Women's Empowerment in Action: Evidence from a Randomized Control Trial in Africa*

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June 2015

Abstract

Women in developing countries are disempowered relative to their contemporaries in developed countries. High youth unemployment, early marriage and childbearing interact to limit human capital investment and enforce dependence on men. We evaluate a policy intervention attempting to jump-start adolescent women's empowerment in the world's second youngest country: Uganda. The intervention relaxes the human capital constraints that adolescent girls face by simultaneously providing them vocational training and information on sex, reproduction and marriage. Relative to adolescents in control communities, after two years the intervention raises the likelihood that girls engage in income generating activities by 72% (driven by increased self-employment), and raises their expenditure on private consumption goods by 38%. Teen pregnancy falls by 26%, and early entry into marriage/cohabitation falls by 58%. Strikingly, the share of girls reporting sex against their will drops from 14% to almost half that level and aspired ages at marriage and childbearing both move forward. The findings suggest women's economic and social empowerment can be jump-started through the combined provision of hard and soft skills, in the form of vocational and life skills, and is not necessarily held back by binding constraints arising from social norms or low aspirations.

JEL Classifications: I25, J13, J24, O12.

*We thank all those at BRAC Uganda, and Agnes Katushabe, Upaasna Kaul, Nuarpear Lekfuangfu, Irene Lumala and Georgina Shiundu for excellent research assistance. We have benefited from discussions with Pedro Carneiro, Lucia Corno, Bruno Crepon, Nathan Fiala, Louise Fox, Emanuela Galasso, Maria Guadalupe, Khondoker Ariful Islam, Adriana Kugler, Brendon McConnell, David McKenzie, Silvana Tenreryo, Michele Tertilt, Marcos Vera-Hernández, Abebual Zerihun and numerous seminar and conference participants. We are grateful to the Africa Gender Innovation Lab , Bank-Netherlands Partnership Programme, Mastercard, Nike, the Gender Action Plan of the World Bank, the Improving Institutions for Pro-Poor Growth program of DfID and the International Growth Centre for financial support. The views presented in this paper are the authors' and do not represent those of the World Bank or its member countries, or DfID. All errors remain our own.

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1 Introduction

Women's empowerment has three dimensions: political, economic, and control over one's body. In today's developed countries, the historic process of economic empowerment, and to a lesser extent, control over the body, mostly preceded universal suffrage [Fernandez 2014]. This situation is almost entirely reversed in many developing countries today: universal suffrage for women was typically achieved at independence, yet empowerment along economic and reproductive dimensions has progressed far more slowly and might even be reversing in some parts of the developing world [Doepke *et al.* 2012].

In these countries, female labor force participation is strikingly low and the majority of women marry and have children at far younger ages relative to their contemporaries in developed nations [World Bank 2007, Doepke *et al.* 2012]. The type of technological advances that drove demand for female labor in the developed nations have spread less far in the developing world [Goldin 2006], access to contraceptive methods, which enable control over reproduction and facilitate human capital investment, is more limited [Goldin and Katz 2002] and violence towards women is more prevalent and acceptable [Anderson and Ray 2010, 2012, Doepke *et al.* 2012]. Many women in these countries appear trapped in an equilibrium where the phenomena of low human capital investment, restricted access to labor markets and limited control over their bodies reinforce each other, leading to dependence on men for opportunities.

The key question is then whether jump-starting women's human capital accumulation can set them on a trajectory towards a better equilibrium, or whether such circumstances are maintained by binding social norms or low aspirations, that cannot easily be shifted or relaxed by public policy [Field *et al.* 2010]. This is the research question at the heart of our analysis. We evaluate a program that provides adolescent girls an opportunity to simultaneously accumulate two types of human capital: vocational skills to enable them to start small-scale income generating activities, and life skills to help to make informed choices about sex, reproduction and marriage.

Targeting adolescents is key to empowering women. As dependence on parents comes to a close during adolescence, there is a central tension between whether women are able to delay childbearing and undertake human capital investments critical to pursuing some form of career, or become dependent on men (either as a wife or via temporary relationships). A lack of future labor market opportunities can reduce the incentives for young girls to invest in their human capital [Jensen 2012], leading to early marriage and childbearing, and potentially increasing their dependency on older men [Dupas 2011]. In turn, teen pregnancy and early marriage are likely to have a decisive impact on the ability of young girls to accumulate human capital, and limit their future labor force participation [Field and Ambrus 2008, Bruce and Hallman 2008].[1] Economic

[1] Baird *et al.* [2011] document that marriage and schooling are mutually exclusive activities in Malawi, and Ozier [2011] provide similar evidence from Kenya. In Bangladesh, Field and Ambrus [2008] show that each additional year that marriage is delayed is associated with .3 additional years of schooling and 6.5% higher literacy rates.

empowerment and control over the body thus interact in a powerful way during adolescence. In consequence, interventions targeted towards girls at this stage of their life cycle might have higher returns than later timed interventions [Heckman and Mosso 2014].

Helping young women out of this low-empowerment equilibrium has become a priority for policy makers in developing countries because of burgeoning youth populations and concerns over youth unemployment.[2] This is true throughout Sub-Saharan Africa and especially in Uganda, the focus of this study. Uganda has the second lowest median age of all countries and the highest child dependency ratio as shown in Figure 1A [UNAIDS 2010]. Uganda also has one of the highest rates of young women out of the labor force (86% vs. 58% in 14 Sub-Saharan countries). For those in the labor force, Figure 1B shows women tend to have higher unemployment rates than men, and this is especially pronounced in the youngest age cohorts. Finally, as Figure 1C highlights, relative to their contemporaries in richer economies, the fertility rate of Ugandan women is three to four times higher and the gap is most pronounced among adolescents aged 15 to 19.[3]

Against this background, the program we evaluate aims to break the vicious circle between low labor force participation and high fertility by kick-starting human capital accumulation along two dimensions through the provision of: (i) 'hard' vocational skills to enable adolescent girls to start small-scale income generating activities; (ii) 'soft' life skills to build knowledge enabling girls to make informed choices about sex, reproduction and marriage. The intervention is delivered from designated 'adolescent development clubs' rather than in schools, and can thus reach school drop-outs as well as girls currently enrolled in school.

The program was developed in another country, Bangladesh, where female disempowerment is also a major issue. Between 1993 and 2013 BRAC, one of the worlds largest NGOs, started almost $40,000$ clubs that have reached one million adolescent girls. We worked with BRAC to evaluate the program in an African setting where women face similar challenges to those in Bangladesh. To date BRAC has started 1200 clubs in Uganda which have reached $50,000$ girls.

We collaborated with BRAC to randomly assign clubs across communities. We surveyed and

[2]The number of young people in the developing world is increasing: one billion people on the planet are aged between 15 and 24 and reside in a developing country, an increase of 17% since 1995. Nowhere is this phenomenon more pronounced than in Sub-Saharan Africa, where 60% of the population is now aged below 25 [World Bank 2009]. Youths face severe economic challenges, as they account for most of the region's poor and unemployed: in sub-Saharan Africa, 60% of the total unemployed are aged 15-24, and on average 72% of the youth population live on less than $2 per day. The continued rise in the numbers of young people in the global population has led policy makers to consider responses to what has now become termed the 'youth bulge' [World Bank 2007]. The central policy challenge is to provide increasing numbers of young people the skills and job opportunities to enable them to lead fulfilled and economically self-reliant lives in adulthood. A parallel set of concerns are that ever rising numbers and proportions of youth will be a key factor driving alienation, social unrest and demands for political reforms, as has been observed throughout North Africa and the Middle East recently [Fuller 1995, Goldstone 2002].

[3]Demographic and Health Survey data indicates 38% of the 52 million women aged 20-24 in developing countries were married before age 18 [Mensch *et al.* 2005] and these girls are often subject to unprotected sex. Girls aged 15-24 are almost 8 times more likely than men to be HIV positive in Sub-Saharan Africa [Bruce and Hallman 2008, UNAIDS 2010, Dupas 2011]. Unprotected heterosexual intercourse together with the onward transmission of HIV to newborn and breast-fed babies is responsible for the vast majority of new HIV infections in the region.

tracked a representative sample of almost 5,000 adolescent girls at baseline, two and four years post-intervention. Participation is voluntary and unrelated to other BRAC activities. The take-up rate is 21%, suggesting that a sizeable share of eligible girls have latent demand for the combined vocational and life skills on offer, and are not held back from participating by social norms or their own weak aspirations over women's labor force participation, teen childbearing and marriage.

Our findings indicate that within two years, the combined provision of hard vocational and soft life skills through the program leads to substantial advances in economic empowerment and control over the body for adolescent girls in treated communities relative to girls in control communities. In terms of economic empowerment, ITT estimates imply girls in treated communities are 7pp more likely to engage in income generating activities relative to girls in control communities, which corresponds to a 72% increase that is almost entirely driven by additional engagement in self-employment activities. These labor market changes are accompanied by significant increases in monthly consumption expenditures (by 38% of their baseline value) and significant reductions in self-reported anxieties about finding a good job in adulthood.

Despite the fact that girls currently enrolled in school are also eligible for the program, we find no reduction in school enrollment rates among eligibles. Rather, girls who have previously dropped out are 8pp more likely to want to *re-enrol* into school. Hence, promoting the empowerment of girls through acquiring human capital related to vocational and life skills, appears to be complementary to girls' contemporaneous incentives to invest in formal education.

The program significantly improves control over the body: there is a 26% reduction in rates of early childbearing, and a 58% reduction in rates of marriage/cohabitation. Most dramatically, the share of adolescent girls reporting having had sex unwillingly is 6pp lower in treatment vs. control communities, starting from a baseline level of 14%. This is perhaps the clearest marker that the combination of life skills and vocational training successfully improves the adolescent girls' relationship quality. In line with the hypothesis that the life skills training underpins these changes, knowledge related to HIV and pregnancy significantly improves and self-reported condom usage increases by 26% over baseline levels,

Evaluating changes in girls' expectations for ages at marriage and expected fertility, as well as aspirations for their own daughters (and sons), we find that among unmarried adolescent girls, suitable ages at marriage significantly increase and desired fertility drops by 7% (corresponding to around .2 of a standard deviation). The program thus offers potential to set into motion processes and beliefs that delay age at first marriage and child-bearing. As such, these girls' lives might then improve along dimensions that have been shown to be associated with such delays such as improved marriage quality, increased decision-making within households and reduced exposure to domestic violence [Goldin and Katz 2002, Jensen and Thornton 2003, Field and Ambrus 2008].

The fact that the program changes girls' lives on dimensions of economic and social empowerment in a short span of time casts doubt on the hypothesis that slow changing social norms, or their own low aspirations, are insurmountable hurdles that keep women out of the labor force and

push them towards teen pregnancy and early marriage.

Moving to the longer term impacts four years post-intervention, we find that those girls in treated villages that have the *highest* two-year gains in terms of aggregated indices of economic empowerment and control over the body, are most likely to migrate away from their home village and thus attrit from the sample. In contrast, in control villages girls that have the *lowest* outcomes on the same indices of economic empowerment and control over the body are those significantly more likely to attrit by the four-year follow-up. This non-random attrition prevents us from providing accurate causal ITT estimates of the four-year program impacts, but suggests a significant impact of the intervention is to increase the geographic mobility of adolescent girls.

Our paper contributes to the literature evaluating the impact of other human capital interventions targeted to youth: these have often provided *either* soft life-skills, *or* hard vocational training interventions. As a body of randomized-control trials suggest, such single-pronged programs have met with, at best, rather mixed success [Gallant and Maticka-Tyndale 2004, Cornish and Campbell 2009, McCoy *et al.* 2010, Card *et al.* 2011, Groh *et al.* 2012].

Our findings complement a small body of research that use large-scale randomized control trials to provide evidence on the *interlinkages* between economic and reproductive challenges that adolescent girls face in developing countries. So far such studies have coupled soft-skill transfers with financial incentives: Duflo *et al.* [2014] investigate a school-based HIV prevention program in Kenya coupled with subsidies to attend school, and present evidence highlighting the joint determination of schooling and pregnancy outcomes for adolescent girls. As in our work, this highlights the efficacy of providing adolescent girls information on how to reduce their exposure to pregnancy risks, is larger when reinforced by program components that *simultaneously* empower girls to lead economically independent lives. The unique aspect of the intervention we study is that it tackles the twin economic and reproductive challenges adolescent girls face through relaxing human capital-related constraints via the combined, and highly cost-effective, provision of both hard and soft skills.[4]

The paper is organized as follows. Section 2 details the adolescent club intervention and its implementation. Section 3 describes the research design, data and estimation strategy. Section 4 presents estimates of the program's two-year impacts on adolescent girls' economic empowerment, control over the body, expectations and aspirations. We then discuss the longer run program impacts. Section 6 concludes by summarizing a cost-benefit analysis of the intervention, and the broader implications of our findings for polices designed to address the economic and reproductive challenges facing the burgeoning number of young people in the developing world today. The Appendix presents further details on the cost-benefit analysis.

[4]Relatedly, Baird *et al.* [2011] evaluate an intervention using only using financial incentives. They find a cash transfer of $10 per month conditional on school attendance for adolescent girls in Malawi led to significant declines in early marriage, teenage pregnancy and self-reported sexual activity after a year. Baird *et al.* [2014] also report beneficial impacts on the economic and social empowerment of adolescent girls in Malawi that have dropped out of formal schooling from a cash transfer conditioned on school attendance.

2 Background

The Empowerment and Livelihood for Adolescents (ELA) program is designed to improve the lives of adolescent girls through the provision of two dimensions of human capital: vocational and life skills. The program is implemented by the NGO, BRAC Uganda. In contrast to school-based information campaigns on adolescent health, the ELA program operates outside of schools, through development clubs that are in a fixed meeting place in the community. Clubs are open five afternoons per week and timed so that girls enrolled in school can attend. Club activities are led by a female mentor. Mentors are selected from within the community, are slightly older than the target population of girls, and receive small lump-sum payments for their work. They are trained during a week-long initiation program, as well as monthly refresher courses. The fact that mentors are close in age to mentees and have often successfully confronted challenges related to economic and social empowerment is likely to facilitate the transfer of knowledge.

Club participation is voluntary and unrelated to participation in other BRAC activities. Eligibility is based on gender and age: girls aged between 14 and 20 are permitted to participate. Given the difficulties of verifying ages in the field and the demand for vocational and life skills from other girls, in practice some girls outside of this age range also attend the clubs, where the skills training provided in the ELA program takes place. In addition, the clubs also host popular recreational activities such as reading, staging dramas, singing, dancing and playing games. As such, the clubs serve as a protected local space in which adolescent girls can meet, socialize, privately discuss issues of concern and to continue to develop their skills.

The vocational skills training comprises a series of courses on income generating activities. Although many of the skills are applicable for either wage or self-employment, more focus is placed on the adolescent girls establishing small-scale enterprises of their own. Courses relating to a broad range of income generating activities are provided including hair-dressing, tailoring, computing, agriculture, poultry rearing and small trades operation.

The vocational training modules are taught by entrepreneurs engaged in the respective activities or by hired professionals as well as BRAC's own agriculture and livestock program staff. These courses are supplemented by financial literacy courses covering budgeting, financial services and accounting skills. The process of matching girls to income generating activities is partly demand-driven, but account is also taken of the girl's educational level, the local business environment and demand for such services. The overarching aim of the vocational skills component of the program is to aid the economic empowerment of adolescent girls.

The key topics covered in the life skills training sessions include sexual and reproductive health, menstruation and menstrual disorders, pregnancy, sexually transmitted infections, HIV/AIDS awareness, family planning, rape; other sessions cover enabling topics such as management skills, negotiation, conflict resolution and leadership; a final class of life skills training focuses on providing girls with legal knowledge on women's issues such as bride price, child marriage and violence

against women. These life skills training sessions are conducted either by the trained mentors and/or BRAC's own professional staff. The overarching aim of the life skills component of the program is to socially empower girls by enhancing the control that adolescent girls have over their own bodies, and to enable them to act on improved knowledge of reproductive health.

Taking these features as a whole, the evaluation plugs two gaps in the literature: (i) to study the impact of skills interventions targeting adolescents in a critical stage of the life cycle as they transit from school to work [Heckman and Kautz 2013]; (ii) to consider the impact of a bundled provision of hard and soft skills, in the form of vocational and life skills training, that lies in contrast to most earlier interventions that have focused only on one of these dimensions in isolation, or in conjunction with financial transfers [Duflo *et al.* 2014].[5]

Two further points are of note. First, given the age range of targeted girls, some of them are enrolled in school, others have graduated, while others have dropped out. Although the clubs operate outside of school times, emphasis is still placed on ensuring that girls enrolled in school do not reduce their educational investments in order to engage in club activities. We later provide evidence the program had no adverse impact on girls' educational investments, and indeed the data suggests the two forms of human capital acquisition are complementary.

Second, our evaluation focuses first on the two-year impacts of the program on outcomes. Subsequently, the program expanded to include a randomly assigned microfinance component in half the treated communities. This offered microfinance to participating older adolescents in order to capitalize on their newly acquired skills. For the first two years post-intervention, BRAC staff, mentors and adolescent club participants were unaware of the potential future offer of microfinance, and we later discuss evidence confirming the anticipation of microfinance does not drive any of the two-year findings. After two-years, although microfinance was offered to age-eligible girls in treated communities, we find an almost zero take-up rate. Hence when we expand our evaluation to examine four-year impacts, we continue to compare outcomes between the original set of treated communities (with and without microfinance) to control communities.

3 Design, Data and Estimation

3.1 Research Design

We evaluate the ELA program using a randomized control trial. BRAC has established branch offices throughout Uganda, ten of which were chosen for the evaluation. Five of these branches are located in the urban or semi-urban regions of Kampala and Mukono; the others are located in the mostly rural region around Iganga and Jinja. In each branch, fifteen communities with

[5] The skills provided overlap those studied in the separate literature on basic business skills training [Field *et al.* 2010, Drexler *et al.* 2014, Karlan and Valdivia 2010] and earlier studies focused on health-related education programmes [Gallant and Maticka-Tyndale 2004, Cornish and Campbell 2009, Dupas 2011]. We later review our findings relative to each of these literatures.

the potential to host an ELA club were identified. From this list, ten locations in each branch office were randomly assigned to receive the treatment, i.e. to set up a club and deliver the ELA program, with the remaining five locations assigned as controls. In each treatment community, a single club was opened up. Hence, the research design delivers 100 treatment and 50 control communities, stratified by branch office.[6]

3.2 Data, Attrition and Descriptives

A baseline survey was administered to adolescent girls from March to June 2008. ELA clubs were established between June and September 2008, and follow-up surveys were fielded from March to June 2010, and May to July 2012. Each survey covers topics: (i) related to the vocational skills component, such as financial literacy, analytical ability, labor market and income generating activities; (ii) related to the life skills component, such as engagement in sex, childbearing and marriage/cohabitation, HIV related knowledge; (iii) other margins such as educational investments, time use, expenditures, and further measures of economic and social empowerment.

In total, at baseline $5,966$ adolescents were surveyed: $3,964$ ($2,002$) from treatment (control) communities, with 40 girls being surveyed in each community. Despite the high degree of geographic mobility of adolescent girls in Uganda, $4,888$ ($3,522$) adolescents were tracked to first (second) follow-up, corresponding to a two-year (four-year) tracking-rate of 82% (59%), that is comparable to rates from studies in similar contexts [Friedman *et al.* 2011, Duflo *et al.* 2014].

Table A1 shows the correlates of two-year attrition. The dependent variable is a dummy equal to one if the girl attrits by first follow-up. Column 1 shows that residing in a treatment community does not predict attrition over this time frame. Column 2 shows this to be robust within branch, and Column 3 shows that the result holds conditioning on individual characteristics at baseline. Moreover, none of these characteristics: age, current enrollment in school, being married/cohabiting or having children, themselves predict attrition. Column 4 examines how individual characteristics differentially relate to attrition between treated and control communities. We find no evidence that some adolescent girls in treated communities are differentially likely to attrit by age, current enrollment, whether they are married/cohabiting at baseline, nor by whether they have children at baseline. This result continues to hold when attrition is predicted using a probit specification as shown in Column 5. The core evaluation results focus on the two-year program impacts. We later return to investigate the determinants of attrition between the first and second follow-up surveys, and the implications for evaluating the longer run program impacts.

[6]For expositional ease we refer to *communities* as the unit of randomization. For the rural branches these correspond to villages. For the branches located in urban or semi-urban regions of Kampala and Mukono, the randomized units often correspond to smaller urban areas or slums.

3.2.1 Baseline Characteristics

Table 1 presents some key characteristics of adolescent girls at baseline, by treatment status. It does so for those 4,888 girls tracked to midline and used for our main estimation. Table A2 presents a more complete set of balancing checks for both the estimation sample, and the full sample of 5,966 girls interviewed at baseline irrespective of whether they attrit or not. In both samples, the average girl is 16 years old and just over 70% of them are enrolled full-time in school. The first Panel in Table 1 presents an overall index of 'gender empowerment', scaled from 0 to 100. This is based on multiple questions asked to girls relating to gender roles in labor markets, education and household chores. A higher index value corresponds to girls believing that tasks should be gender neutral or more equally split by genders.[7] In control communities, the index average is just 32 (out of 100), suggesting women-biased norms, as held by adolescent girls themselves, are highly prevalent in these communities. A key point of our analysis is to examine whether the ELA intervention changes norms and behaviors from this baseline, through its relaxation of human capital constraints.

The second Panel then focuses on economic empowerment, first presenting evidence on girls own assessment of their entrepreneurial ability: this is based on an index scaled to run from 0 to 100, that is based on answers to 10 questions. The average score is around 70, suggesting most girls are confident about having the necessary business-related skills pre-intervention.[8] Despite this confidence, only 9.5% of girls are engaged in some income generating activities in treated communities at baseline: 6% of girls report being self-employed in control communities (the type of income generating activity the program particularly fosters by relaxing vocational skills constraints), and rates of wage employment are even lower (3.6%) at baseline. On anxieties related to the transition into the labor market, 60% of girls worry they will not find a job as adults. These statistics illustrate that economic empowerment is extremely low among our sampled girls.[9]

The third Panel shows that despite their young age, 11% of girls already have at least one child

[7] The empowerment index is a variable that cumulates the number of times a respondent answers "Both/Same" to the following questions: "Who should earn money for the family?", "Who should have a higher level of education in the family?", "Who should be responsible for washing, cleaning and cooking?", "If there is no water pump or tap, who should fetch water?", "Who should be responsible for feeding and bathing children?", "Who should help the children in their studies at home?" and "Who should be responsible for looking after the ill persons?" The other possible answers given to the respondent were "Male" and "Female". The index is then re-scaled such that 100 indicates that the respondent answered that both sexes should be responsible for the mentioned activities.

[8] The entrepreneurial index consists of cumulative ranks (scaled from one to ten with ten being the highest) of the following activities: "Run your own business", "Identify business opportunities to start up new business", "Obtain credit to start up new business or expand existing business", "Save in order to invest in future business opportunities", "Make sure that your employees get the work done properly", "Manage financial accounts", "Bargain to obtain cheap prices when you are buying anything for business (inputs)", "Bargain to obtain high prices when you are selling anything for business (outputs)", "Protect your business assets from harm by others", "Collecting the money someone owes you".

[9] The rates of self-employment reported in our baseline match closely with those from the nationally representative Uganda National Household Survey 2005/2006. There we find that among those in the labor force, self-employment rates for 12-20 years olds are 7%.

and around 12% of them are already married or in a cohabiting relationship. The data illustrates how high the incidence of girls having sex against their will is in the communities we study. In control communities at baseline 14% report having had sex unwillingly in the past year. This signals a striking lack of control that adolescent girls have over their bodies in these communities, a fact associated with low economic empowerment, early childbearing and marriage in our sample.

On life skills at baseline, we see that one in four of them *incorrectly* answer a very basic question related to pregnancy knowledge, that asks whether "A woman cannot become pregnant at first intercourse or with occasional sexual relations". Girls score around 3.8 on a 0-6 scale of HIV knowledge on average, yet there is considerable variation in this metric: at the tails of the knowledge distribution, 4.9% of girls correctly answer all the questions and 2.2% provide no correct answers. We see that only 51% of adolescent girls report always using a condom if they are sexually active and only 18% report using some other form of contraceptive. These self-reports help explain why teenage pregnancies are common in these communities.[10] The final row reveals that adolescent girls believe that women should get married at around 24 years of age: clearly observed behavior departs significantly from these expressed ideals, suggesting the presence of binding constraints.

Tables 1 and A2 show that on most dimensions treatment and control samples are balanced. Among the estimation sample, the null of equal means is rejected for only three out of the twenty-four outcomes considered. However, in all cases the normalized differences are small relative to the sample variation, and well below the rule of thumb value of .25 [Imbens and Wooldridge 2009]. Our empirical specification also controls for outcomes at baseline throughout.

3.2.2 Club Participation

To establish the intensity of treatment from the ELA program, Table 2 documents participation in the adolescent development clubs measured at the two-year follow-up. Only a sufficiently time intensive intervention is likely to relax the underlying constraints limiting economic and social empowerment in this context. The first row shows that in treated communities the participation rate is 21%.[11] This suggests there is demand for ELA and that, at least for some girls, the skills constraints the program aims to ease, are binding. The practicalities of program implementation lead to possible non-compliance with the research design: an adolescent girl resident in a control

[10] The HIV knowledge index is based on the number of statements correctly identified as true or false. The statements are: (i) "A person who has HIV is different from a person who is ill with AIDS"; (ii) "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man"; (iii) "Pulling out the penis before a man climaxes keeps a women from getting HIV during sex"; (iv) "A woman cannot get HIV if she has sex during her period"; (v) "Taking a test for HIV one week after having sex will tell a person if she or he has HIV"; (vi) "A Pregnant woman with HIV can give the virus to her unborn baby".

[11] It is perhaps useful to contrast the take-up rate for those in microfinance projects. Karlan *et al.* [2010] provide evidence from two surveys and 13 interventions providing credit, savings or insurance services. They document take-up rates varying from 2 to 84%. In the context of business skills/entrepreneurship interventions. Mckenzie and Woodruff [2013] also cite low take-up rates in many studies.

community wishing to attend a club in a treated community is always able to do so.[12] As a result we note that 4.7% of those in control communities (77 girls) have *ever* participated in ELA club activities in the past. However, more then 75% of the girls that initially did attend from control communities had dropped out by six months prior to midline.

Appendix Table A3 shows characteristics of participants and non-participants in treatment communities. On demographics, sex, childbearing and marriage/cohabitation and income generating activities, participants do not significantly differ from non-participants. Hence, participants do not appear to be strongly negatively or positively selected on the various measures of economic empowerment and control over the body.[13]

The remaining rows in Table 2 report statistics *conditional* on club participation in treated communities. We focus on treatment communities as the number of *regular* participants from control communities is negligible. We see that the majority of adolescents who have ever participated in ELA club activities continue to be engaged through to the two-year follow-up. Nearly half of all participants have attended club meetings one or twice a week over the first two years of the club's operation. Hence, the intervention amounts to a considerable time investment for participants, and it is plausible that such an intense intervention causes permanent shifts in human capital accumulated, that in turn drives girls' gaining economic empowerment and control over the body.

By the two-year follow-up, 84.7% (52.7%) of club participants have taken part in the life skills (vocational skills) training. The majority (50.9%) report having received both forms of training; we therefore infer that 33% take-up *only* life skills training, and 1% take-up *only* vocational skills training. As participation in either or both trainings is voluntary, revealed preference suggests the two program components are complementary for the majority.[14]

To conclude, it is useful to overview the key differences between this intervention and the kind of business training/entrepreneurship skills program reviewed by McKenzie and Woodruff [2013]: (i) it targets adolescent girls, the majority of whom do not engage in self-employment activities at baseline; (ii) it has an intense training period lasting far longer than a few weeks; (iii) the training covers general business skills as well as technical knowledge and sector specific content; (iv) it bundles vocational skills with life skills. These features raise the possibility that such an intense

[12] In some urban areas, the distance to the nearest club can be similar in treatment and control communities. In rural locations, most clubs are located in the center of treatment locations, inevitably some clubs are located in more peripheral village locations, due to a lack of available space in the village centre.

[13] There is a nominal fee due for club attendance but in practice this is often waived (and this is common knowledge). Hence binding credit constraints are unlikely to drive non-participation.

[14] We have explored the possibility that these take-up rates are driven by supply side constraints rather than demand side heterogeneity (and so under plausible assumptions might be used to separately identify the impact of each component of the ELA programme). This however is not the case: in nearly all treated communities we observe: (i) some eligible girls choosing to take-up a component and other girls not doing so; (ii) the vast majority of eligible girls report life and livelihood skills training as being available even if they don't themselves take-up the course(s). In addition, we do not find school enrolment at baseline to be a significant determinant of enrolment in the vocational training component, that might otherwise have been indicative of implicit supply side constraints preventing some girls from participating.

and bundled program might relax human capital-related constraints by enough to significantly impact the economic and social lives of adolescent girls.

3.3 Estimation

As club participation is voluntary, not all eligible girls take-up the offer of receiving the ELA program, and we therefore focus on intent-to-treat (ITT) impacts throughout. Given random assignment of communities to treatment, it is straightforward to estimate the ITT impact of the ELA program, using the following OLS specification for the impact on outcome y_{ijt} for adolescent i in community j at two-year follow-up ($t = 1$),

$$y_{ij1} = \alpha + \beta X_{ij0} + \gamma treat_j + \delta y_{ij0} + \varepsilon_{ij1}. \tag{1}$$

X_{ij0} controls for the adolescent's age at baseline ($t = 0$), and we also include a series of dummies for our randomization strata (i.e. branch) [Bruhn and McKenzie 2009]. $treat_j$ equals one if community j is assigned to be treated and zero otherwise. To improve the efficiency of the estimated treatment effect, we control for the baseline level of each outcome variable y_{ij0} [McKenzie 2012]. ε_{ijt} is a disturbance term that we allow to be clustered by community j. γ is the coefficient of interest, measuring the ITT impact of the ELA program.

All two-year results presented are robust to explicitly accounting for attrition over the period, and we have checked that none of these results are driven by the anticipation of microfinance being rolled out after the two year follow-up.[15,16]

While the OLS specification in (1) is our base configuration, some outcomes relate to dichotomous outcomes. We therefore also report ITT estimates based on non-linear Probit specifications analogous to (1). Moreover, (1) is estimated only from those adolescents that are in the two-year panel sample. As discussed above and in Table A1, there is little evidence of differential attrition on observables between baseline and first follow-up across treatment and control communities.

[15] To check the robustness of the two-year results to attrition, we also re-estimated each ITT impact using weights constructed from the inverse of the estimated probability of panel inclusion [Wooldridge 2002]. Hence adolescents likely to be under-represented in the panel receive higher weights in order to strengthen their contribution to the estimated impacts. The key step in this procedure is a Probit regression of the dummy variable capturing panel inclusion on the usual set of control variables included in the main outcome regression as well as baseline variables with decisive influence on panel status. The latter set of variables includes interviewer fixed effects, the number of named friends, a measure for the distance between the village and the BRAC branch office, household size, an indicator of whether there is at least one household member who migrated away in the last year as well as a dummy variable indicating membership in an NGO of at least one household member. From this regression predicted probabilities are obtained which are then inverted and used as weights in the actual outcome regressions. The results obtained are very similar to the baseline ITT estimates reported.

[16] To check for whether the two-year impact results pick up anticipation effects of the future offer of microfinance, we focus on the sample of 100 treated communities and then estimate whether the future random assignment to microfinance predicts outcomes in the first two years of the program. We estimate a specification analogous to (1) where $treat_j$ refers to whether the community will *in future* receive microfinance or not (something that is observed to the econometrician as random assignment to both treatment arms was conducted at baseline). Reassuringly, for nearly all outcomes, we find no significant ITT anticipation impacts of future assignment to microfinance.

4 Results

We present estimates of the program impacts on economic empowerment (Table 3), control over the body (Table 4), and aspirations on childbearing and marriage (Table 5). Each results table follows the same format: to benchmark the magnitude of the ITT effect, Column 1 shows the level of each outcome at baseline in control communities. Column 2 shows the number of adolescents in the panel sample used to estimate the ITT. Column 3 reports the ITT estimate from (1), and Column 4 reports ITT probit estimates for all dichotomous outcomes: all of the documented impacts are qualitatively robust to this change in specification. To ease exposition, the tables report only the coefficient of interest, $\widehat{\gamma}$.

4.1 Economic Empowerment

The first row of Table 3 shows the program impact on girls' self-reported entrepreneurial skills. This index is significantly higher for adolescent girls in treated communities: the ITT estimates show an increase of 8% relative to its baseline value. Figure 2A presents a spider graph showing the ITT impacts (and their associated 95% confidence interval) for each of the 10 components of the entrepreneurial skills score. Strikingly, the program increases entrepreneurial skills on all ten dimensions: girls in treatment communities perceive themselves as having better entrepreneurial skill than girls in control communities in terms of being able to run a business, identifying business opportunities, obtaining and managing capital, managing employees, bargaining over input and output prices, protecting assets and collecting debts. Hence relative to girls in control communities, this is a major shift upward in the treated girls' self-perceived ability to run small businesses: in line with the program relaxing these forms of human capital constraint.

We next analyze whether this translates into actual labor market activities of adolescent girls. We first note that eligible girls are 6.8pp more likely to be engaged in income generating activities, a 72% increase over the baseline mean. Improvements in human capital related to entrepreneurial ability seen in Figure 2A are thus reflected in greater labor force participation. Labor force participation is a major driver of women's empowerment across the world. The fact that the program is able to increase participation in an environment where employment opportunities are limited (and particularly for women) is an important result.

Dividing income generating activities into those arising from self- and wage-employment, Rows 2 and 3 in Table 3 show this increase is entirely driven by the adolescent girls becoming increasingly engaged in *self-employment* activities. The incidence of self-employment increases from 6% to 9% in control communities as girls get older and work more. What the program does is accelerate transition into self-employment for girls in treatment communities. At endline they are almost 90% more likely to be self-employed relative to the control baseline. We summarize these impacts on economic empowerment by constructing an IGA index, that converts each index component:

the entrepreneurial ability measure and self-employment rates, into a z-score (these are the two outcomes that ELA targets), averaging these, and then constructing a z-score of the average. The ITT impact on this index shows an effect size of .335 on economic empowerment (from a baseline level of 0 by construction), that is significant at the 1% level. We will later be able to compare this program impact to impacts on other z-score indices that aggregate outcomes relating to girl's control over the body and aspirations for example.

Panel B examines how these changes affect welfare. To do so we use a measure of labor-market related anxiety, and monthly expenditures on private goods consumption. The latter is used as a proxy for earnings, because earnings are difficult to measure accurately for self-employment activities in low-income settings. Row 4 shows the program significantly reduces girls' anxiety about finding a good job in adulthood: the share of those who do not worry about this aspect of their lives is 7.2pp higher in treatment communities from a baseline mean of 40%, an increase of 18%. Row 5 evaluates the impacts on monthly consumption expenditures aggregated across eight items.[17] The ITT estimate in Column 3 shows that expenditures are $UGX4,361$ higher in treatment communities, corresponding to a 38% increase from their baseline value. We again merge both welfare outcomes into a single welfare index: the ITT effect size of the ELA program on this index is .314.

We have also explored the impacts on reported earnings from self and wage-employment (results not shown). As expected we find that earnings from self-employment significantly increase, while there is no impact on earnings from wage-employment. Estimating ITT impacts on annual earnings from self-employment from a Tobit specification we find that: (i) on the extensive margin, adolescent girls are 62% more likely to have some earnings from self-employment; (ii) on the intensive margin, self-employment earnings increase by three times their baseline level. Going one step further to examine the impacts on labor supply, we find the program significantly increases hours devoted to self-employment (but not to wage employment). On the intensive margin we find the proportionate impact on earnings from self-employment to be larger than on hours worked in self-employment, indicating the marginal product of labor for adolescent girls in self-employment rises as a consequence of the combined hard and soft skills provided by the program.

Overall, these results suggests that relaxing human capital constraints through an intense and bundled-skills intervention such as ELA has quantitatively significant impacts on adolescent girls' economic empowerment. The documented impacts are encouraging relative to the impact evaluations of other programs delivering standalone entrepreneurship training – see for example Field *et al.* [2010], Karlan and Valdivia [2010], Bruhn *et al.* [2012], Drexler *et al.* [2014], and Fairlie *et al.* [2015], or the review of evidence in McKenzie and Woodruff [2013].[18] This is despite

[17] The goods categories are jewelry/ornaments, cosmetics/makeup, clothes, hairdressers, shoes/footwear, going to restaurants/bars/teashop/cafe, talk time for your mobile phone and presents/gifts. In January 2008 $1 was worth approximately UGX1,700.

[18] Field *et al.* [2010] evaluate the provision of basic financial literacy training to female entrepreneurs in India. Only a socially restricted sub-group benefited in terms of business income and borrowings. Drexler *et al.* [2014] find

the fact that other programs are often specifically *targeted* towards those who have self-selected to be small-scale entrepreneurs. Our evidence suggests that bundling the provision of hard and soft skills that simultaneously tackle economic and social constraints adolescent girls face, can lead to significant improvements in business skills and engagement in self-employment even among girls who *ex ante*, might not consider themselves as being on the margin of being an entrepreneur.

The second natural point of comparison is with the literature evaluating standalone vocational training. Such hard skills interventions are often found to have limited impacts in developed [Blundell *et al.* 2004, Card *et al.* 2010] and developing countries [Card *et al.* 2011, Groh *et al.* 2012]. Among studies finding impacts, Attanasio *et al.* [2012] show that for women, the likelihood to be employed increases by 6.1pp, and earnings increase by 22% relative to a randomized control group. These impacts are comparable to those we find for the ELA intervention, although as we discuss later in more detail in relation to the cost-benefit-analysis, the ELA program is significantly more cost-effective in generating such gains (and scalable in the context of Sub Saharan Africa).

Finally, we address a concern from offering vocational skills training: the potential adverse effect on contemporaneous schooling investments because the program targets girls of school going age. Panel C of Table 3 explores whether there are any such adverse impacts. The first row confirms the ELA program does not significantly increase drop out rates, two years after its introduction. Hence the increased rates of self-employment documented above are then driven by girl's simultaneously engaging in such activities as well as attended school. However, the program does not adversely impact the number of hours spent on studying/school per week for those currently enrolled. In fact, the evidence suggests the program *increases* the value attached to formal education in treated villages, consistent with formally provided education being complementary to the vocational and life skills provided in the ELA program. As the final two rows show: (i) among those in school, the ITT estimate implies the ELA program marginally *increases* their hours of study; (ii) among those that have dropped out of school at baseline, the program motivates a significantly higher proportion of dropped out girls to consider going back to school.

that teaching accounting principles to micro-borrowers in the Dominican Republic has no impact on the way they run their business or business outcomes. However, simple rule-of-thumb style training does affect financial record keeping. Karlan and Valdivia [2010] investigate the impact of an intense training intervention of up to two years, that delivered training on business practices to clients of a Peruvian Microfinance institution. Despite improving business knowledge, the intervention failed to impact business outcomes. Fairlie *et al.* [2015] find that providing entrepreneurs training has no long-run measurable impact on business operations. Two studies have however found more substantial evidence of the effectiveness of such interventions: Bruhn *et al.* [2012] suggests granting small and medium enterprises in Mexico access to consulting services, that are much more costly than the forms of business intervention described above, does have large positive impacts on firm profits, but not on employment. Calderon *et al.* [2013] report large impacts on profits from self-employment among female entrepreneurs in rural Mexico from a business skills intervention. A key channel for the impact is changes in product mix offered by entrepreneurs.

4.2 Control Over the Body

Table 4 shows the program impacts on control over the body for adolescent girls, as measured through outcomes such as childbearing, marriage and sex. As before, the table reports baseline means to benchmark impacts, linear and non-linear ITT estimates.

Panel A of Table 4 covers the critical issue of whether the program affects early childbearing and marriage, two of the most significant roadblocks to adolescent girls acquiring human capital and fully participating in labor markets. The program has a strong negative impact on early childbearing: the ITT impact in Column 3 shows the probability of having a child is 2.7pp lower in treated communities than control communities: given that at baseline 10.5% of girls have at least one child, this is a near 26% drop in fertility rates over a two year period. If we consider that fertility rates rise between baseline and endline from 10.5% to 12.3% in control communities as girls get older, the ITT estimate implies this natural rate of increase is eliminated in treatment communities where adolescent girls largely forego reproduction once the program is offered.

Delaying the onset of marriage is an important mechanism through which adolescent girls can improve their long term earnings potential [Field and Ambrus 2008, Baird *et al.* 2011]. Along this margin the program also has noteworthy impacts: the ITT estimate shows girls in treated communities to be 6.9pp less likely to be married/cohabiting at follow up, corresponding to 58% of the baseline mean. Again in control communities marriage rates for adolescent girls rise naturally from 12% to 18% from baseline to follow-up, and the evidence suggests this is almost entirely prevented from happening by the program in treatment communities.

In Panel B of Table 4 we see that the rate of adolescents who report having had sex unwillingly during the past year is 5.8pp lower in treated communities. Starting from a baseline of 14% in control communities, this corresponds to a near 41% reduction in the incidence of such events. The incidence of unwilling sex in these communities is strikingly high and indicative of adolescent girls having limited control over their bodies. However, what is equally striking is the power of the program in terms of helping girls to regain control over their bodies.

This provides a dramatic illustration of the program enabling girls to become empowered in their relations with men. This impact is likely a direct result of three program features: (i) girls being able to act on specific soft skills accumulated through the life skills sessions on negotiation, rape and legal rights, as well as improved knowledge of reproductive health; (ii) the additional hard skills provided raise girls' engagement in and earnings from self-employment, and such economic empowerment likely reinforces girls' control over their bodies [Baird *et al.* 2011, 2014]; (iii) the fact that the clubs provide a safe location for girls, especially in the after-school period in the afternoon when their parents might not be back from work.

In Panel C we see that on a very basic question related to pregnancy, girls' knowledge is 4.8pp higher in treatment communities relative to a baseline mean of 74.6%. Panel C also shows that the index of HIV-related knowledge is .471 points higher in treated communities, relative to a baseline

mean of 3.78. In Panel D we see that condom use increases among those who are sexually active: the percentage of eligible girls who *always* use a condom when having intercourse is 13pp higher in the linear OLS specification (Column 3), and 14pp higher in the non-linear probit specification (Column 4).[19] Row 7 shows that among the sexually active there is little evidence the use of other forms of contraception having increased. This is reassuring because although girls are encouraged to use various forms of contraception in the program, there is actually limited availability of such alternatives. Hence the results do not seem to reflect girls merely repeating what they have been taught in life skills courses, or what they believe enumerators wish to hear. These indicators of improved knowledge (Panel C) and enhanced contraceptive use (Panel D) help us to understand the dramatic reductions in early childbearing and marriage that we observe in Panel A.[20]

Aggregating all these margins of control over the body into a single index, we see the ITT effect size is to increase the index by .605, which is a larger point estimate relative to the earlier documented impact on economic empowerment as measured by the IGA Index.

Comparing our findings to the literature, we note first that meta-analyses generally report weak impacts of standalone HIV-education programs, irrespective of whether they are delivered via classroom-based courses [Gallant and Maticka-Tyndale 2004, McCoy *et al.* 2010, Duflo *et al.* 2014] or peer-provided courses [Cornish and Campbell 2009]. There are two recent studies that find impacts of *standalone* education programs that are worth comparing to. First, Arcand and Wouabe [2010] use a regression discontinuity design to estimate the impacts of a school-based HIV prevention course in Cameroon. Their estimated impacts on childbearing and condom usage are slightly above the ITT estimates we find. Second, Dupas [2011] uses an RCT design to evaluate the effectiveness of the Kenyan national HIV curriculum relative to an intervention providing information on the *relative risk* of HIV infection by the partner's age. She finds that exposure to this curriculum causes a 28% reduction in teenage pregnancies over a one-year period.

We have probed whether subsamples of adolescent girls drive the core impacts on economic empowerment and control over the body documented in Tables 3 and 4. More precisely, Table A4 presents results on impact heterogeneity along the following dimensions: (i) rural versus urban households; (ii) rich versus poor households, as defined by whether the household's asset values at baseline are above or below the median for all households; (iii) girls aged above 16 at baseline versus older girls at baseline. We do so for two classes of outcome: (i) on the various summary

[19] As argued in Dupas [2011], childbearing is not a perfect proxy for the incidence of risky sex because: (i) adolescent girls in long-term relationships are more likely to get pregnant than girls in several short-term relationships; (ii) teenage girls might be more likely to abort if the father is a teenage boy who cannot provide economic support; (iii) adolescent girls might be more likely to engage in anal sex with partners to avoid pregnancy, and this is especially risky for HIV transmission. The concern that such changes in behavior might be driving fertility drops is partly ameliorated by the increased self-reported condom usage.

[20] A recent trend in the literature examining interventions to reduce risky behaviors has been towards the collection of bio-markers rather than relying on self-reports that are often argued to be more unreliable. Corno and de Paula [2014] test this claim by developing and calibrating a model of STIs: they identify conditions under which self-reports can be more reliable than bio-markers, where these conditions depend on the prevalence of STIs and properties of the epidemiological model of infection.

indices (IGAs, control over the body, welfare, gender empowerment and aspirations), as shown in Panel A; (ii) on outcomes related to current investments in schooling, as shown in Panel B.

We see that for the various indices the impacts are largely *homogeneous* across rural and urban areas, rich and poor households, and young and old girls.[21] This implies, for example, that relaxing human capital skills constraints can lead to behavioral change with regards to sex, childbearing and marriage among adolescent girls of all ages from 12 to 20. This might not have been the case for older girls if such behavior were habitual for example, or if younger girls particularly lacked bargaining power or negotiation skills in their relationships with men.

On education related outcomes, the ITT impacts are also similar across the three dimensions considered. In particular, the finding that the program does not encourage girls to drop out from schooling applies equally to rural and urban areas, rich and poor households, and young and old girls. This is again encouraging: if, for example, girls were especially myopic, the incentives to drop out of school in the presence of the program might be higher in rural areas where the returns to education are limited due to a lack of labor market opportunities.

4.3 Aspirations

We complete our analysis by considering ITT effects on girls' overall reports of gender empowerment, and their aspirations on marriage and childbearing: these serve as markers for the program potentially impacting deep rooted social norms about girls' role in society and lifetime opportunities, that might be far harder to shift than the accumulation of human capital as focused on so far. The results are presented in Table 5.

The first row reports impacts on an aggregate gender empowerment index, that reflects how girls perceive their role in various tasks related to the labor market and in the household, and then scaled as a z-score. The ITT estimates indicate that by endline this is .129 higher for adolescent girls in treated communities than for those in control communities: in absolute terms this corresponds to an increase of 9% of the sample mean (in control communities) at baseline. Figure 2B presents a spider graph showing the ITT impacts (and their associated 95% confidence interval) for each component of the gender empowerment index (scaled 1-10). The red line shows the ITT impact along each component, and the black line shows the boundary for a zero impact. On key dimensions such as earning money, obtaining higher levels of education, feeding and bathing children and fetching water we see that adolescent girls in treatment communities (relative to those in control communities) feel that both sexes should take part in these activities. The pattern we observe in Figure 2B is consistent with girls demanding a more equal footing in the workplace and in the home relative to men. This represents a significant shift in norms as regards the role of the

[21] The results for younger girls are especially encouraging given the conventional wisdom that girls aged 10-14, particularly those out of school, face the greatest economic challenges and health challenges arising from unsafe sexual behavior in this context [UNICEF 2003].

sexes in income generation, education and the performance of household tasks and in a direction that is towards that observed in developed countries.

Panel B of Table 5 relates to girls' views on ideal ages at marriage for men and women in *society* as a whole. Adolescent girls in treated communities report significantly higher ages for women and men by .77 and .69 years respectively. As not all ages of marriage are logically feasible, a more appropriate way to benchmark these impacts is relative to the standard deviation of baseline responses (rather than their mean value). The ITT impacts then correspond to a shift in expectations on age at marriage for women of around one quarter of a standard deviation. If unmarried at follow-up, we also asked girls about their expected age at the time of their *own marriage*: the ITT impact is almost one year (not shown).[22]

Panel C focuses on aspirations related to childbearing. We find the program causes a significant reduction in the preferred number of children: this is .279 lower for girls in treated communities, corresponding to 7% of the baseline number of desired children (or .2 of a standard deviation). If we estimate treatment on the treated (TOT) effects of the program on actual participants by instrumenting individual club participation with $treat_j$, the reduction in demand for children is dramatic: the TOT is -1.77, which corresponds to 43% of the baseline level (or more than one standard deviation). If implemented, this change in aspirations would close much of the gap in fertility rates among adolescent girls between developed countries and the average adolescent girl in Uganda shown in Figure 1C.

On another dimension of aspiration related to childbearing, Row 4 shows there is a significant increase in what girls report being the most suitable age for women to have their first child: the ITT estimate is .619, and the TOT is more economically significant at 3.93 years (corresponding to more than a one standard deviation change from the baseline).

Finally, Panel D reports the program impacts on adolescent girls' aspirations for their *own children*. The question refers both to any children alive at follow-up as well as those yet unborn. The evidence suggests that the program's beneficial impacts might persist across generations: adolescent girls in treated communities express an aspiration for their daughters (but not their sons) to get married at a significantly older age. The TOT estimate suggests mothers would like their daughters to get married 4.58 years later. Strikingly, this would bring them much closer to average age at first marriage in developed countries and also close the gender gap with the preferred age at first marriage for sons.

The final row integrates all these above measures into a single aspirations index, and shows the ELA ITT impact on this index to be highly significant, but of smaller magnitude to the impacts on the IGA and control over the body indices.

[22] Adolescent girls were also asked who they thought would be involved in deciding their marriage partners (not shown). We find that among treated girls there is a significant reduction in the likelihood they report the choice will be made by them alone, and a corresponding increase of similar magnitude in the likelihood they report decisions over marriage partners will be made in conjunction with their parents. This might be taken as tentative evidence that higher quality marriage partners being sought, as well as changes in the timing of marriage.

4.4 Long Run Impacts

We now examine the four-year program impacts. To do so, we first need to establish whether and how attrition varies between the two- and four-year follow-ups, which we now refer to as the midline and endline surveys. Table A1 already established there to be no differential attrition between treatment and control locations from baseline to midline. Table 6 reconsiders the issue, but correlates attrition over this period with the various composite indices described in Tables 3 to 5: on IGAs, welfare, control over the body, aspirations and gender empowerment. It is also useful to combine all five indices and construct one overall 'ELA index' from their simple average (therefore giving each component index the same weight despite the fact that they are comprised of slightly different numbers of underlying questions).

The first half of Table 6 examines how attrition between baseline and midline relates to treatment assignment and each girl's ELA index as measured *at baseline*. We see that: (i) attrition in the two-year post-intervention period is uncorrelated to treatment status (Column 1); (ii) it is not differentially correlated to the ELA index in treatment and control communities (Column 2); (iii) considering each component index, girls that have a lower score on the IGA index are more likely to attrit, but this is not different between treatment and control locations (Column 3).

The second half of Table 6 repeats the analysis for attrition between midline and endline, where each girl's indices are measured *at midline*. We see that: (i) attrition is, on average, uncorrelated to treatment assignment (Column 1); (ii) this however masks important heterogenous forms of attrition in treatment and control communities: in particular, girls with a *lower* ELA index in control communities at midline are significantly more likely to attrit by endline, but in treatment communities it is those girls with *higher* ELA index at midline that are significantly more likely to attrit by endline (Column 2); (iii) examining differential attrition from midline to endline by each index, we see that in control communities girls with higher indices for IGAs, control over the body and welfare are significantly *less* likely to attrit, but that in treatment communities, girls with higher indices for IGAs and control over the body are significantly *more* likely to attrit.[23]

Figure 3 graphically illustrates how selective attrition varies across treatment control communities: Panel A shows for adolescent girls in control communities, the distribution of the ELA index drawn separately for those girls that remain in the community between midline and endline (stayers) and those that attrit (leavers). This reaffirms the result from Table 6 that in control communities, the average ELA index at midline is lower for leavers than stayers ($-.129$ versus $-.066$), and indeed, the entire distribution of the index for leavers is shifted leftwards relative to stayers. Panel B repeats the exercise for adolescent girls in treatment communities: the graph underpins the finding that the pattern of attrition is entirely in the opposite direction to that in control communities, with girls in treated communities that have a higher ELA index at midline

[23] Furthermore, in treated communities, girls that participate in the clubs are significantly more likely to attrit by endline than non-participants, suggesting club attendance might be the root cause of attrition.

being more likely to have left the community by endline (.174 versus .082).

Since attrition patterns between two and four years are correlated with the intervention itself we cannot precisely estimate four-year causal impacts. To the extent that attrition is driven by migration of adolescent girls away from their home communities, the program appears to induce a positive selection of girls to migrate away. Hence an important longer term channel through which the program might operate is through increased labor mobility, primarily of those girls that experience the largest gains in their economic empowerment and control over their body from the program. It opens an interesting avenue for future research evaluations to build on, raising new questions both on: (i) quantifying the long run gains to program beneficiaries arising through migration, perhaps as they migrate to labor and marriage markets where the returns to hard vocational skills and soft life skills differ; (ii) the dynamic impacts on those girls that endogenously choose to remain in treated communities.

5 Conclusions

Developing countries face enormous challenges stemming from rapid population growth and a rising proportion of young people entering the labor market. For women in developing countries, these challenges are coupled with a lack of empowerment: they lag behind their contemporaries in richer nations on all relevant dimensions of female empowerment but most strikingly so as regards economic empowerment and control over the body. Yet effectively facing each challenge requires us to think *jointly* about economic and reproductive issues [Duflo 2012]. A lack of future labor market opportunities can reduce the incentives for young girls to invest in their human capital leading to early marriage and childbearing, and potentially increasing their dependency on older men. At the same time, teen pregnancy and early marriage are likely to have a decisive impact on the ability of young girls to accumulate human capital and limit their future labor force participation.

In this paper we evaluate an attempt to jump-start female economic and social empowerment in the world's second youngest country: Uganda. We examine the impacts of a program that provides adolescent girls an opportunity to relax constraints related to two types of human capital: hard vocational skills to enable them to start small-scale income generating activities, and soft life skills to enable them to make informed choices about sex, reproduction and marriage. The ideas which underpin the program were developed in Bangladesh where the program has achieved significant scale. Our evidence suggests these ideas can be effectively transported (with modification) from South Asia to a setting in Sub-Saharan Africa. Engaging in economic activities and delaying childbearing and marriage is likely to have a major impact on the life trajectories of adolescent girls. For example, such delays have been shown, in other contexts, to improve marriage quality, increase decision-making within households and reduce exposure to domestic violence [Goldin and Katz 2002, Jensen and Thornton 2003, Field and Ambrus 2008]. Alongside economic empowerment

they are fundamental to improving women's lives.

Africa has been a laggard relative to other developing regions in terms of how quickly it is converging to the low fertility, late marriage and high career participation norms that characterize women's lives in developed nations. There is thus a case to be made for cost-effective programs like this to help women in Africa accelerate convergence towards these norms. What our results suggest is that such escape is possible. The impacts found over a two-year period suggest that the poor life circumstances that adolescent girls find themselves in at baseline will not necessarily be maintained by binding social norms. The longer run impacts, evaluated over a four-year horizon, suggest that an important further channel through which the program impacts adolescent girls is that it enables those who benefit the most from the intervention to migrate away and potentially exploit new opportunities in labor and marriage markets.

In the Appendix we detail a cost-benefit analysis of the intervention, focusing on those measurable impacts in the two-year post-intervention period, and so make no attempt to value the longer term benefits to beneficiaries arising from increased hard/soft skills and geographic mobility. We show that two-years post-intervention, the program cost is $17.9 per adolescent girl in the village (corresponding to only .54% of household annual incomes at baseline, or 21% of the annual expenditures of adolescent girls on the sub-set of private consumption goods described in Table 3). One way to monetize the impacts of the program is to use the ITT estimate on girls' expenditures: this annual increase of $32.8 is significantly different from zero and more than offsets the per girl program cost. The impact of the program on reducing early childbearing, early marriage, having sex against one's will or unprotected sex (Table 4) or in changing social norms regarding early childbearing, early marriage and desired fertility (Table 5) are much more difficult to monetize but are likely to add significantly to these estimated benefits.

The external validity of the these results are currently being researched as ELA-style programs have been rolled out and are being evaluated in a range of Sub-Saharan countries. The program offers some promise to policy makers, as being a low cost and scalable intervention that enables adolescent girls to improve their life outcomes. As this research agenda expands, an important direction for future work to take is to study in more detail the impacts such programs have on interactions between men and adolescent girls. Doing so would help crystallize whether the gains occur because adolescent girls are able to match with better quality men when their human capital improves [Dupas 2011], whether it improves their bargaining power within existing relationships, say because of a direct impact of earned income of women and their autonomy in relationships [Anderson and Eswaran 2009], or whether men change attitudes towards women as the program raises returns to women's human capital rises.[24] This last channel is an important mechanism that

[24] Dupas [2011] documents how the provision of information on relative risk of HIV infection by partner's relative age to adolescents in Kenya led to substitution away from higher risk older-aged partners. Anderson and Eswaran [2009] present evidence from Bangladesh that increases in womens' *earned* income (rather than unearned income), significantly improve the level of autonomy they enjoy in the household.

drove the provision of women's rights across countries over time [Doepke and Tertilt 2009], and can feedback into a virtuous circle that further widens women's economic opportunities and drives forward economic development [Goldin and Katz 2002, Bailey 2006, Tertilt 2006, Duflo 2012].

6 Appendix: Cost-Benefit-Analysis

We document the cost of the program to benchmark how large the per girl benefits would have to be for the intervention to be effective for a social planner. Given the endline results above, we focus on a two-year cost benefit analysis and so make no attempt to value the longer term benefits to beneficiaries arising from increased geographic mobility. Table A5 categorizes the fixed and variable costs of the program, where variable costs depend on the number of participating girls. Depending on whether the costs are incurred once only or recur each month, we list the amounts in Column 1 or 2 respectively. Columns 3 and 4 then split each cost into its first and second year component respectively. All costs are in 2008 US$.

Rows 1 to 3 show the costs associated with the initial program investment of setting up a program office, training of program staff and program manual development. The second set of fixed costs in Rows 4 to 14 comprise all cost items that are necessary to provide the infrastructure for the ELA clubs to function (irrespective of the number of actual club participants). Finally, Rows 15 to 19 detail the variable costs of the program. Summing across all costs in the 100 treated communities, Row 20 shows that in year one, the program costs $\$365,690$. This falls to $\$232,240$ in year two as some set-up costs are not recurring. This somewhat overestimates the total program costs because some of these resources would have been put to another overlapping use in the absence of the program. However, as it is impossible to accurately measure what fraction of these costs would still have be reallocated to other uses, we include them all as program costs and so bias the results against yielding a positive net gain.

We conducted a pre-baseline census listing of all households in the communities in the evaluation sample. This revealed that around 130 eligible adolescent girls resided in the average community. Given the benefits we document relate to ITT estimates of residing in a community that is offered the ELA program, we use this number of eligible girls to calculate the per girl cost of the program. Hence in the fourth panel of Table A5, Rows 21 and 22 show the average fixed and variable costs per eligible girl. The overall cost per eligible girl is shown in Row 23. Given our ITT estimates are measured two-years after the baseline, we focus on the second year per-girl incurred cost of $17.9.

To put the cost estimate in context, we note that $17.9 corresponds to only .54% of household incomes at baseline. Alternatively, this cost corresponds to 21.0% of the annual expenditures of adolescent girls on the sub-set of consumption goods described in Table 3. If the per girl benefits to an adolescent girl residing in a community that is offered the ELA program are larger than

this, it would suggest the program is sustainable from the social planner's perspective.

Our findings indicate that the program increases labor force participation while reducing childbearing, marriage and unprotected sex. The impacts of the program can be monetized using the ITT estimate on expenditures. The final row of Table A5 shows this increase of $32.8 is significantly different from zero and more than offsets the per girl program cost.[25]

The impact of the program on reducing early childbearing, early marriage, having sex against one's will or unprotected sex (Table 4) or in changing social norms regarding early childbearing, early marriage and desired fertility (Table 5) are much more difficult to monetize but are likely to add significantly to these estimated benefits. It is precisely events such as getting married or having children during adolescence which interrupt human capital accumulation and thus permanently and significantly adversely affect the lifetime earnings potential of women across the developing world. There is also a literature which suggests that having sex against one's will seriously depresses lifetime incomes [MacMillan 2011]. Monetizing all these gains in a sensible way is beyond the scope of this paper, but they are likely to be substantial.

Even if the benefits of the program outweigh its costs, the question of whether the same resources could be spent more effectively remains open. As discussed earlier, the bundled ELA intervention appears to improve outcomes at least as well as single-pronged interventions that have focused on classroom-based education courses designed to reduce risky behaviors, or exclusively on vocational training designed to improve labor market outcomes among youth. However, one class of vocational training programs that has met with some success are the *Jovenes* programs implemented throughout Latin America. For example, Attanasio *et al.* [2012] find that for the *Jovenes* program in Colombia, among women, the likelihood to be employed increases by 6.1pp, and earnings increase by 22% relative to a randomly-assigned control group. These are comparable impacts to those we find for the bundled ELA intervention. However the costs per trainee of the *Jovenes* programs vary from $600 to $2000 per participant served [World Bank 2009]. These costs are still an order of magnitude larger than the $17.9 per eligible girl of the ELA program, or given a 21% take-up rate, a cost of $85 per participating adolescent girl. Apart from differences in cost-effectiveness, there also remains doubt as to whether private sector firms in Sub-Saharan Africa would be able to currently take part in *Jovenes* style training programs for workers.

Another approach to understand whether the ELA program is socially beneficial is to consider the impacts of providing unconditional cash transfers in a similar setting. This is precisely what is considered in Blattman *et al.* [2014], who present evidence from the Youth Opportunities program (YOP) using a randomized control trial in which youth were given unconditional and unsupervised cash transfers.[26] They find that almost 80% of youth chose to spend these transfers

[25] The figure of $32.8 is taken from the corresponding monthly estimate in UGX shown in Column 3 of Table 3, where we use the exchange rate of UGX1700 to one US dollar.

[26] Similarly, Baird *et al.* [2012] report that the provision of unconditional cash transfers via lotteries, to girls aged 13-22 and enrolled in school at baseline in Malawi, significantly reduced the prevalence of HIV and herpes simplex virus 2 [HSV-2] after 18 months. These effects were also supported by self-reported sexual behaviors. To gauge

on acquiring vocational skills and tools, and that the resultant increase in earnings imply an annual return on capital of 35% on average. There are of course many differences between the treated individuals in the ELA and YOP programs: the YOP targets both genders and those aged 16 to 35; individuals form groups to apply for the unconditional transfers; the per person transfer $374. Although the ELA program can be thought of as a constrained version of such unconditional cash transfers, even if the rates of return through labor market outcomes alone are half as much, this still compares favorably with regards to other formal sector financial investment opportunities available in Uganda in mid-2008 when the ELA program was initiated.[27]

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the cost per treated girl, we note that monthly cash transfers valued at between $4 and $10 were provided to girls along with monthly transfers of between $1 and $5 to their guardians.

[27] For example, the International Financial Statistics of the IMF state that the deposit rate in the formal sector in Uganda (i.e. the rate paid by commercial banks for savings deposits) was 10.7% in 2008, 9.75% in 2009 and 7.69% in 2010. An alternative investment would have been to buy a two-year Uganda Treasury bond auctioned at the end of May 2008. It sold at a discount and yielded 14.45% according to the Bank of Uganda (http://www.bou.or.ug/bou/collateral/tbond_forms/2008/May/tbond_28May2008.html).

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Table 1: Descriptive Statistics on Adolescent Girls, By Treatment Status

Means, standard errors in parentheses, standard deviations in brackets

	(1) Treatment	(2) Control	(3) Difference	(4) Normalized Difference
Gender empowerment [0-100 score]	28.5	31.6	-3.12	-.091
	[24.2]	[24.5]	(2.03)	
Entrepreneurial ability [0-100 score]	69.6	71.6	-1.94	-.055
	[24.6]	[25.0]	(1.78)	
Self-employment [yes=1]	.070	.060	.010	.029
	[.255]	[.237]	(.010)	
Wage employment [yes=1]	.057	.036	.021**	.071
	[.233]	[.186]	(.010)	
Never worry to get a good job in adulthood [yes=1]	.418	.400	.018	.026
	[.493]	[.490]	(.027)	
Has child(ren) [yes=1]	.105	.105	.000	.001
	[.307]	[.306]	(.018)	
Married or cohabiting [yes=1]	.095	.120	-.026*	-.058
	[.293]	[.325]	(.015)	
Had sex unwillingly in the past year [yes=1]	.205	.142	.062***	.117
	[.404]	[.350]	(.024)	
Pregnancy knowledge [0-1 score]	.739	.746	-.006	-.010
	[.439]	[.436]	(.027)	
HIV knowledge [0-6 score]	3.82	3.78	.047	.027
	[1.24]	[1.24]	(.082)	
If sexually active, always uses condom [yes=1]	.514	.514	.000	.001
	[.500]	[.500]	(.042)	
If sexually active, uses other contraceptives [yes=1]	.145	.175	-.030	-.057
	[.353]	[.380]	(.028)	
Suitable age at marriage for a woman	24.0	23.9	.113	.026
	[3.08]	[3.14]	(.218)	

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression using the baseline data only and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. The gender empowerment index is a variable that cumulates the number of times a respondent answers "Both/Same" to the following questions: "Who should earn money for the family?", "Who should have a higher level of education in the family?", "Who should be responsible for washing, cleaning and cooking?", "If there is no water pump or tap, who should fetch water?", "Who should be responsible for feeding and bathing children?", "Who should help the children in their studies at home?" and "Who should be responsible for looking after the ill persons?" The other possible answers given to the respondent were "Male" and "Female". The index is then rescaled such that 100 indicates that the respondent answered that the female should (at least partly) be responsible for all the activities. The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): "Run your own business", "Identify business opportunities to start up new business", "Obtain credit to start up new business or expand existing business", "Save in order to invest in future business opportunities", "Make sure that your employees get the work done properly", "Manage financial accounts", "Bargain to obtain cheap prices when you are buying anything for business (inputs)", "Bargain to obtain high prices when you are selling anything for business (outputs)", "Protect your business assets from harm by others", "Collecting the money someone owes you". The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement "A woman cannot become pregnant at first intercourse or with occasional sexual relations" as true or false. The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are "A person who has HIV is different from a person who is ill with AIDS", "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man", "Pulling out the penis before a man climaxes keeps a women from getting HIV during sex", "A women cannot get HIV if she has sex during her period", "Taking a test for HIV one week after having sex will tell a person if she or he has HIV." and "A Pregnant woman with HIV can give the virus to her unborn baby". Variables indicating suitable ages were trimmed at 15 years or younger.

Table 2: Participation

Means, standard errors in parentheses, standard deviations in brackets

	(1) Treatment	(2) Control	(3) Difference	(4) Normalized Difference
Have heard about club [yes=1]	.589	.398	.193***	.275
	[.492]	[.490]	(.030)	
Have ever participated in club activities, conditional on having heard about club [yes=1]	.206	.047	.156***	.348
	[.405]	[.212]	(.016)	
Continued participation, conditional on ever having participated [yes=1]	.630			
	[.483]			
Attend(ed) club meetings at least 3 times a week, conditional on ever having participated [yes=1]	.273			
	[.446]			
Attend(ed) club meetings 1 or 2 times a week, conditional on ever having participated [yes=1]	.494			
	[.500]			
Received life skills training, conditional on ever having participated [yes=1]	.847			
	[.360]			
Received livelihood skills training, conditional on ever having participated [yes=1]	.527			
	[.500]			
Received life and livelihood skills training , conditional on ever having participated [yes=1]	.509			
	[.500]			

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. The indicators for having received life skills and/or livelihood skills are elicited from respondents' declarations to having participated in the corresponding training sessions at least very few times.

Table 3: Economic Empowerment

Coefficients, standard errors in parentheses, standard deviations in brackets

	Outcome	(1) Baseline Levels, Control	(2) Sample Size	(3) ITT , OLS	(4) ITT, Probit Marginal Effects
A. Income Generating Activities (IGA)	**1. Entrepreneurial ability [0-100 score]**	71.6	4815	5.75***	
		[25.0]		(1.02)	
	2. Self-employment [yes=1]	.060	4888	.056***	.056***
		[.237]		(.012)	(.007)
	3. Wage employment [yes=1]	.036	4888	.006	.006
		[.186]		(.007)	(.019)
	IGA Index	0	4888	.335***	
		[1]		(.047)	
B. Welfare	**4. Never worry to get a good job in adulthood [yes=1]**	.400	4685	.072***	.074***
		[.490]		(.018)	(.020)
	5. Expenditure on private consumption goods in the last month [UGX]	11,454	4807	4361***	
		[18,487]		(1007)	
	Welfare Index	0	4888	.314***	
		[1]		(.057)	
C. Education	**6. Currently enrolled in school [yes=1]**	.712	4888	-.011	-.013
		[.453]		(.018)	(.010)
	7. If enrolled, hours spent on going to and attending school, homework and study per week	61.5	2,423	1.59*	
		[20.0]		(.892)	
	8. If dropped out, plan to start/go back to school [yes=1]	.539	739	.076**	.080**
		[.499]		(.037)	(.039)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community. The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): "Run your own business", "Identify business opportunities to start up new business", "Obtain credit to start up new business or expand existing business", "Save in order to invest in future business opportunities", "Make sure that your employees get the work done properly", "Manage financial accounts", "Bargain to obtain cheap prices when you are buying anything for business (inputs)", "Bargain to obtain high prices when you are selling anything for business (outputs)", "Protect your business assets from harm by others", "Collecting the money someone owes you". For the consumption expenditure variable, the goods categories are jewelry/ornaments, cosmetics/makeup, clothes, hairdressers, shoes/footwear, going to restaurants/bars/teashop/cafe, talk time for your mobile phone and presents/gifts. The top 1% outliers of the expenditure variable are trimmed. All monetary variables are deflated and expressed in terms of the price level in January 2008 using the monthly consumer price index published by the Uganda Bureau of Statistics. The IGA index is based on the entrepreneurship ability and the indicators for self-employment. The Welfare index is based on expenditures and the 'worry about finding a job" variable. The index is constructed by converting each component into a z-score, averaging these and taking the z-score of the average. z-scores are computed using means and standard deviations in control at baseline.

Table 4: Control Over the Body

Coefficients, standard errors in parentheses, standard deviations in brackets

	Outcome	(1) Baseline Levels, Control	(2) Sample Size	(3) ITT , OLS	(4) ITT, Probit Marginal Effects
A. Childbearing and Marriage	**1. Has child(ren) [yes=1]**	.105	4714	-.029***	-.026***
		[.306]		(.011)	(.014)
	2. Married or cohabiting [yes=1]	.120	4681	-.068***	-.075***
		[.325]		(.013)	(.026)
B. Sexual Violence	**3. Had sex unwillingly in the past year [yes=1]**	.142	937	-.058**	-.055**
		[.350]		(.028)	(.021)
C. Knowledge	**4. Pregnancy knowledge [0-1 score]**	.746	4595	.048**	.050**
		[.436]		(.021)	(.006)
	5. HIV knowledge [0-6 score]	3.78	4888	.471***	
		[1.24]		(.046)	
D. Contraception	**6. If sexually active, always uses condom [yes=1]**	.514	829	.132***	.140***
		[.500]		(.038)	(.034)
	7. If sexually active, uses other contraceptives [yes=1]	.235	829	.016	.017
		[.425]		(.033)	(.012)
	Control Over the Body Index	0	4888	.605***	
		[1]		(.048)	

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community. The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement "A women cannot become pregnant at first intercourse or with occasional sexual relations" as true or false. The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are "A person who has HIV is different from a person who is ill with AIDS", "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man", "Pulling out the penis before a man climaxes keeps a women from getting HIV during sex", "A woman cannot get HIV if she has sex during her period", "Taking a test for HIV one week after having sex will tell a person if she or he has HIV." and "A Pregnant woman with HIV can give the virus to her unborn baby". The Control Over the Body index is based on all the listed outcomes. The index is constructed by converting each component into a z-score, averaging these and taking the z-score of the average. z-scores are computed using means and standard deviations in control at baseline.

Table 5: Aspirations Related to Marriage and Child Bearing

Coefficients, standard errors in parentheses, standard deviations in brackets

		(1) Baseline Levels, Control	(2) Sample Size	(3) ITT , OLS
A. Gender Empowerment	**1. Gender empowerment index**	0	4,831	.129***
		[1]		(.0425)
B. Marriage	**2. Suitable age at marriage for a woman**	23.9	4780	.777***
		[3.14]		(.116)
	3. Suitable age at marriage for a man	28.0	4755	.688***
		[3.70]		(.124)
C. Child Bearing	**4. Preferred number of children**	4.14	4749	-.282***
		[1.43]		(.052)
	5. Suitable age for women to have the first baby	23.7	4750	.620***
		[3.26]		(.110)
D. Children's Marriage	**6. Preferred age at which daughter(s) get married**	24.8	4651	.719***
		[2.78]		(.117)
	7. Preferred age at which son(s) get married	28.4	4553	.104
		[3.24]		(.112)
	Aspiration Index	0	4888	.185***
		[1]		(.026)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community. The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The gender empowerment index is the sum of the answers to the following questions: "Who should earn money for the family?", "Who should have a higher level of education in the family?", "Who should be responsible for washing, cleaning and cooking?", "If there is no water pump or tap, who should fetch water?", "Who should be responsible for feeding and bathing children?", "Who should help the children in their studies at home?" and "Who should be responsible for looking after the ill persons?" where answers are coded as 1 if the respondent chooses "both" or "woman" for the first question, and "both" or "man" for all other questions. The index is standardized by the control group mean and standard deviation at baseline. All variables indicating ages were trimmed at 15 years or younger. The Aspiration index is based on all the listed outcomes. The index is constructed by converting each component into a z-score, averaging these and taking the z-score of the average. z-scores are computed using means and standard deviations in control at baseline.

Table 6: Attrition by Midline and Endline

OLS estimates, standard errors clustered at the community level in parentheses

Outcome:	=1 if Adolescent Girl Attrits Between Baseline and Midline			=1 if Adolescent Girl Attrits Between Midline and Endline		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-.022	-.092	-.131	.008	.070	.061
	(.028)	(.082)	(.089)	(.021)	(.083)	(.085)
ELA Index		.046			-.092***	
		(.043)			(.033)	
ELA Index X Treatment		-.045			.155***	
		(.047)			(.039)	
IGA Index			.032**			-.024*
			(.015)			(.013)
Control Over the Body Index			.002			-.065**
			(.024)			(.027)
Welfare Index			-.000			-.030*
			(.015)			(.015)
Gender Empowerment Index			.009			.010
			(.016)			(.011)
Aspiration Index			.002			-.001
			(.015)			(.017)
IGA Index X Treatment			-.029			.041***
			(.018)			(.016)
Control Over the Body Index X Treatment			.011			.082**
			(.027)			(.032)
Welfare Index X Treatment			-.004			.024
			(.017)			(.020)
Gender Empowerment Index X Treatment			-.008			.019
			(.018)			(.013)
Aspiration Index X Treatment			-.005			-.002
			(.020)			(.020)
Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	.014	.014	.013	.230	.234	.236
Observations	5895	5895	5895	4831	4831	4831

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community. The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The IGA Index is based on the entrepreneurship ability score and the indicator for self-employment. The Control Over the Body Index is based on all the outcomes in Table 4. The Welfare Index is based on expenditures and the "worry about finding a job" variable. The Gender Empowerment Index is based on the index reported in Table 5. The Aspiration Index is based on all the outcomes in Table 5. Each index is constructed by converting each component into a z-score, averaging these and taking the z-score of the average. z-scores are computed using means and standard deviations in control at baseline. The summary ELA Index in Columns 2 and 5 is the standardised average of the five other indices.

Table A1: Correlates of Two-Year Attrition

Dependent Variable: In Panel Sample [yes=1]
OLS estimates in Columns 1-4, Probit estimate in Column 5
Standard errors clustered by community

	(1)	(2)	(3)	(4)	(5) Probit
Treatment	.025	.026	.026	-.019	-.041
	(.029)	(.027)	(.027)	(.100)	(.093)
Age			-.0004	-.0009	-.002
			(.002)	(.004)	(.004)
Currently enrolled in school [yes=1]			.017	-.015	-.028
			(.015)	(.030)	(.030)
Married or cohabiting [yes=1]			.012	.024	.038
			(.018)	(.033)	(.031)
Has child(ren) [yes=1]			.021	.004	-.010
			(.020)	(.033)	(.036)
Treatment x age				.0007	.002
				(.005)	(.005)
Treatment x currently enrolled in school [yes=1]				.046	.050
				(.039)	(.038)
Treatment x married or cohabiting [yes=1]				-.022	-.017
				(.040)	(.038)
Treatment x has child(ren) [yes=1]				.024	.019
				(.043)	(.044)
Branch Dummies	No	Yes	Yes	Yes	No
Observations	5661	5661	5661	5661	5661

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The dependent variable is a dummy that is equal to 1 if the adolescent girl does not attrit between the baseline survey and the two-year follow-up survey and 0 otherwise. The standard errors are clustered by community. Columns 1 to 4 are estimated using a linear probability model. Column 5 is estimated using a probit model, where marginal effects are reported. There are ten branch dummies controlled for in Columns 2 to 4.

Table A2: Balance at Baseline

Means, standard errors in parentheses, standard deviations in brackets

		Estimation Sample				Baseline Sample	
		(1) Treatment	(2) Control	(3) Difference	(4) Normalized Difference	(5) Difference	(6) Normalized Difference
A. Demographics	**Age**	16.3	16.4	-.094	-.023	-.059	-.015
		[2.80]	[2.96]	(.168)		(.116)	
B. Income Generation	**Entrepreneurial ability [0-100 score]**	69.6	71.6	-1.94	-.055	-2.37**	-.068
		[24.6]	[25.0]	(1.78)		(1.15)	
	Self-employment [yes=1]	.070	.060	.010	.029	.004	.029
		[.255]	[.237]	(.010)		(.008)	
	Wage employment [yes=1]	.057	.036	.021**	.071	.020**	.071
		[.233]	[.186]	(.010)		(.009)	
C. Welfare	**Never worry to get a good job in adulthood [yes=1]**	.418	.400	.018	.026	.012	.025
		[.493]	[.490]	(.027)		(.019)	
	Expenditure on goods in the last month [UGX]	12,397	11,454	943	.035	935	.035
		[19,181]	[18,487]	(1,031)		(866)	
D. Education	**Currently enrolled in school [yes=1]**	.713	.712	.001	.001	-.010	-.016
		[.452]	[.453]	(.028)		(.017)	

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression using the baseline data only and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): "Run your own business", "Identify business opportunities to start up new business", "Obtain credit to start up new business or expand existing business", "Save in order to invest in future business opportunities", "Make sure that your employees get the work done properly", "Manage financial accounts", "Bargain to obtain cheap prices when you are buying anything for business (inputs)", "Bargain to obtain high prices when you are selling anything for business (outputs)", "Protect your business assets from harm by others", "Collecting the money someone owes you". The top 1% outliers of the expenditure variable have been removed. All monetary variables are deflated and expressed in terms of the price level in January 2008 using the monthly consumer price index published by the Uganda Bureau of Statistics. The estimation sample refers to those girls tracked from baseline to midline, and the baseline sample refers to all girls interviewed at baseline.

Table A2 (continued): Balance at Baseline

Means, standard errors in parentheses, standard deviations in brackets

		Estimation Sample				Baseline Sample	
		(1) Treatment	(2) Control	(3) Difference	(4) Normalized Difference	(5) Difference	(6) Normalized Difference
E. Childbearing and Marriage	**Has child(ren) [yes=1]**	.105	.105	.000	.001	.003	.007
		[.307]	[.306]	(.018)		(.011)	
	Married or cohabiting [yes=1]	.095	.120	-.026*	-.058	-.024	-.058
		[.293]	[.325]	(.015)		(.011)	
F. Sexual Violence	**Had sex unwillingly in the past year [yes=1]**	.205	.142	.062***	.117	.064***	.101
		[.404]	[.350]	(.024)		(.018)	
G. Knowledge	**Pregnancy knowledge [0-1 score]**	.739	.746	-.006	-.010	-.011	-.010
		[.439]	[.436]	(.027)		(.018)	
	HIV knowledge [0-6 score]	3.82	3.78	.047	.027	.052	.027
		[1.24]	[1.24]	(.082)		(.045)	
H. Contraception	**If sexually active, always uses condom [yes=1]**	.514	.514	.000	.001	-.013	.000
		[.500]	[.500]	(.042)		(.029)	
	If sexually active, uses other contraceptives [yes=1]	.145	.175	-.030	-.057	-.028	-.057
		[.353]	[.380]	(.028)		(.022)	
I. Empowerment	**Gender empowerment index [0-100 score]**	28.5	31.6	-3.12	-.091	-3.38**	-.100
		[24.2]	[24.5]	(2.03)		(1.14)	
J. Marriage	**Suitable age for marriage for a woman**	24.0	23.9	.113	.026	.123	.025
		[3.08]	[3.14]	(.218)		(.131)	
	Suitable age for marriage for a man	27.9	28.0	-.111	-.021	-.106	-.021
		[3.72]	[3.70]	(.201)		(.140)	
K. Child Bearing	**Preferred number of children**	4.21	4.14	.077	.036	.125**	.057
		[1.55]	[1.43]	(.104)		(.056)	
	Suitable age for women to have the first baby	24.0	23.7	.236	.052	.164	.036
		[3.15]	[3.26]	(.263)		(.148)	
L. Children's Marriage	**Preferred age at which daughter(s) get married**	25.0	24.8	.154	.039	.194	.048
		[2.82]	[2.78]	(.170)		(.121)	
	Preferred age at which son(s) get married	28.5	28.4	.129	.028	.194	.041
		[3.23]	[3.24]	(.173)		(.132)	

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression using the baseline data only and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are "A person who has HIV is different from a person who is ill with AIDS", "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man", "Pulling out the penis before a man climaxes keeps a women from getting HIV during sex", "A women cannot get HIV if she has sex during her period", "Taking a test for HIV one week after having sex will tell a person if she or he has HIV." and "A Pregnant woman with HIV can give the virus to her unborn baby". The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement "A women cannot become pregnant at first intercourse or with occasional sexual relations" as true or false. The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are "A person who has HIV is different from a person who is ill with AIDS", "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man", "Pulling out the penis before a man climaxes keeps a women from getting HIV during sex", "A woman cannot get HIV if she has sex during her period", "Taking a test for HIV one week after having sex will tell a person if she or he has HIV." and "A Pregnant woman with HIV can give the virus to her unborn baby". The gender empowerment index is a variable that cumulates the number of times a respondent answers "Both/Same" to the following questions: "Who should earn money for the family?", "Who should have a higher level of education in the family?", "Who should be responsible for washing, cleaning and cooking?", "If there is no water pump or tap, who should fetch water?", "Who should be responsible for feeding and bathing children?", "Who should help the children in their studies at home?" and "Who should be responsible for looking after the ill persons?" The other possible answers given to the respondent were "Male" and "Female". The index is then rescaled such that 100 indicates that the respondent answered that the female should (at least partly) be responsible for all the activities. All variables indicating ages in panels J, K and L were trimmed at 15 years or younger. The estimation sample refers to those girls tracked from baseline to midline, and the baseline sample refers to all girls interviewed at baseline.

Table A3: Descriptives on Participants and Non-participants

Means, standard errors in parentheses, standard deviations in brackets

		(1) Participants	(2) Non Participants	(3) Difference	(4) Normalized Difference
A. Demographics	**Age**	16.2	16.4	-.150	-.038
		[2.82]	[2.80]	(.133)	
	Currently enrolled in school [yes=1]	.716	.712	.004	.006
		[.451]	[.453]	(.025)	
B. Economic Empowerment: Income Generating Activities	**Gender empowerment index [0-100 score]**	28.0	28.6	-.629	-.019
		[23.5]	[24.3]	(1.42)	
	Entrepreneurial ability [0-100 score]	68.5	69.9	-1.42	-.041
		[23.9]	[24.7]	(1.26)	
	Self-employment [yes=1]	.068	.070	-.002	-.006
		[.252]	[.256]	(.011)	
	Wage-employment [yes=1]	.055	.058	-.003	-.010
		[.228]	[.234]	(.009)	
	Satisfaction with earnings/income [0-6 score]	1.12	1.19	-.068	-.029
		[1.67]	[1.71]	(.099)	
	Never worry to get a good job in adulthood [yes=1]	.438	.412	.026	.037
		[.497]	[.492]	(.022)	
C. Social Empowerment: Control Over the Body	**Has child(ren) [yes=1]**	.093	.108	-.015	-.036
		[.290]	[.311]	(.014)	
	Married or cohabiting [yes=1]	.087	.097	-.009	-.022
		[.283]	[.296]	(.013)	
	Had sex unwillingly in the past year [yes=1]	.177	.212	-.036	-.063
		[.382]	[.409]	(.030)	
	Pregnancy knowledge [0-1 score]	.754	.735	.019	.031
		[.431]	[.441]	(.021)	
	HIV knowledge [0-6 score]	3.84	3.82	.022	.012
		[1.31]	[1.22]	(.065)	
	If sexually active, always uses condom [yes=1]	.562	.502	.060*	.085
		[.497]	[.500]	(.035)	
Number of observations		676	2606		

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The standard errors on the differences are estimated from running the corresponding least squares regression allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. The gender empowerment index is a variable that cumulates the number of times a respondent answers "Both/Same" to the following questions: "Who should earn money for the family?", "Who should have a higher level of education in the family?", "Who should be responsible for washing, cleaning and cooking?", "If there is no water pump or tap, who should fetch water?", "Who should be responsible for feeding and bathing children?", "Who should help the children in their studies at home?" and "Who should be responsible for looking after the ill persons?" The other possible answers given to the respondent were "Male" and "Female". The index is then rescaled such that 100 indicates that the respondent answered that the female should (at least partly) be responsible for all the activities. The entrepreneurial ability index is the cumulative and rescaled score aggregating the self-assessed ranks to the following activities (where 10 was the highest rank and 1 the lowest): "Run your own business", "Identify business opportunities to start up new business", "Obtain credit to start up new business or expand existing business", "Save in order to invest in future business opportunities", "Make sure that your employees get the work done properly", "Manage financial accounts", "Bargain to obtain cheap prices when you are buying anything for business (inputs)", "Bargain to obtain high prices when you are selling anything for business (outputs)", "Protect your business assets from harm by others", "Collecting the money someone owes you". The index for satisfaction with earnings/income is the reversed and rescaled respondent's self-assessment on a 7 point score (where originally "1" is completely happy and "7" is not at all happy). The pregnancy knowledge index equals 1 if the respondent correctly identifies the statement "A woman cannot become pregnant at first intercourse or with occasional sexual relations" as true or false. The HIV knowledge index is based on the number of statements correctly identified as true or false. The relevant statements are "A person who has HIV is different from a person who is ill with AIDS", "During vaginal sex, it is easier for a woman to receive the HIV virus than for a man", "Pulling out the penis before a man climaxes keeps a women from getting HIV during sex", "A women cannot get HIV if she has sex during her period", "Taking a test for HIV one week after having sex will tell a person if she or he has HIV." and "A Pregnant woman with HIV can give the virus to her unborn baby".

Table A4: Impact Heterogeneity

Marginal effects, standard errors in parentheses, p-values

		(1) Baseline ITT Estimates	(2) Rural	(3) Urban	(4) Above Median HH Asset Value	(5) Below Median HH Asset Value	(6) Younger than 16yrs	(7) Older than 16yrs
A. ELA Indices	**IGA Index**	.335***	.215***	.377***	.329***	.255***	.302***	.309***
		(.047)	(.068)	(.077)	(.069)	(.068)	(.056)	(.072)
	Control Over the Body Index	.605***	.611***	.591***	.579***	.609***	.615***	.578***
		(.048)	(.067)	(.066)	(.059)	(.060)	(.0450)	(.065)
	Welfare Index	.314***	.216**	.414***	.311***	.322***	.316***	.314***
		(.057)	(.090)	(.069)	(.084)	(.064)	(.066)	(.069)
	Gender Empowerment Index	.129***	.080	.177***	.129***	.129**	.122**	.148***
		(.043)	(.060)	(.060)	(.050)	(.061)	(.051)	(.049)
	Aspiration Index	.185***	.199***	.171***	.153***	.205***	.166***	.204***
		(.026)	(.041)	(.031)	(.033)	(.036)	(.040)	(.031)
B. Education	**Currently enrolled in school [yes=1]**	-.021	-.036	-.011	-.028	-.011	-.023	-.021
		(.020)	(.027)	(.028)	(.023)	(.028)	(.017)	(.027)
	If enrolled, hours spent on going to and attending school, homework and study per week	1.59*	2.16	.969	1.89	1.18	1.39	1.78
		(.892)	(1.44)	(1.02)	(1.30)	(.950)	(.957)	(1.57)
	If dropped out, plan to start/go back to school [yes=1]	.080**	.038	.142***	.036	.108**	.898	.065*
		(.039)	(.053)	(.053)	(.072)	(.042)	(.166)	(.039)

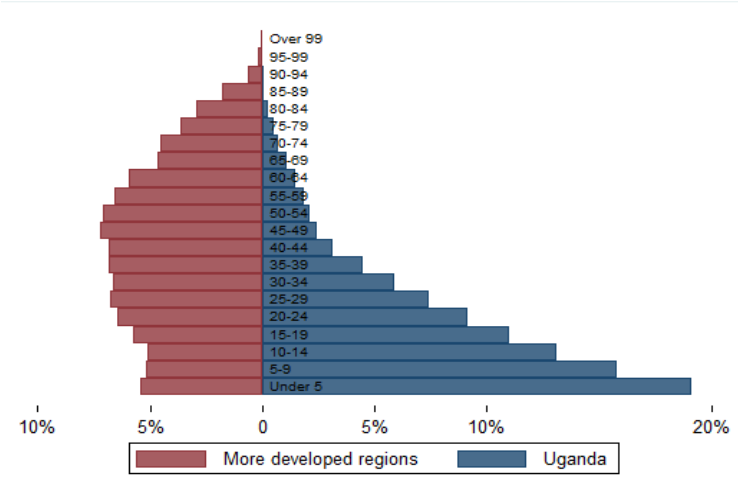
Notes: *** denotes significance at 1%, ** at 5%, and * at 10%.Standard errors are clustered by community. The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The IGA Index is based on the entrepreneurship ability and the indicators for self-employment and wage employment. The Control Over the Body index is based on all the listed outcomes in Panel B of Table A4. Each index is constructed by converting each component into a z-score and then averaging these and taking the z-score of the average.

Table A5: Cost-Benefit Analysis, in 2008 US$

				(1) Non-Recurring	(2) Recurring Monthly	(3) Year One	(4) Year Two
A. Fixed Costs	(1)	Office Space & Equipment	10 Branch Offices	4,000		4,000	
	(2)	Program Assistant Training	10 Assistants	2,250		2,250	
	(3)	Training & Operational Material Development	2 Manuals	4,000		4,000	
	(4)	Program Management Compensation	2 Coordinators		780	9,360	9,360
	(5)	Program Assistant Compensation	10 Assistants		1,690	20,280	20,280
	(6)	Adolescent Leader Compensation	100 Adolescent Leaders		1,200	14,400	14,400
	(7)	Adolescent Leader Training	100 Adolescent Leaders	22,500		22,500	
	(8)	Adolescent Leader Training (for Replacements)	20 Adolescent Leaders	4,500			4,500
	(9)	Adolescent Leader Refreshers	100 Adolescent Leaders		400	4,800	4,800
	(10)	Club Rent	100 Clubs		1,000	12,000	12,000
	(11)	Club Materials	100 Clubs	42,000		42,000	
	(12)	Club Materials (Replenishment)	100 Clubs	16,800			16,800
	(13)	Branch Office Overhead	10 Branch Offices		800	9,600	9,600
	(14)	Country Office Overhead	1 Country Office		4,000	48,000	48,000
B. Variable Costs	(15)	Financial Literacy Courses	2,500 Members	12,500		12,500	12,500
	(16)	Livelihood Training (Year 1)	2,000 Members	100,000		100,000	
	(17)	Livelihood Training Inputs (Year 1)	2,000 Members	60,000		60,000	
	(18)	Livelihood Training (Year 2)	1,000 Members	50,000			50,000
	(19)	Livelihood Training Inputs (Year 2)	1,000 Members	30,000			30,000
C. Total Costs	(20)	**ELA Program Costs for the 100 studied Communities**				**365,690**	**232,240**
D. Yearly Per Unit Average Costs	(21)	Assuming 130 potential girl attendees per club	Fixed Costs			14.9	10.7
	(22)		Variable Costs			13.3	7.12
	(23)		**Total Costs**			**28.1**	**17.9**
E. Yearly Benefits	**(24)**	**ITT Impact of ELA on Individual Yearly Total Expenditures**					**32.8**

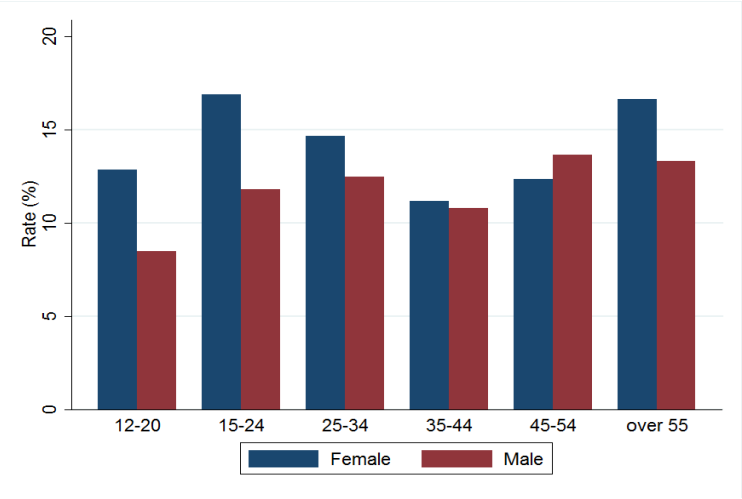
Notes: The exchange rate used to convert monetary values is based on January 2008 at which point $1 was worth approximately UGX1,700. The yearly costs shown in Columns 3 and 4 are obtained by multiplying column 2 times 12 (months) and adding Column 1 for all fixed and variable cost categories applicable to the respective year of operation. The yearly total cost of the ELA Program stated in row 20 is the summation of all individual cost items applicable to the respective year. The yearly benefits shown in row 24 are based on the ITT impact estimates on expenditures.

Figure 1A: Female Population by Age, 2010



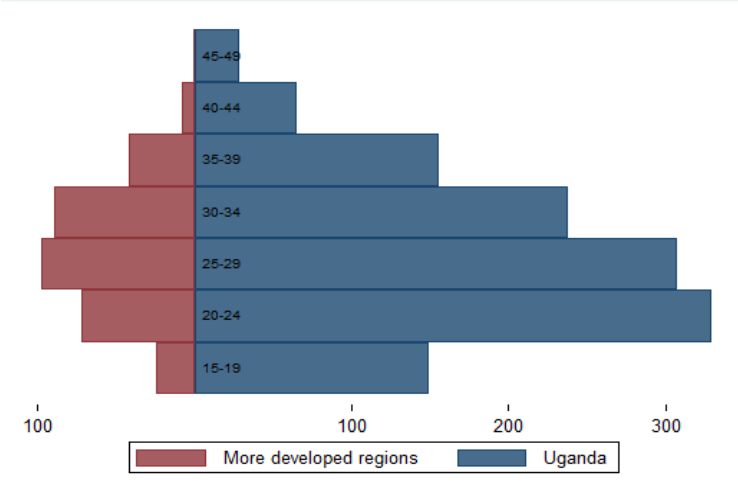
Notes: The data stems from the 2010 UN World Population Prospects data base. More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan.

Figure 1B: Unemployment Rates (%), by Age and Gender, Uganda 2005/6



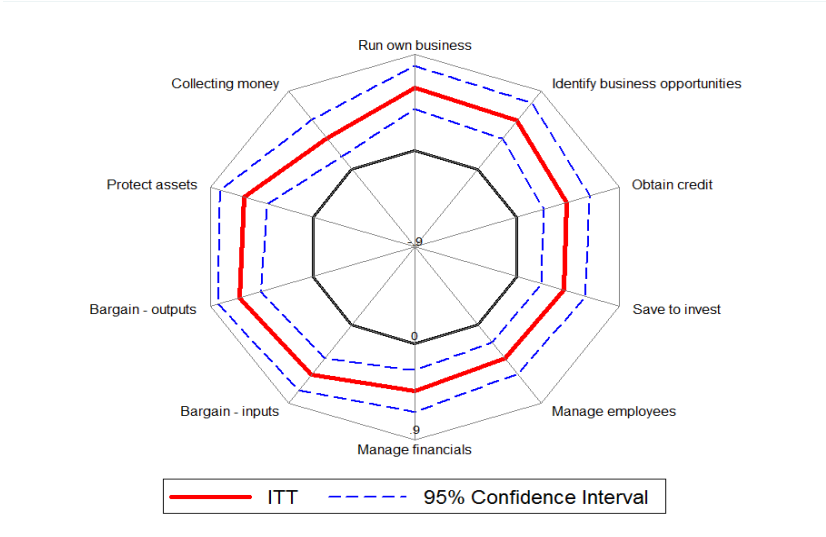
Notes: The data source is the Uganda National Household Survey (UNHS). Unemployment is defined as those who actively wanted a job but did not participate in any employment activities, inclusively self-employment and agricultural works). The UNHS is a nationally representative sample of 7246 households.

Figure 1C: Age-Specific Fertility Rate, 1995-2010



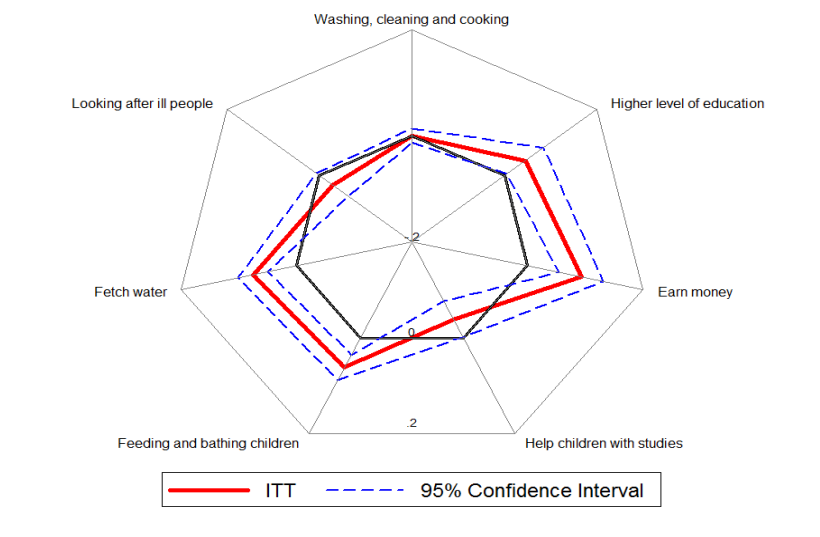
Notes: The data stems from the 2010 UN World Population Prospects data base. The fertility rate is measured by the number of births per 1,000 women. More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan.

Figure 2A: The ITT Impact of the ELA Program on Entrepreneurship Measures



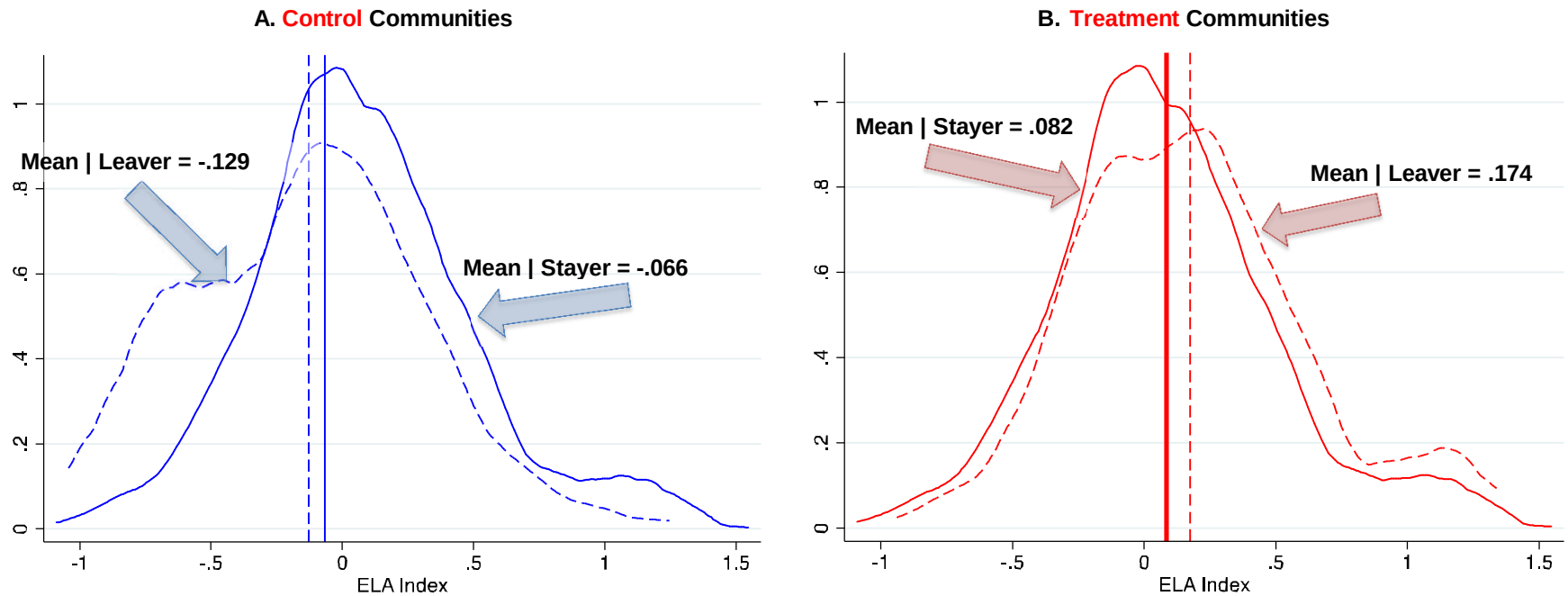
Notes: The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The adolescents were asked to rank their ability on how well they can do the following activities on a scale of 1 to 10, 1 means they cannot do this activity and 10 is they definitely can (clockwise, beginning with the spoke on top): "Run your own business", "Identify business opportunities to start up new business", "Obtain credit to start up new business or expand existing business", "Save in order to invest in future business opportunities", "Make sure that your employees get the work done properly", "Manage financial accounts", "Bargain to obtain cheap prices when you are buying anything for business (inputs)", "Bargain to obtain high prices when you are selling anything for business (outputs)", "Protect your business assets from harm by others", and "Collecting the money someone owes you".

Figure 2B: The ITT Impact of the ELA Program on Gender Empowerment Measures



Notes: The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The adolescents were asked to indicate whether the following tasks should be performed by the "Male", "Female" or "Both/Same": "Who should earn money for the family?", "Who should have a higher level of education in the family?", "Who should be responsible for washing, cleaning and cooking?", "If there is no water pump or tap, who should fetch water?", "Who should be responsible for feeding and bathing children?", "Who should help the children in their studies at home?" and "Who should be responsible for looking after the ill persons?". The outcome variable equals 1 if the adolescent indicated that the respective task should be performed by "Both/Same" and 0 otherwise.

Figure 3: Leaves and Stayers Between Midline and Endline



Notes: The summary ELA Index is the simple average of the five other indices: the IGA Index is based on the entrepreneurship ability score and the indicator for self-employment. The Control Over the Body Index is based on all the outcomes in Table 4. The Welfare Index is based on expenditures and the "worry about finding a job" variable. The Gender Empowerment Index is based on the index reported in Table 5. The Aspiration Index is based on all the outcomes in Table 5. Each index is constructed by converting each component into a z-score, averaging these and taking the z-score of the average. The Figures show the distribution of the ELA index among leavers (those that attrit between midline and endline) and stayers (those that do not attrit between midline and endline). Panel A does so in control communities, and Panel B does so for treatment communities.