); Grossman (2008)].

Even though education empowers women so that they can voice preferences that are aligned with their own well-being, whether or not this would translate into actual behavioral change is unclear. This is because we also find that an increase in men's education, triggered by the program, does *not* alter *men's attitudes* regarding

women's well-being. If men resist change, it is unclear if women's well-being would be improved in the short-run.³⁹ In fact, we show that an increase in women's education on this margin has no impact on women's propensity to get married, their age at first marriage and age at first birth. At the same time, it is also possible that a change in women's preferences, detected in this paper, could facilitate a change in men's preferences over a period of time. Furthermore, much like the transmission of human capital from mothers to daughters reported by previous research, it is possible that the change in women's preferences could have an impact on their daughter's preferences. Regardless, these findings are potentially important for women's well-being to the extent that exogenous changes in the legal and political structure may not be effective in improving women's well-being quickly if women themselves don't believe that such changes are necessary.

APPENDIX A. PREFERENCE QUESTIONS AS APPEARING IN THE SLDHS

1. If you could go back to the time you did not have children and could choose exactly the number of children to have in your whole life, how many would that be? Or for those with no living children, the following question was asked: If you could choose exactly the number of children to have in your whole life, how many would that be?
2. Is a wife justified in refusing to have sex with her husband when she is tired or not in the mood?
3. Have you ever used any (any of the contraceptive methods)?
4. I don't want to know the results, but have you ever been tested to see if you have AIDS?
5. Husband and wives do not always agree in everything. If a wife knows her husband has a disease that she can get during sexual intercourse, is she justified in refusing to have sex with him?
6. Sometimes a husband is annoyed or angered by the things that his wife does. In your opinion, is a husband justified in hitting or beating his wife in the following situations: if she refuses to have sex with him? (Other situations were given to the respondent as well)
7. Do you think that this practice (female genital cutting) should be continued, or should it be stopped?

APPENDIX B

TABLE B.1. The impact of schooling on preferences – instrumental variables regressions – females

	Dependent variable:						
	Modern contracep- tives (1)	Tested for AIDS (2)	Desired number of children (3)	Wife justified in refusing sex when tired (4)	Wife justified in refusing sex with STD husband (5)	Wife beating NOT justified in refusing sex (6)	Stop female genital mutilation (7)
Schooling	0.108** (0.032) [0.060]	0.102*** (0.005) [0.007]	− 0.303* (0.052) [0.053]	0.039 (0.429) [0.525]	0.116** (0.027) [0.053]	0.078* (0.055) [0.054]	0.090** (0.031) [0.056]
Christian	− 0.023 (0.690)	− 0.023 (0.574)	− 0.064 (0.711)	− 0.032 (0.563)	− 0.088 (0.196)	− 0.057 (0.270)	0.083 (0.110)
Temne	0.032 (0.492)	0.050 (0.113)	0.054 (0.722)	0.011 (0.756)	0.088** (0.013)	− 0.039 (0.226)	− 0.013 (0.756)
Mende	− 0.052 (0.248)	0.041 (0.189)	0.005 (0.979)	− 0.110*** (0.002)	− 0.054 (0.287)	0.037 (0.348)	− 0.038 (0.346)
Urban	− 0.085* (0.055)	− 0.059 (0.102)	0.045 (0.843)	− 0.042 (0.421)	− 0.098* (0.096)	− 0.047 (0.400)	0.026 (0.660)
Married	0.131 (0.222)	0.219** (0.017)	− 0.096 (0.782)	0.044 (0.701)	0.187 (0.109)	0.055 (0.542)	0.104 (0.242)
Employed	0.103** (0.027)	0.072** (0.041)	− 0.068 (0.684)	− 0.031 (0.501)	0.037 (0.519)	0.022 (0.640)	0.034 (0.366)
Radio	− 0.042* (0.072)	− 0.020 (0.346)	0.039 (0.751)	0.025 (0.335)	− 0.023 (0.523)	− 0.029 (0.297)	− 0.041 (0.152)
Fridge	− 0.140 (0.112)	− 0.090 (0.176)	0.232 (0.355)	− 0.017 (0.788)	− 0.087 (0.397)	− 0.042 (0.587)	− 0.018 (0.826)

TABLE B.1. Continued

	Dependent variable:						
	Modern contracep-tives (1)	Tested for AIDS (2)	Desired number of children (3)	Wife justified in refusing sex when tired (4)	Wife justified in refusing sex with STD husband (5)	Wife beating NOT justified in refusing sex (6)	Stop female genital mutilation (7)
TV	0.028 (0.677)	-0.057 (0.292)	0.034 (0.874)	0.034 (0.651)	-0.082 (0.284)	0.025 (0.644)	-0.054 (0.341)
Wealth 1	0.004 (0.903)	0.006 (0.876)	0.100 (0.554)	0.071* (0.064)	0.065 (0.170)	0.035 (0.497)	-0.028 (0.414)
Wealth 2	-0.010 (0.610)	0.020 (0.389)	0.255 (0.175)	0.060 (0.193)	0.032 (0.461)	-0.030 (0.457)	-0.035 (0.253)
Wealth 4	-0.036 (0.327)	-0.044 (0.263)	0.022 (0.914)	0.010 (0.854)	-0.066 (0.215)	0.033 (0.459)	-0.058 (0.221)
Wealth 5	-0.076 (0.407)	-0.103 (0.152)	0.040 (0.907)	-0.015 (0.886)	-0.137 (0.212)	-0.022 (0.764)	-0.117 (0.153)
Popshare	-0.007 (0.142)	-0.006 (0.263)	0.023 (0.285)	-0.003 (0.669)	0.006 (0.369)	-0.010** (0.038)	0.001 (0.841)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First stage F	9.987	9.692	9.987	10.303	9.818	9.881	9.987
Observations	2661	2615	2661	2624	2640	2655	2661

Notes: *p*-values of the estimated coefficients with 56 clusters are in (parentheses), while regression and bootstrapped *p*-values with 28 clusters are in [brackets] are shown in rows 2 and 3 below the coefficients. The sample comprises the FPE cohort (those born during the period 1990 to 1993) as the treatment and those females born during the period 1980 to 1985 as the control group.

TABLE B.2. The impact of schooling on preferences – ordinary least squares regressions – females

	Dependent variable:						
	Modern contracep-tives (1)	Tested for AIDS (2)	Desired number of children (3)	Wife justified in refusing sex when tired (4)	Wife justified in refusing sex with STD husband (5)	Wife beating NOT justified in refusing sex (6)	Stop female genital mutilation (7)
Schooling	0.025*** (0.000) [0.000]	0.019*** (0.000) [0.000]	-0.066*** (0.000) [0.000]	0.014*** (0.000) [0.001]	0.011*** (0.001) [0.005]	0.015*** (0.000) [0.000]	0.022*** (0.000) [0.000]
Christian	0.053** (0.030)	0.053*** (0.001)	-0.282*** (0.001)	-0.009 (0.771)	0.008 (0.807)	0.001 (0.964)	0.146*** (0.000)
Temne	0.004 (0.896)	0.023 (0.279)	0.132 (0.324)	0.003 (0.918)	0.052 (0.182)	-0.060** (0.044)	-0.036 (0.337)
Mende	-0.030 (0.298)	0.063** (0.022)	-0.058 (0.692)	-0.106*** (0.002)	-0.029 (0.415)	0.055* (0.098)	-0.020 (0.590)
Urban	-0.007 (0.713)	0.016 (0.409)	-0.177 (0.206)	-0.018 (0.580)	-0.000 (0.997)	0.012 (0.724)	0.090** (0.019)
Married	-0.047* (0.067)	0.043** (0.031)	0.410*** (0.000)	-0.010 (0.747)	-0.042 (0.165)	-0.079*** (0.005)	-0.043* (0.053)
Employed	0.042** (0.012)	0.009 (0.500)	0.106 (0.306)	-0.050* (0.084)	-0.044 (0.165)	-0.026 (0.328)	-0.016 (0.564)
Radio	-0.015 (0.360)	0.005 (0.737)	-0.037 (0.743)	0.033 (0.170)	0.012 (0.688)	-0.009 (0.702)	-0.020 (0.476)
Fridge	-0.036 (0.290)	0.016 (0.438)	-0.064 (0.540)	0.012 (0.743)	0.044 (0.365)	0.039 (0.244)	0.067 (0.208)
TV	0.080* (0.065)	-0.005 (0.869)	-0.112 (0.572)	0.050 (0.436)	-0.021 (0.730)	0.061 (0.169)	-0.012 (0.808)

TABLE B.2. Continued

	Dependent variable:						
	Modern contracep- tives (1)	Tested for AIDS (2)	Desired number of children (3)	Wife justified in refusing sex when tired (4)	Wife justified in refusing sex with STD husband (5)	Wife beating NOT justified in refusing sex (6)	Stop female genital mutilation (7)
Wealth 1	− 0.020 (0.391)	− 0.019 (0.502)	0.169 (0.308)	0.063* (0.087)	0.033 (0.411)	0.017 (0.729)	− 0.048* (0.087)
Wealth 2	− 0.010 (0.625)	0.023 (0.297)	0.253 (0.194)	0.061 (0.198)	0.034 (0.436)	− 0.029 (0.476)	− 0.035 (0.275)
Wealth 4	0.020 (0.284)	0.016 (0.507)	− 0.135 (0.440)	0.026 (0.509)	0.003 (0.927)	0.075* (0.057)	− 0.013 (0.728)
Wealth 5	0.051** (0.033)	0.031 (0.317)	− 0.320 (0.149)	0.023 (0.739)	0.028 (0.588)	0.075* (0.077)	− 0.012 (0.796)
Popshare	− 0.009** (0.047)	− 0.008* (0.062)	0.029 (0.123)	− 0.003 (0.573)	0.003 (0.545)	− 0.012** (0.044)	− 0.000 (0.949)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,661	2,615	2,661	2,624	2,640	2,655	2,661
R-square	0.223	0.158	0.207	0.114	0.082	0.142	0.220

Notes: p -values of the estimated coefficients with 56 clusters are in (parentheses), while p -values with 28 clusters are in [brackets]. Statistical levels of significance are: * indicates $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$. The sample comprises the FPE cohort (those born during the period 1990 to 1993) as the treatment and those females born during the period 1980 to 1985 as the control group regressions are weighted by sample weight from the SLDHS.

NOTES

1 School life expectancy is the total number of years of schooling a child is expected to receive. Information is based on education data obtained from UNESCO Institute for Statistics and income data from the World Bank.

2 Gender inequalities are determined by complex historical, economic, social, and cultural factors. For example, there is evidence for preference for sons in many developing countries such as China and India where the ratio of newborn boys to girls is greater than one. However, the preference for sons is not exclusively a developing country phenomenon. For example, Dahl and Moretti (2008) find evidence for preference for sons in the United States.

3 Our argument is consistent with that of some sociologists, who long hypothesized that objective inequalities between groups cannot be eliminated unless subjective beliefs about the legitimacy of these inequalities are eradicated [Weber (1964 [1922]); Durkheim (1933 [1893])].

4 United Nations has launched a program in 2007 involving the UNICEF, the UNFPA and other public and private organizations to help stop the practice of FGM.

5 It should be noted that male circumcision is a completely different practice than female genital mutilation. Male circumcision is not harmful and it has medical benefits [World Health Organization (2010)].

6 The general idea of this paper is similar to the one pursued by Jensen and Oster (2009) where they investigated if access to cable TV modified women's attitudes toward domestic violence, preference for sons, and fertility.

7 Although the civil war officially ended in January 2002, the war has come to an end in 2001 for all practical purposes.

8 At least 95% of all recognized primary and secondary schools are either government-owned or government-assisted [World Bank (2007)].

9 During the decentralization process in 2004, the country is divided into 19 political units, called Local Councils. For further details on the system of administration in Sierra Leone, see Statistics Sierra Leone and ICF Macro (2009a, Appendix A, p. 275).

10 Primary school gross enrollment rate for any given year is the number of students enrolled in primary school expressed as a percentage of the population of primary-school-age children. In Sierra Leone, the official primary school age ranges from 6 to 11 years. It is possible for the primary school gross enrollment rate to be above 100%. This is because some of the enrolled may consist of older aged children who have returned to school after the war, pre-primary school-aged kids attending primary school as well as repeaters.

11 Demographic and Health Surveys (DHS) have been conducted for more than 75 developing countries since 1985 as repeated cross sections. In most of these countries, there are several waves of the survey. In Sierra Leone, the 2008 DHS is the only one that is done so far.

12 While funding for the survey came from a variety of international agencies, the collection, processing and dissemination of the data were undertaken by Statistics Sierra Leone in collaboration with the Ministry of Health and Sanitation, with technical support provided by ORC Macro International.

13 When the survey was conducted in 2008, the youngest individuals in the survey were 15 year old. These individuals were 8 year old in 2001 when the implementation of the FPE policy started. Thus, in our analysis sample, the youngest person in the treatment group was 8 years old in 2001.

14 For the details of the creation of this measure, see the DHS website at http://www.measuredhs.com/data/Data-Quality-and-Use.cfm#CP_JUMP_5373 (accessed February 15, 2012).

15 Sierra Leone is divided into four main regions (East, West, North, and South) comprising a total of 14 districts where one leader from each district has a seat in the country's parliament. The design of the SLDHS was done to take this district-level grouping into consideration. Figure 1 shows the division of these districts according to regions.

16 Personal communication with Mr. Adams Kargbo, Director of Local Government Finance Department, Ministry of Finance and Economic Development, Sierra Leone; August 2012.

17 The average predicted education obtained from column (1) of Table 2 is 4.37 (std = 2.45) for the treated group, and it is 2.10 (std = 2.43) for the control group. The mean predicted level of education for these groups is 4.39 (std = 1.70) and 2.11 (std = 1.86), respectively, when using the model with no covariates, depicted in column (2) of Table 2.

18 The first-stage F -statistics are around 10, which is the rule-of-thumb cut-off value, although even smaller F -values would not constitute a problem in just-identified models with one instrument because as indicated by Angrist and Pischke (2009, p.209) 2SLS is median-unbiased in just-identified models.

19 For a discussion of how couples' fertility preferences translate into fertility outcomes through household bargaining, see Rasul (2008).

20 The control group consists of those who are 22 to 28 years old. Restricting this group and re-estimating the models with those who are 22 to 25 produced similar point estimates. However this exercise reduced the sample size by 20-23%, depending on the outcome, and the precision of the estimated coefficients declined as a result.

21 It is conceivable that the younger group of the treatment cohort (those who were 8 or 9 years old in 2001) may have been impacted more by the program. To investigate this hypothesis, we included to the model a dummy for this group and its interaction with schooling, which is instrumented by the interaction with treatment, district spending and the dummy for the young cohort. The results showed that the impact on the younger treatment group was not different.

22 Friedman et al. (2011) also find that participation in a merit scholarship program that increases the years of education in Kenyan schools reduces young women's acceptance of male violence against women and children.

23 We thank an anonymous referee for this insight.

24 In these specifications, the coefficient of the instrument in the first-stage was 1.14 (se = 0.4). This is bigger that the first-stage coefficient estimated (column 2 of Table 2) for the main regressions reported in the bottom panel of Table 3.

25 This method of identifying movers implies that about 38% of our main sample (used in Table 3) is classified as migrants, some of whom are clearly non-migrants. Using the Sierra Leone IPUMS data from 2004, and using the question of the location of residence in 1990, we can identify individuals who have moved from one district to another between 1990 and 2004. In this analysis, the rate of migrants is about 20% of the population.

26 We estimated $M_{dc} = \alpha + \beta T_{dc} + \gamma HR_d + \delta HR_d * T_{dc} + \varepsilon_{dc}$, where M_{dc} stands for the migration rate in district d for cohort c ($c = 1$ if treatment, $c = 0$ if control cohort), $HR_d = 1$ if the district has received above-median education resources, and $HR_d = 0$ otherwise, and $T_{dc} = 1$ for the treatment cohort in district d . The estimated value of δ 0.124 (se = 0.10).

27 The literacy rate for men 15 and over was 53% in 2009.

28 The literacy rates are 100% for those who have at least 7 years of education. This is true both in the control group and in the treatment group. This result is not because of the effectiveness of the secondary school system. Rather, it is because of the fact that to enroll in the secondary school, the student must take an exam, and those who are still illiterate after having completed the 6th grade cannot plausibly pass the exam to qualify for the 7th grade.

29 Such poor education outcomes are common in developing countries. For example, Banerjee, Cole, Duflo and Linden (2007) indicate that in India 44% of the children aged 7 to 12 years cannot read a basic paragraph.

30 The coefficient of education in the literacy regression was -0.018 (se = 0.026). It was 0.018 in semi-literacy regression (se = 0.034).

31 Bellows and Miguel (2009) also find significant differences in behavior and attitudes among those who live in the same village but who differ in their direct experience with violence. They indicate that this finding implies that personal experience with civil war violence is much more influential in shaping one's subsequent behavior than mere observation of violence [Bellows and Miguel (2009) p. 1155]. This means that there would be considerable variation among those who are exposed to the war (those in the control group) based on their personal exposure to violence.

32 Financial support for the Commission came from a number of countries including the United States of America, the United Kingdom, Germany, Canada, and France. Other support came from the European Commission, members in the Office of the High Commission for Human Rights, the United Nations Development Programme (UNDP), the United Nations Mission in Sierra Leone, the President of Sierra Leone, Dr. Ahmad Tejan Kabbah, and the Government of Sierra Leone.

33 Chiefdoms are the third-level of administrative units (next to the central government and local councils) in Sierra Leone and are governed by chiefs. Districts are divided into chiefdoms, of which there are 149. Dues to security reasons, the Commission was unable to reach nine of these.

34 The coefficients (se) of education for various outcomes, in the order in which they are reported in the tables were: 0.131 (0.084), 0.281(0.218), $-0.071(0.517)$, $-0.370(0.507)$, $-0.229(0.337)$, $-0.125(0.206)$, and 0.036(0.109).

35 For example, somebody who was 15 years old in 2001 was born in 1986 and she as 4 years old when the war started in 1990. So, she was exposed to the entire war (11 years) since she was 2 years old. On the other hand, a person who was 11 years old in 2001 was born in 1990. Thus, this person was exposed to war for 9 years since age 2. In this procedure, there is variation in war violence between districts; but also people who live in the same district are exposed to different levels of war violence because they were of different ages when the war started.

36 The average age at first marriage in the sample is 16.6 and the average age at first birth is 18.0.

37 Other sensitivity analyses are reported in Mocan and Cannonier (2012).

38 For example, Dee (2004) finds that increased educational attainment improves civic engagement in terms of voting behavior and support of free speech in the United States.

39 Thus, sanctions for violence against women are important policy levers given the evidence on deterrent effect of punishment, even for violent crime [Machin et al. (2011); Corman and Mocan (2000); Kessler and Levitt (1999)].

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