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

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Abstract

Women in developing countries are disempowered: high youth unemployment, early marriage and childbearing interact to limit their investments into human capital and enforce dependence on men. We evaluate a multifaceted policy intervention attempting to jumpstart adolescent women’s empowerment in Uganda, a context in which 60% of the population are aged below twenty. The intervention aims to relax human capital constraints that adolescent girls face by simultaneously providing them vocational training and information on sex, reproduction and marriage. We find that four years post-intervention, adolescent girls in treated communities are 4.9pp more likely to engage in income generating activities, corresponding to a 48% increase over baseline levels, and an impact almost entirely driven by their greater engagement in self-employment. Teen pregnancy falls by a third, and early entry into marriage/cohabitation also falls rapidly. Strikingly, the share of girls reporting sex against their will drops by close to a third and aspired ages at which to marry and start childbearing move forward. The results highlight the potential of a multifaceted program that provides skills transfers as a viable and cost effective policy intervention to improve the economic and social empowerment of adolescent girls over a four year horizon.

JEL Classifications: I25, J13, J24.

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1 Introduction

Women’s empowerment has three key 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 is almost entirely reversed in many developing countries today: universal suffrage for women was often achieved at independence, yet empowerment along economic and reproductive dimensions has progressed more slowly and might be reversing in some countries [Doepke *et al.* 2012, Jayachandran 2015].

In these countries, female labor force earnings are 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, Jayachandran 2015]. 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, Goldin and Katz 2008], 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, Doepke *et al.* 2012, Jayachandran 2015]. Many women in these countries appear trapped in an equilibrium where the phenomena of low human capital investment, restricted access to labor markets (relative to men) and limited control over their bodies reinforce each other, leading to dependence on men.

The key question is then whether jump-starting women’s human capital accumulation can empower them and set them on a trajectory towards a better equilibrium, or whether such circumstances are maintained by binding 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 multifaceted program that provides adolescent girls with 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 important. 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 skilled 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 participation in skilled jobs [Field and Ambrus 2008, Bruce and Hallman 2008].¹ Economic empowerment

¹Baird *et al.* [2011] document that marriage and schooling are mutually exclusive activities in Malawi, and Ozier [2016] provides similar evidence from Kenya. In Bangladesh, Field and Ambrus [2008] show that each additional

and social empowerment, in its most basic form as having control over the body, thus interact in a powerful way during adolescence. Hence interventions targeted towards adolescent girls might have higher returns than later timed interventions [Heckman and Mosso 2014]. Moreover, multifaceted interventions such as the one we study, recognize the multidimensional nature of womens' empowerment, and hence might be more effective and self-reinforcing than interventions focused on just one aspect of disempowerment.

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 among the lowest median age of countries and among the highest child dependency ratio as shown in Figure 1A [UNAIDS 2010]. For those in the labor force, women tend to have higher unemployment rates relative to men, and this is especially pronounced in the youngest age cohorts. Finally, as Figure 1B 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 multifaceted program we evaluate aims to break the vicious cycle between low participation in skilled jobs and high fertility by kick-starting human capital accumulation along two dimensions through the simultaneous 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 program thus recognizes the external constraints girls face, such as a lack of labor market relevant skills. The program also recognizes internal constraints girls face, and the life skills component aims to empower them through raising their knowledge, self-confidence and aspirations.⁴ 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.

year that marriage is delayed is associated with .3 additional years of schooling and 6.5% higher literacy rates.

²The 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 twenty [World Bank 2009]. 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].

³Demographic 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.

⁴Lybbert and Wydick [2017] provide an overview of the psychology of hope and aspirations. The notion of such internal constraints has gradually begun to inform debates in economics on poverty and economic development [Ray 2006, Genicot and Ray 2017].

Moreover, these clubs can serve as a safe-space for girls to meet and socialize with other adolescent girls, free from pressures exerted by adolescent and older men.

The program was developed in another country, Bangladesh, where female disempowerment is also a major issue. Since 1993 in Bangladesh, BRAC, one of the world’s largest NGOs, has established 9,000 clubs that have reached over 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. The program has proved to be transportable across countries, and also scalable and cost effective: to date BRAC has started 1200 clubs in Uganda, reaching 50,000 girls.⁵

We collaborated with BRAC to randomly assign clubs across communities. We surveyed and tracked a representative sample of almost 5,000 adolescent girls at baseline, midline (two-years post intervention) and endline (four years post-intervention), allowing us to chart the longer term dynamic impacts on empowerment of the program. Club participation is voluntary and unrelated to other BRAC activities.

At baseline, we document the low levels of empowerment adolescent girls have across all spheres of life. In terms of economic independence, few girls (6%) report being self-employed, and rates of wage employment are even lower. Given that around 30% of the girls are not in school, this suggests most girls that have left the formal education system are not successfully transitioning into work, and remain unemployed, underemployed or reliant on casual work. Indeed, 60% of girls worry they will not find a job in adulthood. On dimensions of empowerment related to control over the body, 17% report having had sex unwillingly in the past year. Girls also display limited knowledge related to pregnancy and HIV, only half report always using a condom if they are sexually active. On aspirations, on an overall index of gender empowerment based on multiple questions relating to gender roles in labor markets, education and household chores, we find that girls themselves strongly hold views that assign gender-roles in the main spheres of life. 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 other binding constraints.

Despite these low levels of empowerment at baseline, the take-up rate for the ELA program is 21%, suggesting that a sizeable share of eligible girls have latent demand for the 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 results show that four years post-intervention, the bundled 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. ITT estimates imply girls in treated communities are 4.9 percentage point (pp) more likely to engage in income generating activities relative to girls in control communities, corresponding to a 48% increase over baseline levels, that is driven predominantly by additional

⁵The program has also started in Tanzania, where 200 clubs have over 7,000 adolescents enrolled in them, 120 clubs have been set up in South Sudan. Ongoing pilots are taking place in Afghanistan and Liberia.

engagement in self-employment activities: at midline, rates of self-employment are near double those in control communities at baseline (12.2pp versus 6.3pp), and at endline these rates remain 50% higher (at 9.5pp) relative to girls in control communities.

Despite school-enrolled girls being eligible for the program, we find no reduction in school enrollment among eligibles (at either midline or endline). Hence, gains in economic empowerment from the program do not come at the cost of girl's lowering their investment in formal education.

The program significantly improves control over the body: by endline the probability of having a child is 3.8pp lower in treated communities, corresponding to 34% of the baseline mean rate of early (teen) pregnancy. The endline ITT estimate shows girls in treated communities to be 8pp less likely to be married/cohabiting, corresponding to 62% of the baseline mean. This divergence in trends continues to endline, at which point they are 8pp less likely to be married or cohabiting. Most dramatically, the share of adolescent girls reporting having had sex unwillingly in the past year is 5.3pp lower in treatment vs. control communities by endline, starting from a baseline level of 17%. This is perhaps the clearest marker that the bundled provision of life skills and vocational training successfully improves the adolescent girls' relationship quality.

Finally, we evaluate changes in girls' expectations for ages at marriage, childbearing and fertility, as well as aspirations for their own daughters (and sons). The overall picture from these aspirations related outcomes are that although the program impacts most dimensions in the short term, these tend to die out by endline. There are however two notable dimensions of aspirations that do not die out, and relate closely to the earlier documented impacts: these relate to adolescent girl's views on ideal ages at marriage for women, and the most suitable age to start childbearing. On both dimensions, these shifts in aspirations endure and we record impacts that are statistically significant at endline.

We then investigate three further issues that are crucial for understanding the wider impacts and scalability of ELA as a tool to aid womens' empowerment: spillovers to non-participants, unbundling its components, and its cost effectiveness.

On spillovers, the ITT effect size impacts along all three dimensions of female empowerment are economically as well as statistically significant. At the same time, ELA participation rates are just over 20%. The findings beg the question of whether the documented impacts arise from ELA participants alone, or whether they suggest spillovers onto non-participating adolescent girls in the same treated communities. We examine the issue in more detail using two strategies. First, we describe the potential nature of spillovers through a non-experimental comparison of differences in outcomes between non-participants in treatment and control communities. This hints at spillovers existing, and being greater in magnitude for dimensions of empowerment captured in aspirations and control over the body indices, and weaker for forms of economic empowerment. This pattern makes sense as what girls learn from the life skills training may be easier to transmit to other girls relative to what they learn from vocational skills training.

Second, we extend our research design to estimate marginal treatment effects (MTEs). This

sheds light on whether there are homogenous or heterogenous returns to ELA participation, the nature of self-selection into participation (the girls driving spillovers), and allows us to construct other relevant treatment effects from which to assess the strength of any spillover effects. The estimated MTEs rule out homogenous gains to ELA: while the evidence suggests no girls lose from ELA, the potential gains from participation vary enormously across girls, and dimensions of empowerment. The MTEs also reveal the pattern of selection into participation varies across the different dimensions of empowerment.

A central advantage of the ELA approach is its potential to give a big push to adolescent girls' empowerment along potentially interlinked dimensions and thus kickstart a virtuous cycle of gains. The downside is that it becomes harder to disentangle if one program component is more effective in raising empowerment than others. To shed light on the role of program components, we probe the data using mediation analysis, following Gelbach [2016] in decomposing the overall ITT impacts on indices of empowerment related to economic outcomes, control over the body and aspirations, into components explained by potential mediators. This exercise highlights the important role life skills training provides for all dimensions of empowerment, but also suggests the provision of a safe space for girls, or enabling them access to older female mentors, might also be key. Such issues should obviously be factored into future evaluations and scale-ups.

Finally, we find the program to be highly cost effective over the four year evaluation horizon. The overall cost per eligible adolescent girl is \$17.9. To put this in context, this corresponds to less than 1% of household annual incomes at baseline. If the per girl benefits to adolescent girls in communities offered the ELA program are larger than this, the program is sustainable from the social planner's perspective. If the program has some components that are more effective than others, this cost can be brought down further in future scale-ups.

Our core contribution to the literature is to provide novel evidence on how to empower young women in low-income contexts. To do this we both carefully measure all key dimensions of adolescent empowerment at baseline and examine how these are affected by the intervention at midline and endline. There is a long established literature from across the social sciences discussing the issue using observational data [Goldin and Katz 2002, Doepke *et al.* 2012, Duflo 2012, Jayachandran 2015], and a more nascent experimental literature seeking to evaluate school-based interventions often focused on one aspect of disempowerment, and over somewhat shorter horizons [Ashraf *et al.* 2017, Dhar *et al.* 2018].⁶ A strength of the ELA approach is to try and tackle multiple, interlinked,

⁶Two recent evaluations of interventions specifically designed to empower young women are Ashraf *et al.* [2017] and Dhar *et al.* [2018]. Both evaluate schools-based interventions, with a focus on improving the negotiation skills of girls or to reshape their attitudes towards gender, respectively. Ashraf *et al.* [2017] evaluate the effects of interventions targeting adolescent girls enrolled in primary schools in Zambia, providing them with negotiation-skills training, and a safe-space in which to congregate. They find the negotiation skills training led to long-run improvements in human capital outcomes of treated girls, but the safe space program had no significant effect. Neither intervention had an effect on pregnancy rates. They do not report effects on girls' labor market outcomes. Dhar *et al.* [2018] evaluate a school-based intervention for adolescents in Haryana, India, designed to reshape their gender attitudes. The intervention involved a series of 45 minute sessions where children discussed gender equality

constraints simultaneously. The intervention also targets adolescents in a critical stage of the life cycle as they transit from school to work [Heckman and Mosso 2014].

Our work thus complements a sequence of recent papers examining the impacts of various forms of soft-skill training for women’s outcomes, although our intervention extends beyond skills deemed relevant for labor market outcomes, and measures impacts up to four year post-intervention [Groh *et al.* 2016, Adhvaryu *et al.* 2017].⁷ Our intervention also builds on existing work examining the impacts of standalone vocational skills training programs, for which meta-analyses have pointed to low or short-lived returns in low-income settings [Card *et al.* 2010, Blattman and Ralston 2015, McKenzie 2017]. Similarly, standalone school-based sex education programs have met with, at best, rather mixed success [Gallant and Maticka-Tyndale 2004, Paul-Ebhohimhen *et al.* 2008, Cornish and Campbell 2009, McCoy *et al.* 2010, Groh *et al.* 2012, De Walque 2014]. As in our setting, some of the more promising life skills interventions have been those delivered outside of school environments [Dupas 2011].

Our findings complement a small body of research using large-scale randomized control trials to provide evidence on the *interlinkages* between economic and reproductive challenges that adolescent girls face in developing countries. The main body of evidence built up along these lines relates to the impacts of (un)conditional cash transfers on risky behaviors, where conditionality often relates to school attendance. For example, Baird *et al.* [2011] find a conditional 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, while an unconditional cash transfer had generally weaker impacts. Baird *et al.* [2014] 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. This branch of work sheds light on the direct effect of resources, rather than skills, on economic and social empowerment. Relative to this earlier literature, our results highlight the potential of a multifaceted program that provides bundled hard and soft *skills* as a viable and cost effective alternative to direct (un)conditional cash transfers, in promoting the economic and social empowerment of adolescent girls over a four year horizon.⁸

(and were prompted to think about their own views and societal norms on the matter). They find the intervention has a powerful impact in reshaping gender attitudes among their sample of both boys and girls.

⁷Groh *et al.* [2016] evaluate a soft skills training program targeting young women in Jordan, covering skills orientated towards improving labor market outcomes (e.g. business writing skills, time management, interviewing skills). Impacts were measured up to 27 months after the program. While the program made participants more optimistic, it did not have any significant effects on women’s employment outcomes. Adhvaryu *et al.* [2017] evaluate a workplace-based soft skills training program on female garment workers’ productivity in India which focused on communication, problem-solving, decision-making and financial literacy skills. Impacts were measured up to 8 months after the program’s completion. The results indicate training improved women’s soft skills, and increased their likelihood to request and complete technical skill development trainings. Treated workers were more productive. There were also significant spillover effects, as non-treated workers in treated production lines were also more productive and assigned to complex tasks.

⁸Baird *et al.* [2014] provide a systematic review of the effects of cash transfer programmes on schooling outcomes, using data covering 35 studies. They find that both conditional cash transfers (CCTs) and unconditional

Closer to our evaluation in terms of other multifaceted interventions targeting adolescents are programs evaluated by Duflo *et al.* [2015], Acevedo *et al.* [2017] and Buchmann *et al.* [2017]. These all add to a growing body of work highlighting the efficacy of multifaceted, scalable and cost effective development interventions.⁹

The paper is organized as follows. Section 2 details the intervention and its implementation. Section 3 describes the research design, data and estimation strategy. Section 4 presents estimates of the program’s two- and four-year impacts on adolescent girls’ economic empowerment, control over the body, expectations and aspirations. Section 5 discusses spillovers, unbundling the components of ELA, and cost effectiveness. Section 6 concludes by highlighting the broader implications of our findings for policies and future research designed to address the economic and reproductive challenges facing the burgeoning number of young women in the developing world today.

2 The Design of the ELA Program

The Empowerment and Livelihood for Adolescents (ELA) program is designed to improve the lives of adolescent girls along multiple dimensions. It does so through an intervention that simultaneously offers girls vocational skills, life skills, as well as a safe space to meet and socialize with other adolescent girls. The program is implemented by the NGO BRAC Uganda.¹⁰

Rather than being a school-based intervention, the ELA program operates through development clubs that are in a fixed meeting place in communities. Clubs are open five afternoons per

cash transfers (UCTs) improve the odds of being enrolled in and attending school compared to no cash transfer programme. The effect sizes for enrolment and attendance are always larger for CCTs compared to UCTs, but the difference is not statistically significant.

⁹Duflo *et al.* [2015] 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. They show 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. Acevedo *et al.* [2017] evaluate a soft skills and internship program in the Dominican Republic, covering skills focused on promoting self-esteem and self-realization, communication, life planning, health and risky behaviors. The program was evaluated on its own and combined with a vocational training program. The target population were disadvantaged young men and women (aged 16 to 29). They study impacts up to 36 months post intervention. For women, they find that both curricula have strong positive effects on soft skills and on expectations of future labor market and life success. Both curricula were associated with higher employment rates in higher paying jobs with higher job satisfaction 12 months after program completion. Buchmann *et al.* [2017] evaluate another adolescent girls’ empowerment program in Bangladesh. The content of is quite similar to the ELA program in Uganda (establishing safe spaces for girls and providing life skills via peer mentoring), but without the vocational training component. The researchers cross-randomized the intervention with incentives to delay marriage (an in-kind transfer, conditional on remaining unmarried until the age of 18). They find the empowerment program on its own had no significant effect on child marriage or teenage childbearing but was effective in increasing schooling. In contrast, the conditional incentive was effective in reducing child marriage and teenage childbearing.

¹⁰In an altogether different context of raising rural assetless households out of poverty, the ultra-poor graduation program is another example of a multifaceted (and scalable) intervention (also pioneered by BRAC) that has been shown in multiple settings, to permanently have an impact on the economic and social lives of beneficiaries [Banerjee *et al.* 2015, Bandiera *et al.* 2017].

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 and are slightly older than eligible girls. Mentors receive small lump-sum payments for their work, and they are trained during a week-long initiation program, as well as monthly refresher courses. Using locally hired mentors ensures the program is scalable (as evidenced by its spread across countries and continents, and also its rapid expansion within Uganda). Moreover, the fact that mentors are close in age to mentees and have often successfully confronted challenges related to economic and social empowerment, is thought to help facilitate the transfer of knowledge [Ray 2006]. Indeed, existing work emphasizes that school-based interventions designed to socially empower adolescent girls may have limited impact because youth are uncomfortable discussing such matters with teachers [Gallant and Maticka-Tyndale 2004, Ross *et al.* 2006].

Club participation is voluntary and unrelated to participation in other BRAC activities.¹¹ Eligibility is based on gender and age: girls aged between 14 and 20 are permitted to participate. Given the practical difficulty of verifying age, and the demand for vocational and life skills from other girls, in practice some girls outside of this age range also attend the clubs and receive skills training. ELA clubs also host popular recreational activities such as reading, staging plays, singing, dancing and playing games. As such, outside of school hours, the clubs serve as a protected local space in which adolescent girls can meet, socialize, privately discuss issues of concern and continue to develop their skills, at a time of day that is after-school but in the afternoon when their parents might not be back from work.

The vocational skills and life skills training are provided in the first two years of the intervention. After this adolescent girls are free to continue to use the clubs as a safe social space, but do not receive further training.

Vocational skills training comprises a series of courses on income generating activities including hair-dressing, tailoring, computing, agriculture, poultry rearing and small trades operation. 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. 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 also takes account of the girl's education, the local business environment and demand for such services (this ensures not all girls in a community are provided the same vocational skill). The overarching aim of the vocational skills component of the program is to aid the economic empowerment of adolescent girls by giving them human capital, thus improving their labor market trajectories and fostering their

¹¹There is little incentive for adolescent girls to join ELA in order to participate in BRAC's main activity of microfinance. Indeed, we see very low take-up of microfinance among age-eligible girls even when it is offered as part of the ELA intervention in later years.

financial independence as they make the critical transition from adolescence into adulthood.¹²

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.

By aiming to give girls more bargaining power in their relations with men, this aspect of the intervention can potentially slow down rates of teen pregnancy and marriage. As such, this program component can be highly complementary to the provision of vocational skills that aims to have more direct impacts on girls economic empowerment.

Given the age range of targeted girls - some are enrolled in school, others have graduated, while others have dropped out - clubs operate outside of school times and emphasis is 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’ investments in their human capital through the formal education system.

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 branches are located in rural regions of Iganga and Jinja; the others are in urban or semi-urban regions of Kampala and Mukono. For expositional ease we refer to *communities* as the unit of randomization. In rural areas these correspond to villages. In urban/semi-urban areas, communities correspond to small neighborhoods. BRAC program officers determined the natural boundaries of a neighborhood. In each branch, fifteen communities with the potential to host an ELA club were identified. From this list, ten communities in each branch office were randomly assigned to receive the treatment,

¹²The vocational skills provided overlap those studied in the literature on stand-alone business skills training [Field *et al.* 2010, Karlan and Valdivia 2011, Drexler *et al.* 2014]. However, there are some key differences between this intervention and the kind of business training/entrepreneurship skills program, reviewed by McKenzie and Woodruff [2013], and that have been found to have relatively weak impacts even among those self-selected into micro-entrepreneurship: (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 for two years rather 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 and the provision of a safe space for girls to meet.

i.e. to set up a club and deliver the ELA program, with the remaining five communities assigned as controls. In each treated community, a single club was opened. The research design thus delivers 100 treatment and 50 control communities, stratified by branch office.

We present two- and four-year impacts of the program on the economic and social lives of girls, just as they transition from adolescence to adulthood. The vocational and life skills training are provided in the first two years of the intervention. When the evaluation was originally designed, the intention was that after two-years, half of the 100 treated communities would be randomly assigned to additionally offer microfinance to participating older adolescents in order to capitalize on their newly acquired skills. During the first two years post-intervention, BRAC staff, mentors and adolescent club participants were unaware of the potential future offer of microfinance. In practice what occurred was that two-years post-intervention, a very limited offer of microfinance was actually made to age-eligible girls in treated communities: the terms of microfinance on offer did not differ from other pre-existing sources available to girls, and so unsurprisingly, we find near zero take-up of microfinance. Hence when examining four-year impacts we continue to compare outcomes between the original set of treated communities (with and without microfinance) to control communities. We later provide evidence confirming the future offer of microfinance does not drive any of the two-year findings.

3.2 Data, Attrition and Descriptives

3.2.1 Surveys

A census of adolescent girls in the 150 evaluation communities was conducted in early 2008. There are around 130 eligible adolescent girls resident in the average community. We use this census to draw a random sample of around 40 girls to survey in each. The baseline survey was administered to adolescent girls from March to June 2008. ELA clubs were established between June and September 2008, midline surveys were fielded from March to June 2010, and endline surveys were fielded May to July 2012. Each survey was conducted face-to-face and was designed to capture multiple dimensions of empowerment and covers topics related to: (i) the vocational skills component, such as financial literacy, analytical ability, labor market and income generating activities; (ii) 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. At baseline 5,966 adolescent girls were surveyed: 3,964 (2,002) from treatment (control) communities.¹³

Panel A of Table 1 shows basic characteristics of adolescents girls at baseline. Girls in our study are on average aged 16, just over 70% are enrolled in school full-time, and despite their

¹³We focused all our survey attention on interviewing girls given BRAC's focus on female outcomes in general, and because only girls could have been potential beneficiaries of ELA. We later discuss results from a follow-on experiment that sheds light on some potential spillovers to boys in the same communities.

young age, 10% already have at least one child and 10% are already married or in a cohabiting relationship. The baseline sample is well balanced on these characteristics.

3.2.2 Adolescent Girls' Empowerment at Baseline

The remaining panels of Table 1 show a range of outcomes related to how empowered adolescent girls are in their lives pre-intervention, along the three dimensions the ELA program addresses. Panel B focuses on economic empowerment. We first consider girls' self-assessment of their entrepreneurial ability: this is based on an index scaled to run from 0 to 100, constructed from 10 underlying questions.¹⁴ The average score is 70, suggesting most girls are confident about having the necessary business-related skills pre-intervention. Despite this confidence, only 6% of girls report being self-employed in control communities (the type of income generating activity the program fosters by offering vocational skills), and rates of wage employment are even lower. Given that around 30% of the girls are not in school, these low levels of labor market activity suggest most girls that have left the formal education system are not successfully transitioning into work, and remain unemployed, underemployed or reliant on casual work. Indeed, the next row shows that 60% of girls worry they will not find a job in adulthood.¹⁵

Panel C relates to the dimensions of empowerment related to control over the body. The data illustrates the high incidence of girls having sex against their will: in control communities 14% report having had sex unwillingly in the past year. This signals a striking lack of control that adolescent girls have over their bodies, a fact typically associated with early childbearing and marriage. On knowledge related to control over the body, one in four girls *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, 5% of girls correctly answer all the questions and 2% provide no correct answers. Only 52% of adolescent girls report always using a condom if they are sexually active and only 17% report using some other form of contraceptive. These self-reports help explain why teen pregnancy is relatively common for adolescent girls in this context.¹⁶

¹⁴The 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".

¹⁵The rates of self-employment reported 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%.

¹⁶The 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

Panel D examines the beliefs and aspirations of girls. We first present an overall index of ‘gender empowerment’, scaled from 0 to 100 and based on multiple questions 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.¹⁷ In control communities, the index average is just 31 (out of 100), suggesting that pre-intervention, adolescent girls themselves hold views that assign strong gender-roles in the main spheres of life. 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 other binding constraints.

On the majority of the empowerment dimensions the sample is balanced at baseline. Table A1 presents a complete set of balance checks, and shows girls in treatment and control communities are balanced on observables. The null of equal means is rejected for only two out of the twenty-one outcomes considered. In all cases the normalized differences are small relative to the sample variation, and below the rule of thumb value of .25 [Imbens and Wooldridge 2009].

To provide a holistic view of girls’ empowerment and not rely on any one measure, we construct three indices, related to economic empowerment, control over the body and aspirations. Each index aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. For missing values, we impute the mean of the z-score (by survey wave and treatment status) before computing the overall index. This procedure avoids a focus on a narrow set of outcomes, and the impacts of the ELA program on these three indices is the core focus of our empirical analysis.

The economic empowerment index has subcomponents based on a girl’s entrepreneurial ability score, whether she engages in any IGA, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should

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”.

¹⁷The 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.

marry, and her preferred age for her sons to marry .

Figure 2 shows the resulting distributions of the three indices of empowerment for adolescent girls at baseline. By construction, each is centred at zero. The indices of economic empowerment and control over the body are somewhat skewed, suggesting a concentration of highly economically empowered girls, and a long left tail of girls lacking control over their body. In the cross section of girls at baseline, the pairwise correlations of these empowerment dimensions are low, although this need not reflect causal interlinkages. This highlights how important it can be to try and shift empowerment on multiple dimensions simultaneously. Further assessing the correlation in these indices with household wealth (using a measure based on household assets), we find the correlation with each empowerment index to be less than .05. Hence participation into ELA might not be simply predicted by family background (as confirmed later, there is no striking evidence of selection on observables into participation).

3.2.3 Attrition

Adolescent girls are geographically mobile in Uganda, often relocating to find work opportunities or due to marriage. To maintain high tracking rates over our four-year study period, we collected multiple contact numbers and details of any contact person(s) mentioned, that could inform us of the girl’s location in case she could not be tracked by phone. We tracked respondents who had moved within the same BRAC branch office area, but we did not attempt to track respondents who had moved outside the branch area. As a result, 4,888 (3,522) adolescents were tracked to midline (endline), corresponding to a two-year (four-year) tracking-rate of 82% (65%).

Table 2 shows correlates of attrition. Considering attrition at midline, Column 1 shows that residing in a treated community does not predict attrition, and Column 2 shows this to be robust within branch. Column 3 shows the result holds conditioning on baseline characteristics, and allowing for there to be differential attrition between treatment and control based on these characteristics (age, current enrollment in school, being married/cohabiting or having children, and the three empowerment indices that are our key outcomes). None of these characteristics predict attrition, and we find no evidence of differential attrition across treatment and control groups by these characteristics (at the foot of Column 3, we report the joint F-statistic on the interactions: they are jointly insignificant [$p = .712$]).

We next examine attrition between baseline and endline (Columns 4-6). Over this four year period, treatment does not predict attrition, nor do the baseline characteristics of girls, and nor is there any evidence of differential attrition by these characteristics or measures of empowerment in treated communities relative to control communities (except for the aspirations index at the 10% level). These interactions are still jointly insignificant [$p = .156$]. Finally, Columns 7 to 9 consider girls tracked at midline *and* endline. This is the sample used for our endline analysis as it maintains the greatest comparability between midline and endline estimates. The results are

very similar to the earlier findings on correlates of being tracked to endline.

The evidence in Table 2 does not shed light on whether attrition is likely to upwards or downwards bias our estimates. To address issues of selective attrition, we therefore present Lee bounds estimates of all the midline and endline impacts for economic empowerment (Table 4), control over the body (Table 5) and aspirations (Table 6) [Lee 2009], where the bounds assume the tracked sample is either entirely negatively or entirely positively selected.

To better compare our tracking rate with those from studies on similar samples of youth in low-income settings, we first note that most related studies track individuals for one or two years only. We summarize tracking rates across studies of this type in Figure A1. The horizontal line in Figure A1 is the attrition rate in our two-year follow-up (18%). This is below or similar to most related studies, although there are a few studies that report lower attrition [Dupas 2011, Dupas *et al.* 2017 and Brudevold-Newman *et al.* 2017].¹⁸ In contrast to some of these studies, around 30% of our baseline sample of girls are already out of school. Hence they are at a stage of the life cycle where geographic mobility might be high, as they move to find employment or marry.

Examining next the handful of studies that have attempted to track young individuals for four or more years in low-income settings, we note that these typically select a random subsample for intensive tracking, and observations are then weighted accordingly to maintain representativeness [Duflo *et al.* 2015, Baird *et al.* 2016, Friedman *et al.* 2016, Duflo *et al.* 2017]. In contrast, we attempted to track all adolescent girls from our baseline.¹⁹

Table A1 presents a complete set of balance checks for our baseline sample of 5,966 interviewed girls, irrespective of whether they attrit or not, and the sample of girls tracked and midline and endline that are used for the core ITT analysis. This shows that on most dimensions in the

¹⁸Dupas [2011] tracks a sample of girls and boys in Kenya, who recently graduated from primary school. Her attrition rate is 2% over one year. Dupas *et al.* [2017] track a sample of teenage girls in Cameroon who were attending 8th grade at baseline. To reduce attrition, they collected information on girls who could not be reached by surveying a relative or a friend (for a subset of objective outcomes). The attrition rate overall was 8% over approximately one year. For face-to-face interviews (as in our study), the attrition rate was 13.4%. Brudevold-Newman *et al.* [2017] track a sample of young women (aged 18-19) living in poor neighborhoods of Nairobi who had applied to a business training program. They report an attrition rate of 8% over two years. In contrast to their sampling strategy, our sample is not conditional on expressing interest in business training. If interest in business training is negatively correlated to geographical mobility, this could explain their lower attrition rate.

¹⁹Duflo *et al.* [2015] report an attrition rate of 11% over 7 years for a sample of young women in Kenya (the attrition rate is 7% for boys of same age group). Part of the sample was selected for intensive tracking, which involved teams of field officers travelling to various locations in Kenya and Uganda to identify and interview selected respondents. In the sample without intensive tracking, the attrition rate was 45%. Baird *et al.* [2016] report an attrition rate of 16% over 10 years (for the Kenya Life Panel Survey Round 2). Similar to Duflo *et al.* [2015], a random subsample were tracked intensively. Friedman *et al.* [2016] track a sample of adolescent girls aged 13-17 in Kenya, reporting an attrition rate of 18% over 4-5 years. To minimize attrition, they followed a similar strategy to Duflo *et al.* [2015] where a random subsample of baseline respondents were selected for intensive tracking. Finally, Duflo *et al.* [2017] report an attrition rate of 9% over 8 years in Ghana (where the target population was high-school students aged 17 at baseline). In order to achieve high tracking rates, mobile phones were distributed at the onset of the study to each participant and they were sent mobile phone credit twice a year as an incentive to keep the phone number active (as in our study). They were attempted to be reached over phone every year in order to update the contact information.

estimation sample, treatment and control groups are balanced. In this sample, the null of equal means is rejected for only one out of the twenty-one outcomes considered. Moreover, there are no large differences between the characteristics of girls in the estimation and baseline samples. This confirms the findings from Table 2, that attrition is not predicted by observables.

3.2.4 Participation in ELA Clubs

Table 3 documents participation in ELA clubs at midline and endline. The majority of adolescent girls have heard of the clubs by midline. At this time, the participation rate for ELA clubs among eligible adolescents in treated communities is 21%: this is the period over which vocational skills and life skills are provided. There is no drop off in continued participation to endline, suggesting there is value to girls being able to enjoy the safe space the clubs provide.

The practicalities of program implementation, especially in more urban districts, lead to a small possibility that an adolescent girl residing in a control community is able to attend an ELA club.²⁰ As Table 3 shows, 4.7% of girls in control communities (77 girls) have *ever* participated in ELA club activities by midline. This participation does not persist: more than 75% of the girls that initially attended from control communities had dropped out by six months prior to midline.

The remaining rows in Table 3 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. In treated communities, the majority of adolescents who have ever participated in ELA club activities continue to be engaged through to midline. 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 permanently shifts the level of human capital accumulated, which, in turn, drives economic and social empowerment.

By midline, 53% (85%) of club participants have taken part in the vocational skills (life skills) training. The majority (51%) report having received both forms of training; we infer that 33% take-up *only* life skills training, and nearly all that take-up vocational skills training also take up life skills training. Revealed preference therefore suggests the two training components are complementary for just over half the girls, while for the others they take up the offer of one form of training. Of course, all girls can also potentially benefit from the safe space ELA clubs provide.²¹

Table A2 shows characteristics of participants and non-participants in treatment communities (as measured at midline, once all training had been delivered and using the sample of girls tracked

²⁰In 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 treated communities.

²¹This variation in skills training is not driven by supply side constraints. In nearly all treated communities we observe: (i) some eligible girls taking-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: this is as expected given clubs operate out of school hours.

to endline). The final three rows show that participants do not appear to be strongly selected on the three aggregate indices of empowerment, but there is a slight tendency for girls with a higher control over the body index measure to participate. Overall then, there is little evidence of selection on observables into ELA participation. Our core analysis presents ITT estimates of the ELA intervention. We later extend our research design to estimate marginal treatment effects, shedding light on the nature of participation into ELA.²²

3.3 Estimation

As club participation is voluntary, we focus on intent-to-treat (ITT) impacts for our core analysis, estimated using the following OLS ANCOVA specification for the impact on outcome y_{ijt} for adolescent i in community j , separately for midline ($t = 1$) and endline ($t = 2$),

$$y_{ijt} = \alpha + \gamma_t \text{treat}_{ij} + \beta X_{ij0} + \delta y_{ij0} + \varepsilon_{ijt}. \quad (1)$$

treat_{ij} equals one if individual i is in a community assigned to be treated and zero otherwise. γ_1 and γ_2 are the coefficients of interest from the midline and endline specifications, measuring the ITT impact of the ELA program at midline and endline respectively. 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]. y_{ij0} is the outcome at baseline, and ε_{ijt} is a disturbance term clustered by community j .²³

To account for attrition, we bound the treatment estimates using the trimming procedure proposed by Lee [2009]. This can be performed for the midline and endline samples separately, hence the motivation for using the specification above for each sample, rather than pooling survey waves into a single specification. We later present a robustness check running such a pooled specification. As Lee [2009] discusses, using covariates to trim the samples yields tighter bounds. In our setting, sample sizes dictate that we cannot use any covariates to perform the trimming. Hence when showing the Lee bounds estimates, we present comparable ITT estimates that do not condition on covariates: these ITT estimates are always guaranteed to lie within the estimated Lee bounds (unlike the ITT estimates from (1) that condition on baseline covariates).²⁴

²²There is a nominal fee due for club attendance but in practice this is often waived (and this is common knowledge). Hence unobserved credit constraints are unlikely to drive non-participation.

²³To check whether the midline impacts pick up anticipation effects of the future offer of microfinance, we use the sample of 100 treated communities and estimate whether future random assignment to microfinance predicts midline outcomes. Reassuringly, for nearly all outcomes, we find no significant anticipation impacts of future assignment to microfinance.

²⁴The procedure trims observations from above (below) in the group with lower attrition, to equalize the number of observations in treatment and control groups. It then re-estimates the program impact in the trimmed sample to deliver the lower (upper) bounds for the true treatment effect (as well as standard errors for each bound). The bounding procedure relies on the assumptions that treatment is assigned randomly and that treatment affects attrition in only one direction so there are no heterogeneous effects of the treatment on attrition/selection: this is in line with the evidence on attrition in Table 2.

4 Core Results

4.1 Economic Empowerment

Table 4 summarizes the ITT impacts of the program on dimensions of economic empowerment at midline and endline. To benchmark magnitudes, Column 1 shows the level (and standard deviation) of the outcome at baseline in control communities. Column 2 then shows the number of adolescents used to estimate the midline and endline ITTs respectively. Columns 3 and 4 report the ITT estimates from (1) at midline and endline (so conditional on a full set of baseline covariates); Columns 5 and 6 report unconditional ITT estimates to maintain consistency with the Lee bounds treatment effect estimates (and their associated standard error).

Row 1 shows the impact on self-reported entrepreneurial skills (recall that these were already quite high at baseline). The midline ITT estimate shows an increase of 8% over its baseline value, and at endline this is sustained at a 3% increase. Figures 3A and 3B presents spider graphs showing the midline and endline ITT impacts (and their associated 95% confidence interval) for each component of the entrepreneurial skills score. Strikingly, the program increases entrepreneurial skills on all ten dimensions at midline: 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 at midline, this is an across-the-board shift in treated girls' self-perceived ability to run small businesses.

We next analyze whether this translates into actual labor market activities of adolescent girls. We find that eligible girls are 6.8pp (4.9pp) more likely to be engaged in any income generating activity at midline (endline), a 66% (49%) increase over the baseline mean. Improvements in human capital related to entrepreneurial ability are therefore reflected in economically significant improvements in labor force participation particularly in skilled jobs which has been a key driver of women's economic empowerment across the developed and developing world [Goldin 2006, Duflo 2012, Doepke *et al.* 2012, Jayachandran 2015].

Rows 3 and 4 show this increase is entirely driven by adolescent girls engaging in *self-employment* activities. At midline, rates of self-employment are near double those in control communities at baseline (12.2pp versus 6.3pp). At endline these rates remain 50% higher (at 9.5pp). Taking into account selective attrition, the Lee bounds estimates remain away from zero: the lower bound endline estimate corresponds to a 48% increase in self-employment over baseline levels.

These results show a drop off in self-employment activities between midline and endline. If such activities are established in the first year of the program, the magnitudes imply an average death rate of 15% from the first year until endline. To check the plausibility of this, we link to the results on the death of small businesses in McKenzie and Paffhausen [2017]. They collate

data from 16 panel surveys in 12 low-income countries, documenting that small firms die at an average rate of 8.3% per year over their first five years of establishment. They find younger firms are more likely to die (17% of firms die in their first year), and that death rates are higher for younger entrepreneurs, and for female owners (they are 2pp more likely to die at each firm age). Our findings are not altogether different from these rates based on this evidence from multiple comparable settings.

Income is noisily measured in this kind of context where adolescent girls can be engaged in multiple work activities over a year, some of which are casual employment. Hence we use expenditures to proxy income. Row 5 shows that on expenditures in the last month, there are significant gains to girls in treated communities, corresponding to 39% increases at midline over baseline, but that these fade (and become more imprecisely measured) at endline.²⁵

We summarize the impacts of the program on economic empowerment by constructing an overall index of outcomes as described earlier, where the subcomponents are those in Rows 1 to 5. The final row in Table 4 shows the ITT effect estimates on this economic empowerment index: at midline the program has an effect size of $.269sd$, that is significant at the 1% level; by endline this falls to $.131sd$, but the impact remains significant at the 5% level. Columns 5 and 6 show both impacts to be robust to selective attrition. For example, the bounds at endline suggest: (i) if attrited girls are negatively selected, then the upper bound ITT estimate on economic empowerment is $.186sd$; (ii) if attrited girls are positively selected, then the lower bound ITT estimate on economic empowerment is $.090sd$; (iii) both bounds are significantly different from zero at conventional levels.

Overall, these results suggests that a multifaceted 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 programs delivering standalone entrepreneurship training – see for example Field *et al.* [2010], Karlan and Valdivia [2011], Drexler *et al.* [2014], Fairlie *et al.* [2015] and Bruhn *et al.* [2018], or the review of such evidence in McKenzie and Woodruff [2013].²⁶ This is despite the fact that other programs are often specifically *tar-*

²⁵The first Row in Table A3 shows impacts on annual earnings, albeit with the caveat that earnings are difficult to measure precisely in low-income settings especially when generated through self-employment. The results suggest that by endline, annual earnings of girls increase threefold. The point estimate is UGX85K, corresponding to US\$50 in 2008 prices, which is economically significant. We have also explored treatment effects on earnings from self and wage-employment separately (results not shown). As expected, earnings from self-employment significantly increase, while there is no impact on earnings from wage-employment. Estimating midline (endline) ITT impacts on annual earnings from self-employment from a Tobit specification we find that: (i) on the extensive margin, adolescent girls are 4.5pp (3.6pp) more likely to have some earnings from self-employment, corresponding to a 102% (79%) increase over baseline levels; (ii) on the intensive margin, self-employment earnings increase by nearly five times their baseline level at midline (and by more than six times their baseline value at endline). 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 skills provided by the program.

²⁶Field *et al.* [2010] evaluate the provision of basic financial literacy training to female entrepreneurs in India. Only a socially unrestricted sub-group benefited in terms of business income and borrowings. Drexler *et al.* [2014]

geted towards those who have self-selected to be small-scale entrepreneurs. Our evidence suggests that a multifaceted intervention that bundles multiple types of hard and soft skills, designed to simultaneously empower girls on economic and social margins, as well as providing a safe space for girls to socialize, 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.²⁷

Finally, we consider whether the time spent at ELA clubs is a complement or substitute for time spent in formal education. The possibility of substitutability arises because, despite clubs operating outside of school hours, some eligibles are of school going age. Panel B of Table A3 examines education related impacts. This confirms: (i) ELA does not significantly increase drop out rates for formal education, either at midline or endline; (ii) among those in school, the ELA program marginally *increases* their hours of study at midline; (iii) 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. In short, the evidence suggests the ELA program *increases* the value attached to formal education in treated communities, and the earlier documented increased rates of self-employment do not come at the expense of school enrolment.

4.2 Control Over the Body

Table 5 shows ITT impacts on control over the body for adolescent girls, as measured through outcomes such as childbearing, marriage and sex. Rows 1 and 2 cover the critical issues 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 at midline in Column 3 shows the probability of having a child is 2.7pp lower in treated communities than control communities: given that at baseline 11.3% of girls have at least one child, this corresponds to a 24% 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

find 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 [2011] 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. On the other hand, Bruhn *et al.* [2018] suggest granting small and medium enterprises in Mexico access to consulting services, that are much more costly than the forms of business intervention described above, has large positive impacts on profits, but not on employment.

²⁷A second natural point of comparison is with the literature evaluating standalone vocational training interventions. Such hard skills interventions are often found to have limited impacts in developed [Card *et al.* 2010] and developing countries [Card *et al.* 2011, Groh *et al.* 2012]. Among studies finding impacts, Attanasio *et al.* [2011] show that for women, the likelihood of being employed increases by 6.1pp. This impact is slightly larger than those we find for the ELA intervention, although as we discuss later, the ELA program is significantly cheaper, and designed to be scalable in the context of Sub-Saharan Africa.

this natural rate of increase is eliminated in treatment communities where adolescent girls largely forego reproduction once the program is offered. These trends continue to endline, at which point girls in treated communities are 3.8pp less likely to have a child than girls in control communities.

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 midline ITT estimate shows girls in treated communities to be 6.9pp less likely to be married/cohabiting at follow up, corresponding to 53% of the baseline mean. 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. This divergence in trends continues to endline, at which point they are 8pp less likely to be married or cohabiting.

In Row 3 we see the rate of adolescents who report having had sex unwillingly during the past year is 6.1pp lower in treated communities at midline and 5.3pp lower at endline. Starting from a baseline of 17% in control communities, this corresponds to a near 30% reduction in the incidence of such events by endline. 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 vocational 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) clubs providing a safe location for girls, especially in the after-school period when their parents might not be back from work.

The program also significantly improves girl's health related knowledge, on a basic question related to pregnancy (Row 4) and as measured by a HIV-related knowledge index (Row 5).

In terms of sexual behaviors, in Row 6 we see that condom use increases by midline among sexually active girls: the percentage of girls who *always* use a condom when having intercourse is 13pp higher, although again this impact dies out by endline. On the other hand, Lee bounds estimates at endline (that do not control for any covariates) remain significantly different from zero.²⁸ Row 7 shows that among the sexually active there is little evidence that other forms of contraceptive use increase. This is reassuring because although girls are encouraged to use various forms of contraception, there is limited availability of such alternatives in these communities. Hence the results do not seem to reflect girls merely repeating what they have been taught in life skills courses.²⁹

²⁸As 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.

²⁹A 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

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 $.535sd$ at midline, and by $.269sd$ at endline, which are both larger point estimates relative to the earlier documented impact on economic empowerment index in Table 4. Moreover, all the Lee bounds estimates on the index are significantly different from zero at midline and endline.

We briefly compare our findings to results from interventions that target outcomes relating specifically to the realm of control over the body, for adolescent girls in similar contexts. Perhaps the largest body of such work in similar contexts relates to standalone HIV-education programs. However, meta-analyses generally report weak impacts of such standalone programs, irrespective of whether they are delivered via classroom-based courses [Gallant and Maticka-Tyndale 2004, McCoy *et al.* 2010, Duflo *et al.* 2015] or peer-provided courses [Cornish and Campbell 2009]. There are two recent studies that find impacts of *stand alone* 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, and the key mechanism relates to how risks are presented to adolescents.

Finally, all the outcomes shown in Table 5 related to childbearing, marriage and sex, are those the ELA program specifically targets within the life skills component. As such, a concern with these self-reported outcomes is experimenter demand effects [Zizzo 2010]. However, this alone would not explain the differential pattern of some effects strengthening over time (such as on childbearing and marriage) and other effects attenuating over time (such as contraceptive use). We directly address the issue below, once we have also discussed the program impacts on girls’ beliefs and aspirations.

4.3 Aspirations

We complete our core analysis by considering ITT effects on girl’s perception of gender roles, and aspirations related to marriage and childbearing: these serve as markers for the program impacting deep rooted social norms about girls’ role in society and lifetime opportunities, which might be far harder to shift than the accumulation of human capital focused on so far. The results are in Table 6. The first outcome is an aggregate gender empowerment index which reflects how girls perceive their role in various tasks related to the labor market and in the household. The other outcomes are girls’ aspirations over ages at marriage for themselves and their children, desired fertility and

[2018] 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.

aspirations over age at first childbirth. The program does not explicitly target these attitudes, but they might well be altered alongside changes in economic empowerment and control over the body that are targeted and causally impacted.

The overall picture from these aspirations related outcomes are that although the program has impacts on most dimensions in the short term, these tend to nearly always die out by endline, as seen clearly contrasting impacts between Columns 3 and 4. This is best illustrated in the final row where all outcomes are incorporated into an aspirations index z-score: at midline this significantly increases by $.269sd$ (an effect size comparable to that found in Dhar *et al.* 2018), but by endline, there is no statistical difference between adolescent girls in treatment and control communities. While these results help reassure against the concern that the earlier results are driven merely by reporting bias or experimenter demand effects, they also serve to highlight the great challenge in being able to permanently shift aspirations, even when girls' economic and social empowerment have improved in treated communities.

There are however two notable dimensions of aspirational changes that do persist, and these both relate to the earlier documented impacts in terms of control over the body. The first is shown in Row 2: girl's views on ideal ages at marriage for women in *society* as a whole. Adolescent girls in treated communities report significantly higher ages of $.77$ and $.23$ years at midline and endline. As not all ages of marriage are logically feasible, an 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 25% (8%) of a standard deviation at midline (endline). If unmarried at follow-up, we also asked girls about their expected age at the time of their *own marriage*: the difference between girls in treatment and control communities is almost one year (not shown).³⁰

The second longer lasting dimension along which aspirations are shifted relate to childbearing: Row 5 shows there are significant increases in what girls report being the most suitable age for women to have their first child at both midline and endline: the ITT estimates are $.619$ and $.272$ respectively, corresponding to 20% and 9% of the baseline standard deviation, respectively.

Both longer lasting changes in aspirations related to age at marriage and at first child were earlier picked up in actual behaviors, where we documented significant reductions in fertility and marriage among treated girls relative to controls. In order to more permanently shift some of the other dimensions, one avenue for future interventions to consider is to also target fathers and other men in the communities.

³⁰ 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 Robustness

We briefly describe robustness checks on the impacts of ELA on the indices of empowerment, at midline and endline. First, we more fully exploit the panel dimension of the data to present ITT estimates using a specification pooling both post-intervention survey waves.³¹ Table A4 shows the quantitative and qualitative pattern of results remains the same as discussed above: all three indices are impacted at midline, the impacts are largest for the control over the body index, and only the impacts on the aspirations index fade at endline.

Second, we probe whether subsamples of adolescent girls drive the core impacts. Panel A of Table A5 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/below 16 at baseline. We find the impacts to be largely *homogeneous* across these dimensions (consistent with the earlier descriptive that all three indices of empowerment are not strongly correlated to household wealth). The results for younger girls are 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].

Panel B of Table 5 examines heterogeneous impacts on education related outcomes. These impacts are also similar across the three dimensions at midline and endline. In particular, the finding that the program does not encourage girls to drop out of school 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 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 lower.

Third, we probe the notion that parent-child relations might correlate to how girls respond to the program. For example, parental beliefs over the ideal age of marriage for a woman, or beliefs related to gender norms might constrain girls to lower levels of empowerment [Bursztyn and Coffman 2012, Ashraf *et al.* 2017, Dhar *et al.* 2018]. Table A6 examines the issue by presenting results on impact heterogeneity along those dimensions of baseline parental belief. We find ITT impacts to be largely homogeneous across parental beliefs, and this is the case for the three indices of empowerment (Panel A) as well as education related outcomes (Panel B).

4.5 Experimenter Demand Effects

As described earlier, a concern with self-reported impacts is that they reflect experimenter demand effects or social desirability biases [Zizzo 2010]. This is especially the case for the outcomes related

³¹More precisely we estimate, $y_{ijt} = \alpha + \sum_t \gamma_t (treat_{ij} \times W_t) + \beta X_{ij0} + \delta y_{ij0} + W_1 + \varepsilon_{ijt}$, where W_t ($t = 1, 2$) is a survey wave dummy, and the coefficients of interest are (γ_1, γ_2) .

to economic empowerment and control over the body, as the program targets these outcomes.³²

Experimenter demand effects can be generally classified as either cognitive or social. Cognitive drivers could be present if adolescent girls believe providing desirable responses will improve their chances to access other BRAC programs (e.g. credit). If so, we might expect such effects to be greater for participants from lower socioeconomic backgrounds or those in rural areas. However, this implication runs counter to the evidence in Table A5, where we documented relatively homogenous impacts across indices and time periods, between rich/poor and rural/urban households.

Social drivers relate to subjects being motivated to adjust reports towards what they expect researchers want to observe. To address this, we follow the approach suggested by Dhar *et al.* [2018], by examining whether our findings differ by a measure of respondent’s social desirability. Given our data, the social desirability score we use is based on the score respondent’s assigned to the statement, ‘I want to be a respectful person in my village.’ Respondents were asked whether this statement is true on a scale of 1-10, where 1 indicated “not at all” and 10 indicated “a lot”.³³ Table A7 then shows whether the ITT impacts of ELA vary with respondent’s social desirability score: we do not find any evidence of heterogenous treatment impacts by this measure. This is the case for all three indices of empowerment, and for impacts at midline and endline. Moreover, for most interactions, the point estimate is close to zero (and vary in sign) and precisely estimated.³⁴

5 Discussion

5.1 Spillovers

The ITT impacts along all three dimensions of female empowerment are economically as well as statistically significant: these are summarized again in Column 1 of Table 7, Panel A shows results for midline, and Panel B shows them for endline. At the same time, ELA participation rates are

³²To validate some answers during data collection, enumerator team leaders checked parts of the data for accuracy by revisiting respondents. During these re-visits, the team leaders took the questionnaires (which were on paper) with them and verified that some observable characteristics had been correctly recorded. For example, they would check if the respondents had a plot (of land) or chickens if they reported being engaged in such activities. We did not triangulate any personal information (such as marital history) with others due to confidentiality.

³³Dhar *et al.* [2018] evaluate the effects of a school-based gender equality training program in India on adolescents’ gender attitudes. To test for social desirability bias, they use an index of social desirability based on Crowne and Marlowe 1960). They do not find evidence of such respondent behavior.

³⁴de Quidt *et al.* [2018] develop a methodology to quantify experimenter demand effects in lab experiments. By providing explicit cues about the hypotheses associated with the experiment to randomly selected subsamples, their methodology provides upper and lower bounds on demand-free behavior. They find that women are more subject to demand effects than men. On the other hand, they conclude, “Across eleven canonical experimental tasks we find modest responses to demand manipulations that explicitly signal the researcher’s hypothesis...We argue that these treatments reasonably bound the magnitude of demand effects in typical experiments, so our findings give cause for optimism.” Mummolo and Peterson [2018] also explicitly test for experimenter demand effects and also find that revealing the purpose of the experiment to subjects does not change findings. Notwithstanding these optimistic findings, we suggest that future research on the effects of interventions in the field with a gender-empowerment focus could adopt such methodologies to quantify experimenter demand effects in field contexts.

just over 20% (Table 3). These combined findings beg the question of whether the documented impacts arise from participants alone, or whether there are spillovers onto non-participating adolescent girls in treated communities. To see the issue most starkly, Column 2 in Table 7 reports the 2SLS impacts of participation, where we follow standard practice and instrument participation with treatment offer, so these estimates just scale-up the ITT effects by the difference in participation rates between treated and control communities. The 2SLS estimates reflect average treatment effects (absent spillovers) *if* there are homogeneous gains across girls. While baseline levels of empowerment are certainly low, the magnitude of these effect sizes are hard to reconcile with low participation rates if there are homogenous returns to participation.

We thus examine the issue in more detail using two strategies: (i) presenting descriptive evidence on the potential nature of spillovers; (ii) extending our research design to estimate marginal treatment effects of ELA.

5.1.1 Impacts on Non-Participants

To build a more detailed picture on the nature of any spillovers, we consider the following non-experimental comparisons: (i) participants in treated communities to non-participants in control communities; (ii) non-participants in treated and control communities. Participation is endogenous so these comparisons are likely driven by selection on unobservables and do not represent causal impacts (albeit there are few *observable* differences between participants and non-participants, Table A2). These results should thus be read as motivation for understanding better the nature of spillovers that might be present. We deal with selection on unobservables in the next Subsection.

Column 3 in Table 7 reveals that among participants, the point estimate impacts on each empowerment index at midline and endline are noticeably larger than the baseline ITT estimates. Column 4 then compares non-participants across treatment and control communities. For all indices: (i) the impacts are smaller than the baseline ITT estimates; (ii) comparing Columns 3 and 4, the ratio of impacts between participants and non-participants is highest for the aspirations index (at midline this is 61%), next highest for the control over the body index (46%), and rather low for the economic empowerment index (17%). These results are suggestive of there being spillovers, that are greater for dimensions of empowerment captured in the aspirations and control over the body indices, and weaker for forms of economic empowerment. This pattern makes sense as what girls learn from the life skills training may be easier to transmit to other girls relative to what they learn from vocational skills training.

5.1.2 Selection into Participation

To understand selection on unobservables into participation, we estimate marginal treatment effects (MTEs). This sheds light on whether there are heterogeneous returns to ELA participation, the nature of self-selection into participation (thus identifying the girls driving spillovers), and

allows us to use other relevant treatment effects to bound the magnitude of any spillover effects.

The basic set-up can be explained using the standard potential outcomes framework.³⁵ Let Y_{ji} denote the potential outcome (empowerment) for girl i in treatment state $j \in \{0, 1\}$: $Y_{ji} = \mu_j(X_i) + U_{ji}$, where $\mu_j(X_i)$ is the conditional mean of Y_{ji} given (X_i) , and $E(U_{0i}|X_i) = 0$. We assume a latent discrete choice model for girl i 's ELA participation, so if D_i^* denotes the latent net gain from participation, $D_i^* = \mu_D(X_i, Z_i) - V_i$, and $D_i = 1$ if $D_i^* \geq 0$, $D_i = 0$ otherwise. The instrument Z_i is excluded from the potential outcomes equation, and V_i is an iid error term. The unobserved trait V_i therefore makes girl i less likely to participate in ELA. Re-writing the participation model as $\mu_D(X_i, Z_i) \geq V_i$, and applying the CDF of V to this we obtain, $F_V(\mu_D(X_i, Z_i)) \geq F_V(V_i)$. The left hand side is the probability of participating based on observables: the propensity score, $P(X_i, Z_i)$. The right hand side, $F_V(V_i)$, are quantiles of the distribution of unobserved traits, denoted U_{Di} . The participation decision can thus be re-written as $P(X_i, Z_i) \geq U_{Di}$.

The MTE is the treatment effect for a girl with given characteristics at the u_D -th quantile of the V distribution, and it allows the unobserved gains from treatment ($U_{1i} - U_{0i}$) to be correlated with unobserved traits that impact participation (V_i). The MTE is identified by the derivative of the outcome with respect to the propensity score [Heckman *et al.* 2006, Carneiro *et al.* 2011]. Hence to construct the MTE over a range of U_{Di} , we first need continuous instrument(s) Z , and for these to have enough variation to generate a propensity score for participating and non-participating individuals, conditional on $X_i = x_i$.

Following earlier applications of MTEs on the returns to college/schooling [Carneiro *et al.* 2011, Nybom 2017], as instruments we use the distance between a girl's home and the nearest ELA club (in her community or a control community), distance squared, the treatment dummy, and interactions of the distance measures with the treatment dummy. We do so for all indices at midline and endline, and in each we control for the baseline index value. Table A8 shows the six first stage probit regressions, and Figure A2 graphs the estimated propensity scores for participants and non-participants in each case.³⁶

We make two standard assumptions to simplify estimation of MTEs. First, we condition on X parametrically, so potential outcomes are $Y_{ji} = X_i\beta_j + U_{ji}$ for $j \in \{0, 1\}$, and the participation equation becomes $D_i^* = (X_i, Z_i)\beta_d - V_i$. Second, we assume a joint normal distribution for U_0 , U_1 and V , in which the variance of V is normalized to one, and ρ_0 (ρ_1) is the correlation coefficient between U_0 (U_1) and V . While this restriction rules out non-monotonic gains over U_D , the parametric model is more precisely estimated given our relatively small sample.

³⁵The method of marginal treatment effects was developed in Bjorklund and Moffitt [1987] and Heckman and Vytlacil [2005, 2007]. We closely follow the exposition in Belfield and Rasul [2018] that itself is a simplified version of the excellent overview on MTE methods provided by Cornelissen *et al.* [2016].

³⁶For the first stage in Table A8, we note that distance measures are available for 84% (86%) of girls tracked to midline (endline). The instruments predict participation (obviously, more so for those in treated communities). Figure A2 shows the predicted propensities are right shifted for participants relative to non-participants, but as in many MTE applications, we have only partial coverage of the propensity over $[0, 1]$.

Figure 4 shows the MTEs at midline and endline for each empowerment index. On each x -axis we have U_D , that is negatively related to unobserved traits making participation more likely, and is therefore referred to as the unobserved resistance to treatment. The y -axis shows the effect size impacts for an adolescent girl with unobserved traits U_D . Panel A shows that at midline, the MTEs for economic empowerment are upward sloping in U_D , although the estimates are imprecise. This implies adolescent girls' participation decisions display negative selection on gains: those most likely to participate in ELA (namely, those with the highest unobserved traits at the LHS of the x -axis) gain less from the program on this dimension of empowerment than those less likely to participate (at the RHS of the x -axis). However, the gains from participation are non-negative for girls over the entire support of U_D , and the MTE is positive for the majority of quantiles. In turn, this suggests the naive ITT estimate in Column 3 of Table 7 for participants is likely downwards biased given selection on unobservables, and the ITT estimate in Column 4 on non-participants is likely upwards biased.

In contrast, for the other dimensions of female empowerment we see strong evidence of participation decisions being characterized by positive self-selection on gains: those girls that have the largest gains from ELA participation on these dimensions of empowerment related to control over the body and aspirations, are those most likely to actually participate in ELA. For no quantiles of U_D do we find negative impacts, and the MTE is positive for the majority of quantiles of U_D on both these dimensions of empowerment. Hence the corresponding ITT estimates in Column 3 of Table 7 on participants are likely upwards biased given selection on unobservables, and the estimates in Column 4 on non-participants are likely downwards biased.³⁷

A similar pattern of results holds at endline, except the slope of MTEs on economic empowerment becomes even more muted and imprecisely estimated.

These results have the following implications for understanding the nature of gains, participation, and spillovers from ELA. First, the MTEs rule out homogenous gains to ELA participation across adolescent girls. While the evidence suggests no girls lose from ELA, the potential gains from participation vary enormously across girls and dimensions of empowerment.

Second, the pattern of selection into participation is informative for any spillover effects. If these exist, then for control over the body and aspirations, they transmit from positively selected girls onto girls whose counterfactual gains from participating would have been smaller. To provide evidence on the magnitude of spillovers to non-participants relative to their gains from counterfactually participating, we can integrate over relevantly weighted MTEs to derive: (i) the average treatment effect (ATE), the average effect of participation if all eligible adolescent girls attended; (ii) the average treatment on the treated (ATT), namely the average treatment effect on participating girls; (iii) the average treatment on the untreated (ATU), namely what would have been the counterfactual gains to participation for non-participants.

³⁷This finding was hinted at earlier in Table A2, where the one observable difference between participants and non-participants was found to be that participants had a higher control over the body index score at baseline.

Columns 5 to 7 in Table 7 show the results. For economic empowerment, given the MTE is mildly upward sloping, it follows that $ATT < ATE < ATU$. For control over the body and aspirations dimensions, with stronger positive self-selection it follows that $ATT > ATE > ATU$.

The ATEs in Column 5 are smaller than the 2SLS in Column 2 (they are also shown on Figure 4): as highlighted above, these estimates diverge because the 2SLS estimates do not account for the heterogeneity in gains from ELA. Comparing the ratio of ATEs to 2SLS estimates, the ATEs are 91% as large on economic empowerment, 68% as large on control over the body, and 61% as large on aspirations (with all three being statistically different from zero). These more plausible ATEs reflect the average gains from ELA if *all* eligible girls would have participated in the program. They range from $1.05sd$ to $2.32sd$ at midline, falling to $.8sd$ at endline for economic empowerment and control over the body (the impacts on the aspirations index die out by endline, as with the ITT estimates). These ATEs still however powerfully reflect the promise of ELA to shift adolescent girls' empowerment.

The ATTs in Column 6 are larger than the ITT impacts on participants in Column 3 for the dimensions of control over the body and aspirations because of positive selection on gains. The girls driving spillovers onto others, have greater gains on these margins: comparing ATTs and ATUs at midline, we see the average gains to participants are more than double those for the average non-participant. Finally, we note that at midline, the ATUs shown in Column 7 are all much larger than the impacts on non-participants from Column 4. Given the biases described above in the ITTs on the non-participant sample, this suggests on economic empowerment, spillover effects onto non-participants are at least 8% of the impact had non-participants counterfactually actually participated in ELA, with these ratios being at most 27% for the control over the body index, and 43% for the aspirations index. These provide useful bounds on any spillover effects.

5.1.3 Boys

The discussion above has focused on spillovers from participating adolescent girls onto other girls. However, spillover effects might also exist for boys. Our evaluation did not survey boys and so we cannot provide direct evidence on the matter. However, Buehren *et al.* [2018] conduct a follow-up experiment in the same communities, this time sampling girls and boys. In particular they choose a random subsample of girls and boys listed either as the panel respondents in this evaluation, or their siblings. Buehren *et al.* [2018] then use a lab-in-the-field experiment to elicit a measure of individual's willingness to compete, and examine how this is impacted by the ELA intervention. On girls' competitiveness they find no impact of ELA. However, on boys' competitiveness they find: (i) in control communities, having an additional sister correlates with a lower competitiveness score; (ii) in treated communities (i.e. those where ELA was implemented and girls have become economically and socially empowered), this pattern is reversed. The results in Buehren *et al.* [2018] suggest that, in a context where siblings compete for limited parental resources, empowering

adolescent girls might trigger boys to exhibit greater sibling rivalry, and increasing their taste for competition. Understanding spillovers across siblings and genders from ELA-style interventions that are targeted to a specific gender, remains a rich area for future study.³⁸

5.2 Unbundling the ELA Components

Women’s empowerment is a multi-dimensional concept, and there are good reasons why these dimensions might be interlinked. The ELA intervention is a multifaceted intervention designed to simultaneously raise empowerment along these dimensions. A key strength of the approach is its potential to give a big push to adolescent girls’ empowerment along these dimensions simultaneously and kickstart a virtuous cycle of gains. The downside is that it becomes harder to disentangle if one program component is more effective in raising empowerment than others. However, we probe the data a bit further using mediation analysis to shed light on the matter. We follow Gelbach [2016] in decomposing the overall ITT impacts on each empowerment index, into components explained by different potential mediators. Of course, we cannot assign any causal interpretation to the mediation results, but the analysis provides useful suggestive evidence on which channels might contribute more significantly to the overall effects on empowerment.

Table 8 reports the mediation analysis, splitting results by each empowerment index. The most natural set of mediators to consider are participation in the life skills training and participation in vocational training. As shown in Table 3, 51% of girls receive both forms of training, those participating in life skills nearly always receiving vocational training, and 33% of participating girls only obtaining vocational training. The first row in each Panel replicates the baseline ITT estimates. The second row estimates (1) but also controls for the mediators. The difference between these estimates corresponds to the total mediated effect, shown in the third row of each panel. The remaining rows then show how much each mediator contributes to explaining this mediated effect (assuming no complementarity between mediators). Two results emerge.

First, for each dimension of empowerment at midline, life skills training appears an important mediator. At endline, life skills remains a significant mediator for economic empowerment. Second, for each dimension of empowerment, there remains a large fraction of the baseline ITT estimates remaining unexplained by the mediators. For example, this share is $.153/.269 = 66\%$ (76%) for the economic empowerment index at midline (endline). One possibility is that this unexplained portion captures the fact that ELA clubs also provide a safe space for girls. They serve as a protected local space in which adolescent girls can meet, socialize, privately discuss issues of concern and continue to develop their skills, at a time of day that is after-school but in the afternoon when their parents might not be back from work. This role of ELA clubs continues beyond midline, and long after the life skills and vocational skills have been delivered. This is in line with a literature

³⁸There is a nascent evidence base examining how improvements in the human capital of children might lead to within household spillovers onto siblings (say through changing parental behavior) [Barrera-Osorio *et al.* 2011, Das *et al.* 2013, Ashraf *et al.* 2017].

that examines economic returns to social interaction or safe spaces [Feigenberg *et al.* 2013, Ashraf *et al.* 2017, Cai and Szeidl 2018, Bandiera *et al.* 2018].³⁹

In addition, ELA clubs bring adolescent girls into contact with mentors, that might further provide useful role models to influence behavior. The ability of various kinds of role model to improve womens' empowerment has been shown in other contexts [Jensen and Oster 2009, Beman *et al.* 2012, La Ferrara *et al.* 2012].

These results are intriguing and at a minimum allowed us to take a first step of towards shining some light into the critical program components. Certainly an important next step for evaluations of ELA-style multifaceted interventions is to further open the black box of program components to understand the impacts of each, and complementarities between them.

5.3 Cost Effectiveness

The ELA program has proved to be transportable across countries (with modification), having started in Bangladesh, been tailored to other contexts in South Asia and East Africa, and is now being piloted in post-conflict countries such as Liberia and Sierra Leone. In Uganda, the scalability and potential cost effectiveness of the program has also been demonstrated through its expansion to over 1200 clubs.⁴⁰

Given the gains to adolescent girls accrue through channels of economic and social empowerment, many of the gains are unpriced and other will be realized over the life cycle, as vocational and life skills are accumulated, entry into self-employment is accelerated, and marriage and child bearing are delayed. It is precisely events such as getting married or having children during

³⁹Feigenberg *et al.* [2013] show that the frequency of social interaction between microfinance group members positively impacted the financial performance of the group. Cai and Szeidl [2018] document how randomly assigning the offer to attend business association meetings among owner-managers of Chinese firms had large positive impacts on firm performance, through the formation of business networks through which information was shared and partnerships formed. There is limited experimental evidence on the impact of safe spaces for adolescent girls in similar contexts. A notable study is Ashraf *et al.* [2017], who they evaluate the effects of two interventions targeting adolescent girls enrolled in primary schools in Zambia: (i) a negotiation-skills training; (ii) a safe-space program. They find that the negotiation skills training led to long-run improvements in human capital outcomes of treated girls, but the safe space program had no significant effect. In ongoing work, Bandiera *et al.* [2018] evaluate the ELA program in Sierra Leone. The intervention takes place during the Ebola crisis, and provides suggestive evidence that a key role that ELA clubs played during the crisis was to provide a safe space for girls, away from men and thus less exposed to sexual violence.

⁴⁰A replication pilot study of the ELA program was also attempted in Tanzania [Buehren *et al.* 2017] but this failed due to implementation issues. For example, in Tanzania it turned out to be far harder to secure a safe space in communities. In many cases, an arrangement with local schools or church had to be found to share space, and this limited BRAC's ability to decide on the timing of club activities. In addition, the donated club houses were often insecure. The provision of materials for the life skills training and quality of vocational training were other implementation challenges. Adoho *et al.* [2014] evaluate a program somewhat similar to ELA in Liberia: their independent replication of the short run (6-month) impacts find that adolescent girls in treated communities increased employment by 47% and earnings by 80% relative to girls in control communities. Their impact evaluation documents positive effects on a variety of empowerment measures, including access to money, self-confidence, and anxiety about circumstances and the future. The evaluation found no net impact on fertility or sexual behavior, suggesting those channels might take longer to work through.

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 lowers 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. Given this, we do not attempt to calculate the internal rate of return of the program. Rather, we conduct the more modest task of describing the program cost structure and using the endline results to gauge how large the benefits would have to be for the program to be cost effective at endline (ignoring any potential spillover effects).

Table 9 categorizes the program’s fixed and variable costs, 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 year, and subsequent year components 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 onwards 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.

Our pre-baseline census listing of all households 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 (and we have no reliable way to estimate spillover effects), we use this number of eligible girls to calculate the per girl cost of the program. Hence in the fourth panel of Table 6, Rows 21 and 22 show the average fixed and variable costs per eligible girl. The overall cost per eligible is shown in Row 23. Given our ITT estimates are measured four-years after the baseline, we focus on the fourth year per-girl cost of \$17.9.

To put the cost estimate in context, we note that \$17.9 corresponds to less than 1% of household annual incomes at baseline. If the per girl benefits to an adolescent girl residing in a community that is offered the ELA program are larger than this, the program is sustainable from the social planner’s perspective.⁴¹

As mentioned above, monetizing the benefits of the program is not straightforward because the main gains will be over the life cycle or unpriced and so hard to value. The impacts of the

⁴¹We do not factor in the opportunity cost of time of attending the ELA clubs. We do however know that attendance does not come at the cost of reduced participation in formal schooling, as shown in Tables A4 and A6.

program can be crudely monetized using the ITT estimate on annual earnings at endline. The final row of Table 9 shows this endline increase of \$50 (taken from Table A3, and is significantly different from zero). This more than offsets the per girl program cost.

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.* [2011] find that for the *Jovenes* program in Colombia, among women, the likelihood to be employed increases by 6.1pp, which is a larger impact than 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.

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.⁴² They find that almost 80% of youth chose to spend these transfers 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.⁴³

⁴²Similarly, 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 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.

⁴³For 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).

6 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 many 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 [Dufflo 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 a country with the world’s second youngest population: Uganda. We carefully measure key dimensions of women’s empowerment at baseline and examine the impacts of a multifaceted program that provides adolescent girls an opportunity to simultaneously relax constraints related to two types of human capital: vocational skills to enable them to start small-scale income generating activities, and 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 progress is possible. The impacts found over a four-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 external validity of our results are currently being researched as ELA-style programs have been piloted in multiple Sub-Saharan countries. The program offers some promise to policy makers, this being a low cost and scalable intervention that enables adolescent girls to improve their life outcomes. As this research agenda expands, an obvious direction for future work is to

understand the relative importance on empowerment of vocational skills, life skills, the provision of a safe space and access to older mentors, as well as complementarities or substitutabilities between these components. However, this will require more than just unbundling components into treatment arms because at heart, female empowerment remains a multidimensional concept, that requires multidimensional solutions. Understanding the dynamic process of empowerment at scale will inevitably lead to challenges of feedback and general equilibrium effects, that suggest a key role remains for long term longitudinal and/or historic studies.

Another direction for future work is to study further the impacts such programs have on interactions between men and adolescent girls. This would help crystallize whether 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 in 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.⁴⁴ This last channel is an important mechanism that drove the provision of women’s rights across countries over time [Doepke and Tertilt 2009, Doepke *et al.* 2012, Jayachandran 2015], and can feed back into a virtuous circle that further widens women’s economic opportunities and drives forward economic development [Goldin and Katz 2002, Bailey 2006, Tertilt 2006, Doepke *et al.* 2012, Duflo 2012, Jayachandran 2015].

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Table 1: Adolescent Girl Empowerment at Baseline

Sample: Adolescent Girls Surveyed at Baseline (N=5966)

Means, standard errors in parentheses, standard deviations in brackets

	(1) Treatment	(2) Control	(3) Difference	(4) Normalized Difference
A. Characteristics				
Age	16.3 [2.80]	16.4 [2.96]	-0.063 (.150)	-.015
Currently enrolled in school	.710	.720	-.010 (.027)	-.016
Has child(ren)	.105	.101	.003 (.017)	.008
Married or cohabiting	.094	.113	-.020 (.014)	-.046
B. Economic Empowerment				
Entrepreneurial ability [0-100 score]	69.5 [24.7]	71.9 [24.9]	-2.48 (1.64)	-.071
Self-employed	.072	.061	.011 (.010)	.032
Wage employed	.055	.035	.020** (.009)	.067
Never worry to get a good job in adulthood	.425	.401	.024 (.026)	.035
C. Control Over the Body				
Had sex unwillingly in the past year	.198	.144	.054** (.022)	.102
Pregnancy knowledge [0-1 score]	.738	.742	-.004 (.025)	-.006
HIV knowledge [0-6 score]	3.82 [1.24]	3.76 [1.25]	.055 (.076)	.032
If sexually active, always uses condom	.511	.517	-.006 (.039)	-.009
If sexually active, uses other contraceptives	.153	.169	-.016 (.026)	-.032
D. Beliefs and Aspirations				
Gender empowerment [0-100 score]	28.5	31.3	-2.81	-.081
Suitable age at marriage for a woman	24.0	23.9	.115	.026

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The sample is based on adolescent girls who are surveyed at baseline (N = 5966). The standard errors on the differences are estimated from running the corresponding least squares regression and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. In Panel B, 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". In Panel C, the pregnancy knowledge index equals one 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 woman 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." Variables indicating suitable ages were trimmed at 15 years or younger. In Panel D, the gender empowerment index 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.

Table 2: Attrition

OLS estimates

Standard errors clustered by community

	Tracked Between Baseline and Midline			Tracked Between Baseline and Endline			Tracked Between Baseline, Midline and Endline		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	.023 (.030)	.024 (.027)	-.013 (.102)	-.013 (.045)	-.013 (.022)	-.153 (.104)	-.011 (.043)	-.011 (.024)	-.124 (.111)
Age			-.0006 (.004)			-.006 (.005)			-.004 (.005)
Currently Enrolled in School			-.025 (.032)			-.033 (.031)			-.023 (.034)
Married or Cohabiting			.045 (.035)			.019 (.043)			.046 (.044)
Has Child(ren)			.024 (.040)			-.006 (.055)			.006 (.060)
Economic Empowerment Index			-.019 (.016)			.027 (.017)			.023 (.019)
Control Over the Body Index			.032 (.040)			.044 (.042)			.055 (.046)
Aspiration Index			.014 (.017)			.026 (.018)			.021 (.019)
Treatment x Age			.00006 (.005)			.006 (.005)			.005 (.006)
Treatment x Currently Enrolled in School			.059 (.041)			.042 (.041)			.041 (.044)
Treatment x Married or Cohabiting			-.045 (.045)			-.001 (.052)			-.031 (.054)
Treatment x has Child(ren)			.001 (.052)			.054 (.066)			.035 (.072)
Treatment x Economic Empowerment Index			.027 (.020)			-.033 (.020)			-.032 (.023)
Treatment x Control Over the Body Index			-.036 (.051)			-.024 (.053)			-.035 (.058)
Treatment x Aspiration Index			-.014 (.019)			-.044* (.023)			-.044* (.024)
Mean of Dependent Variable:		.819			.647			.588	
Branch Dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	5966	5966	5661	5966	5966	5661	5966	5966	5661
F-statistic [p-value]			.652/.712			1.55/.156			1.25/.279

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The dependent variable in Columns 1-3 is a dummy that is equal to one if the adolescent girl is tracked between the baseline survey and the midline survey, and zero otherwise. The dependent variable in Columns 4-6 is a dummy that is equal to one if the adolescent girl is tracked between the baseline and endline surveys (but is not necessarily observed at midline). The dependent variable in Columns 7-9 is a dummy that is equal to one if the adolescent girl is tracked between baseline, midline and endline surveys. Standard errors are clustered by community. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. There are ten branch dummies controlled for in Columns 2, 3, 5, 6, 8 and 9. At the foot of Columns 3, 6 and 9 we report the joint F-statistic and corresponding p-value on the null of the joint significance of all interactions between treatment and individual characteristics of adolescent girls.

Table 3: Participation in ELA Clubs

Means, standard errors in parentheses

	Girls Tracked to Midline (N = 4831)				Girls Tracked to Endline (N = 3474)			
	Treatment (1)	Control (2)	Difference (3)	Normalized Difference (4)	Treatment (5)	Control (6)	Difference (7)	Normalized Difference (8)
Have heard about club?	.590	.400	.189*** (.036)	.272	.795	.613	.182*** (.042)	.287
Have ever participated in club activities, conditional on having heard about club?	.207	.047	.159*** (.016)	.349	.246	.083	.163*** (.024)	.318
Conditional on ever having participated in an ELA club:								
<i>Continued participation</i>	.629				.356			
<i>Attended club meetings at least 3 times a week</i>	.273				.421			
<i>Attended club meetings 1 or 2 times a week</i>	.494				.337			
<i>Received life skills training</i>	.846				.758			
<i>Received livelihood skills training</i>	.526				.602			
<i>Received life and livelihood skills training</i>	.507				.569			

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Columns 1-4 relate to midline outcomes: the sample covers adolescent girls tracked from baseline to midline and where information on their age is available (N = 4831). Columns 5-8 relate to endline outcomes: the sample covers those adolescent girls tracked from baseline to midline and endline and where information on their age is available (N = 3474). 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. Training area examples mentioned for the life skill training include learning about pregnancy or HIV. Training area examples mentioned for the livelihood training include training in hair-dressing, computer and poultry rearing. Continued participation is coded as one if the girl reports still attending the ELA club on survey date.

Table 4: Economic Empowerment

Coefficients, standard errors in parentheses, standard deviations in brackets

Lee bounds estimated using panel inclusion at midline/endline as the selection indicator

	(1) Baseline, Control	(2) Sample Size, Midline/Endline	(3) Midline	(4) Endline	(5) Midline	(6) Endline
1. Entrepreneurial ability [0-100 score]	71.8 [24.7]	4797 / 3455	5.63*** (.982)	1.80* (.951)	5.76*** (2.17)	1.29 (1.80)
					4.82*** (.931)	7.31*** (1.12)
					.279 (.964)	2.13** (.962)
2. Any IGA	.102 [.302]	4831 / 3474	.068*** (.016)	.049** (.020)	.070*** (.019)	.050** (.024)
					.049*** (.016)	.076*** (.012)
					.044*** (.017)	.068*** (.023)
3. Self-employed	.063 [.243]	4831 / 3474	.059*** (.012)	.032* (.017)	.061*** (.013)	.033* (.019)
					.039*** (.015)	.065*** (.010)
					.030** (.014)	.054** (.023)
4. Wage employed	.040 [.196]	4831 / 3474	.009 (.007)	.018 (.012)	.008 (.009)	.017 (.014)
					-.017 (.015)	.009 (.007)
					.015 (.011)	.039* (.023)
5. Expenditure on goods in the last month [UGX]	11916 [18850]	4791 / 3411	4676*** (950)	982 (1814)	4972*** (1357)	1117 (2155)
					2365* (1347)	5519*** (803)
					270 (.046)	5088** (.062)
Economic Empowerment Index	.032 [1.03]	4831 / 3474	.269*** (.043)	.131** (.056)	.282*** (.058)	.123* (.066)
					.203*** (.048)	.319*** (.037)
					.090* (.046)	.186*** (.062)
Adolescent Girl Controls and Branch Dummies			Yes	Yes	No	No

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 indicators 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 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 and the variable is 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 Economic Empowerment Index is aggregates information over all outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The Lee bounds in Column 5 are estimated considering girls included in the midline as the selected sample. The lower and upper bounds in Column 6 are estimated considering girls included in the midline and endline as the selected sample.

Table 5: Control Over the Body

Coefficients, standard errors in parentheses, standard deviations in brackets

Lee bounds estimated using panel inclusion at midline/endline as the selection indicator

	(1) Baseline, Control	(2) Sample Size, Midline/Endline	(3) Midline	(4) Endline	(5) Midline	(6) Endline
1. Has child(ren)	.113 [.317]	4806 / 3415	-.027*** (.010)	-.038*** (.013)	-.031* (.017)	-.040* (.022)
					-.054*** (.016)	-.029*** (.010)
					-.043*** (.013)	-.020 (.023)
2. Married or cohabiting	.129 [.335]	4713 / 3263	-.069*** (.013)	-.080*** (.015)	-.071*** (.018)	-.082** (.032)
					-.094*** (.017)	-.069*** (.011)
					-.086*** (.016)	-.070*** (.023)
3. Had sex unwillingly in the past year	.174 [.380]	1847 / 1655	-.061** (.028)	-.053** (.025)	-.071*** (.024)	-.031 (.027)
					-.102*** (.033)	-.067*** (.019)
					-.033* (.018)	-.023 (.038)
4. Pregnancy knowledge [0-1 score]	.737 [.441]	4750 / 3386	.048** (.021)	.025 (.016)	.058** (.026)	.029 (.034)
					.051*** (.015)	.077*** (.018)
					.009 (.023)	.035** (.016)
5. HIV knowledge [0-6 score]	3.79 [1.26]	4831 / 3474	.471*** (.047)	.109** (.045)	.507*** (.079)	.115 (.078)
					.452*** (.053)	.611*** (.070)
					.036 (.081)	.160*** (.061)
6. If sexually active, always uses condom	.446 [.498]	1781 / 1630	.130*** (.038)	.035 (.039)	.194*** (.030)	.089** (.039)
					.192*** (.027)	.198*** (.031)
					.081** (.032)	.099*** (.034)
7. If sexually active, uses other contraceptives	.203 [.403]	1781 / 1630	.028 (.031)	-.019 (.049)	.047* (.028)	-.042 (.037)
					.046** (.020)	.053* (.032)
					-.048* (.029)	-.030 (.036)
Control Over the Body Index	-.018 [1.03]	4831 / 3474	.535*** (.038)	.269*** (.034)	.540*** (.052)	.265*** (.060)
					.521*** (.033)	.611*** (.041)
					.193*** (.064)	.305*** (.047)
Adolescent Girl Controls and Branch Dummies			Yes	Yes	No	No

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 one 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 woman 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 aggregates information over all outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The index has subcomponents on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The Lee bounds in Column 5 are estimated considering girls included in the midline as the selected sample. The lower and upper bounds in Column 6 are estimated considering girls included in the midline and endline as the selected sample.

Table 6: Aspirations

Coefficients, standard errors in parentheses, standard deviations in brackets

Lee bounds estimated using panel inclusion at midline/endline as the selection indicator

	(1) Baseline, Control	(2) Sample Size, Midline/Endline	(3) Midline	(4) Endline	(5) Midline	(6) Endline
1. Gender empowerment index [0-100 score]	32.9 [24.4]	4831 / 3474	2.86*** (.932)	-2.25 (1.59)	2.63** (1.26)	-2.56 (2.08)
					1.10 (.996)	3.45*** (.789)
					-3.24*** (1.08)	-.969 (1.53)
2. Suitable age at marriage for a woman	23.9 [3.08]	4790 / 3457	.770*** (.116)	.231* (.132)	.826*** (.145)	.176 (.252)
					.679*** (.116)	1.01*** (.134)
					-.006 (.188)	.320** (.153)
3. Suitable age at marriage for a man	28.0 [3.74]	4789 / 3453	.693*** (.125)	.199 (.149)	.747*** (.198)	.139 (.366)
					.546*** (.135)	1.01*** (.163)
					-.109 (.238)	.363* (.189)
4. Preferred number of children	4.11 [1.43]	4774 / 3416	-.279*** (.052)	.013 (.052)	-.296*** (.089)	.028 (.086)
					-.394*** (.051)	-.247*** (.048)
					-.053 (.072)	.137 (.084)
5. Suitable age for women to have the first child	23.5 [3.20]	4781 / 3445	.619*** (.110)	.272* (.158)	.681*** (.168)	.277 (.213)
					.538*** (.107)	.880*** (.118)
					.101 (.152)	.431*** (.144)
6. Preferred age at which daughter(s) get married	24.8 [2.64]	4757 / 3380	.718*** (.118)	.123 (.116)	.749*** (.126)	.059 (.209)
					.605*** (.109)	.928*** (.119)
					-.101 (.156)	.184 (.136)
7. Preferred age at which son(s) get married	28.4 [3.13]	4761 / 3378	.120 (.113)	.025 (.116)	.185 (.167)	-.014 (.311)
					-.003 (.126)	.431*** (.156)
					-.204 (.184)	.185 (.195)
Aspirations Index	-.015 [.967]	4831 / 3474	.269*** (.038)	.059 (.045)	.290*** (.055)	.045 (.095)
					.233*** (.038)	.361*** (.043)
					-.014 (.060)	.106* (.060)
Adolescent Girl Controls and Branch Dummies			Yes	Yes	No	No

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 one if the respondent chooses "both" and zero otherwise. 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 are trimmed at 15 years or younger. The Aspirations Index aggregates information over all outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The index has subcomponents made up of the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. The Lee bounds in Column 5 are estimated considering girls included in the midline as the selected sample. The lower and upper bounds in Column 6 are estimated considering girls included in the midline and endline as the selected sample.

Table 7: Spillovers, Non-Participation and Other Treatment Effects

A. Midline

	(1) ITT	(2) 2SLS	(3) Participants	(4) Non-Participants	(5) ATE	(6) ATT	(7) ATU
<i>Economic Empowerment Index</i>	.269*** (.043)	1.72*** (.283)	.910*** (.070)	.152*** (.042)	1.57*** (.338)	.909** (.404)	1.91** (.546)
<i>Control Over the Body Index</i>	.535*** (.038)	3.41*** (.419)	.939*** (.057)	.436*** (.039)	2.32*** (.260)	3.45*** (.335)	1.63*** (.415)
<i>Aspirations Index</i>	.269*** (.038)	1.72*** (.298)	.395*** (.396)	.240*** (.039)	1.05*** (.323)	1.91*** (.405)	.555 (.530)
Adolescent Girl Controls and Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	4831	4831	2184	4086		3984	

B. Endline

	(1) ITT	(2) 2SLS	(3) Participants	(4) Non-Participants	(5) ATE	(6) ATT	(7) ATU
<i>Economic Empowerment Index</i>	.131** (.056)	.836** (.340)	.435*** (.077)	.054*** (.058)	.885* (.492)	1.17*** (.398)	.767 (.776)
<i>Control Over the Body Index</i>	.269*** (.034)	1.71*** (.307)	.388*** (.042)	.212*** (.035)	.834* (.454)	2.19*** (.372)	.276 (.716)
<i>Aspirations Index</i>	.059 (.045)	.377 (.296)	.030 (.060)	.061 (.049)	-.149 (.441)	.518 (.359)	-.406 (.697)
Adolescent Girl Controls and Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	3474	3474	1646	2812		2942	

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community in Columns 1 to 4. The control variables include the adolescent girl's age and a series of indicators for branch areas. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. Column 2 shows 2SLS estimates, where we instrument ELA participation with treatment assignment at the community level. The sample in Column 3 is based on ELA participants in treated communities and non-participants in control communities. The sample in Column 4 is based on ELA non-participants in treated communities and non-participants in Control communities. Columns 5 to 7 are derived from the marginal treatment effect estimates.

Table 8: Mediation Analysis

Standard errors in parentheses

		(1) Midline	(2) Endline
<i>Economic Empowerment Index</i>	1. Baseline ITT impact	.269*** (.043)	.131** (.056)
	2. Unrestricted Estimate (includes mediators as controls)	.178*** (.041)	.100* (.053)
	3. Total Mediated Effect (difference between ITT and unrestricted effect)	.091*** (.011)	.031*** (.009)
	4. Mediator: Participation in Life Skills Training	.092*** (.015)	.025*** (.009)
	5. Mediator: Participation in Livelihood Skills Training	-.001 (.010)	.006 (.008)
<i>Control Over the Body Index</i>	1. Baseline ITT impact	.535*** (.038)	.269*** (.034)
	2. Unrestricted Estimate	.476*** (.038)	.262*** (.035)
	3. Total Mediated Effect	.059*** (.008)	.006 (.005)
	4. Mediator: Participation in Life Skills Training	.063*** (.011)	.005 (.006)
	5. Mediator: Participation in Livelihood Skills Training	-.004 (.006)	.002 (.007)
<i>Aspirations Index</i>	1. Baseline ITT impact	.269*** (.038)	.059 (.045)
	2. Unrestricted Estimate	.242*** (.038)	.059 (.045)
	3. Total Mediated Effect	.026*** (.008)	-.0004 (.004)
	4. Mediator: Participation in Life Skills Training	.033*** (.011)	.008 (.007)
	5. Mediator: Participation in Livelihood Skills Training	-.006 (.009)	-.009 (.008)
Number of Observations		4831	3474

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. The table shows the results from mediation analysis following Gelbach [2016]. In each panel, the first row shows the ITT impact, where the control variables include the adolescent girl's age and a series of indicators for branch areas. In the second row we show the ITT impact once the mediators are controlled for – these are participation in the life skill training, and participation in the vocational skills training. Row 3 shows the total mediated effect and rows 4 and 5 show the contribution of each mediator.

Table 9: Cost Effectiveness, in 2008 US\$

			(1) Non-Recurring	(2) Recurring Monthly	(3) Year One	(4) Year Two Onwards
<u>A. Fixed Costs</u>	(1) Office Space & Equipment	10 Branch Offices	4000		4000	
	(2) Program Assistant Training	10 Assistants	2250		2250	
	(3) Training & Operational Material Development	2 Manuals	4000		4000	
	(4) Program Management Compensation	2 Coordinators		780	9360	9360
	(5) Program Assistant Compensation	10 Assistants		1690	20280	20280
	(6) Adolescent Leader Compensation	100 Adolescent Leaders		1200	14400	14400
	(7) Adolescent Leader Training	100 Adolescent Leaders	22500		22500	
	(8) Adolescent Leader Training (for Replacements)	20 Adolescent Leaders	4500			4500
	(9) Adolescent Leader Refreshers	100 Adolescent Leaders		400	4800	4800
	(10) Club Rent	100 Clubs		1000	12000	12000
	(11) Club Materials	100 Clubs	42000		42000	
	(12) Club Materials (Replenishment)	100 Clubs	16800			16800
	(13) Branch Office Overhead	10 Branch Offices		800	9600	9600
	(14) Country Office Overhead	1 Country Office		4000	48000	48000
<u>B. Variable Costs</u>	(15) Financial Literacy Courses	2500 Members	12500		12500	12500
	(16) Livelihood Training (Year 1)	2000 Members	100000		100000	
	(17) Livelihood Training Inputs (Year 1)	2000 Members	60000		60000	
	(18) Livelihood Training (Year 2)	1000 Members	50000			50000
	(19) Livelihood Training Inputs (Year 2)	1000 Members	30000			30000
<u>C. Total Costs</u>	(20) ELA Program Costs for the 100 studied Communities				365690	232240
<u>D. Yearly Per Unit Average Costs</u>	(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
<u>E. Yearly Benefits</u>	(24) ITT Impact of ELA on Individual Annual Earnings					50

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 endline earnings.

Table A1: Balance in Baseline and Estimation Samples

Means, standard errors in parentheses, standard deviations in brackets

	Baseline Sample (N=5966)			(4) Normalized Difference	Estimation Sample (N=3474)	
	(1) Treatment	(2) Control	(3) Difference		(5) Difference	(6) Normalized Difference
A. Characteristics						
Age	16.3 [2.80]	16.4 [2.96]	-.063 (.150)	-.015	-.014 (.162)	-.004
Currently enrolled in school	.710	.720	-.010 (.027)	-.016	.004 (.031)	.006
If dropped out, plan to start/go back to school	.524	.537	-.014 (.035)	-.019	-.048 (.044)	-.068
Has child(ren)	.105	.101	.003 (.017)	.008	.0006 (.022)	.001
Married or cohabiting	.094	.113	-.020 (.014)	-.046	-.027 (.019)	-.061
B. Economic Empowerment						
Entrepreneurial ability [0-100 score]	69.5 [24.7]	71.9 [24.9]	-2.48 (1.64)	-.071	-2.17 (1.97)	-.063
Self-employed	.072	.061	.011 (.010)	.032	-.007 (.009)	-.022
Wage employed	.055	.035	.020** (.009)	.067	.018 (.011)	.060
Never worry to get a good job in adulthood	.425	.401	.024 (.026)	.035	.007 (.031)	.010
Expenditure on goods in the last month [UGX]	12519 [19508]	11249 [17924]	1269 (1020)	.048	429 (1113)	.016
C. Control Over the Body						
Had sex unwillingly in the past year	.198	.144	.054** (.022)	.102	.023 (.029)	.042
Pregnancy knowledge [0-1 score]	.738	.742	-.004 (.025)	-.006	-.008 (.030)	-.013
HIV knowledge [0-6 score]	3.82 [1.24]	3.76 [1.25]	.055 (.076)	.032	.050 (.091)	.028
If sexually active, always uses condom	.511	.517	-.006 (.039)	-.009	-.023 (.051)	-.033
If sexually active, uses other contraceptives	.153	.169	-.016 (.026)	-.032	-.016 (.045)	-.029
D. Beliefs and Aspirations						
Gender empowerment [0-100 score]	28.5 [24.2]	31.3 [24.9]	-2.81 (2.02)	-.081	-4.18** (2.00)	-.121
Suitable age at marriage for a woman	24.0 [3.14]	23.9 [3.17]	.115 (.201)	.026	.035 (.217)	.008
Preferred number of children	4.22 [1.55]	4.10 [1.43]	.120 (.101)	.057	.076 (.106)	.036
Suitable age for women to have the first child	23.9 [3.20]	23.8 [3.25]	.165 (.251)	.036	.204 (.257)	.045
Preferred age at which daughter(s) get married	25.0 [2.81]	24.8 [2.84]	.192 (.163)	.048	.138 (.157)	.035
Preferred age at which son(s) get married	28.5 [3.23]	28.3 [3.32]	.192 (.165)	.042	.090 (.163)	.020

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The sample in Columns 1 to 4 is based on adolescent girls who are surveyed at baseline (N = 5966). The sample in Columns 5 and 6 is based on adolescent girls surveyed at baseline, midline and endline (and where age information is available) (N=3474). The standard errors on the differences are estimated from running the corresponding least squares regression and allowing for the errors to be clustered by community. The normalized difference is computed following Imbens and Wooldridge [2009]. In Panel B, 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". In Panel C, the pregnancy knowledge index equals one 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 woman 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." Variables indicating suitable ages were trimmed at 15 years or younger. In Panel D, the gender empowerment index 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.

Table A2: Participants and Non-participants

Sample: Adolescent Girls Tracked to Midline (N = 4888)

Means, standard errors in parentheses, standard deviations in brackets

	(1) Participants	(2) Non Participants	(3) Difference	(4) Normalized Difference
Age	16.3 [2.85]	16.4 [2.86]	-.134 (.129)	-.033
Currently enrolled in school	.715 [.452]	.712 [.453]	.003 (.023)	.005
Gender empowerment index [0-100 score]	28.0 [23.4]	29.7 [24.5]	-1.71 (1.42)	-.050
Entrepreneurial ability [0-100 score]	68.9 [24.1]	70.5 [24.8]	-1.59 (1.22)	-.046
Self-employed	.068 [.252]	.066 [.249]	.002 (.010)	.004
Wage-employed	.051 [.219]	.050 [.219]	.0002 (.008)	.0008
Satisfaction with earnings/income [0-6 score]	1.15 [1.68]	1.25 [1.77]	-.102 (.092)	-.042
Never worry to get a good job in adulthood	.429 [.495]	.409 [.492]	.020 (.021)	.029
Has child(ren)	.090 [.287]	.107 [.310]	-.017 (.013)	-.040
Married or cohabiting	.084 [.278]	.107 [.309]	-.022* (.012)	-.054
Had sex unwillingly in the past year	.167 [.373]	.186 [.389]	-.019 (.026)	-.036
Pregnancy knowledge [0-1 score]	.762 [.426]	.738 [.440]	.024 (.019)	.039
HIV knowledge [0-6 score]	3.83 [1.30]	3.81 [1.23]	.023 (.064)	.013
If sexually active, always uses condom	.556 [.498]	.507 [.500]	.049 (.034)	.070
<i>Economic empowerment index</i>	.028 [1.06]	.054 [1.09]	-.026 (.041)	-.017
<i>Control over body index</i>	.025 [.959]	-.053 [.994]	.078* (.045)	.056
<i>Aspirations index</i>	.036 [1.01]	.018 [.996]	.018 (.048)	.013
Number of Observations	752	4136		

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The sample is based on adolescent girls who are surveyed at baseline and midline (N = 4888). The standard errors on the differences are estimated from running the corresponding least squares regression 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 pregnancy knowledge index equals one 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 woman 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." Variables indicating suitable ages were trimmed at 15 years or younger. The gender empowerment index 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 indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry.

Table A3: Earnings and Education

Coefficients, standard errors in parentheses, standard deviations in brackets

Lee bounds estimated using panel inclusion at midline/endline as the selection indicator

	(1) Baseline, Control	(2) Sample Size, Midline/Endline	(3) Midline	(4) Endline	(5) Midline	(6) Endline
A. Earnings						
Annual Earnings [UGX]	27,443 [139,968]	4824 / 3466	5,189 (17,498)	84,732** (41,793)	9090 (19284)	83429 (58519)
					-46438*** (15822)	11605 (13813)
						77138** (38356)
						202552*** (69032)
B. Education Related Outcomes						
Currently enrolled in school	.685 [.465]	4831 / 3475	-.018 (.017)	.001 (.020)	-.013 (.025)	.0010 (.027)
					-.022 (.015)	.004 (.017)
						-.013 (.022)
						.011 (.020)
If enrolled, hours spent on going to and attending school, homework and study per week	61.1 [20.3]	3243 / 1972	1.59* (.892)	1.69 (1.18)	2.36* (1.24)	1.63 (1.61)
					1.31 (.918)	4.16*** (1.17)
						-.229 (1.87)
						2.69** (1.29)
If dropped out, plan to start/go back to school	.573 [.496]	1537 / 1393	.076** (.037)	.044 (.043)	.102*** (.035)	-.008 (.043)
					.071** (.033)	.139*** (.035)
						-.023 (.035)
						.011 (.038)
Adolescent Girl Controls and Branch Dummies			Yes	Yes	No	No

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 indicators for branch areas. The top 1% outliers of the annual earnings variable are trimmed and the variable is 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 Lee bounds in Column 5 are estimated considering girls included in the midline as the selected sample. The lower and upper bounds in Column 6 are estimated considering girls included in the midline and endline as the selected sample.

Table A4: Pooled ANCOVA Specification
Coefficients, standard errors in parentheses

	(1) Sample Size	(2) Midline	(3) Endline
Economic Empowerment Index	6948	.196*** (.052)	.140** (.053)
Control Over the Body Index	6948	.437*** (.043)	.269*** (.043)
Aspirations Index	6948	.254*** (.054)	.049 (.060)
Adolescent Girl Controls and Branch Dummies		Yes	Yes

Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered by community. A pooled specification is used, exploiting data from baseline, midline and endline. The control variables include the adolescent girl's age and a series of indicators for branch areas. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry.

Table A5: Impact Heterogeneity

Coefficients, standard errors in parentheses, p-values

	Midline		Endline		Midline		Endline		Midline		Endline	
	Rural	Urban	Rural	Urban	HH Asset Value				Younger Than 16	Older Than 16	Younger Than 16	Older Than 16
					Above Median	Below Median	Above Median	Below Median				
A. Indices												
Economic Empowerment Index	.214*** (.044)	.329*** (.074)	.085 (.076)	.186** (.081)	.291*** (.056)	.249*** (.055)	.090 (.065)	.169*** (.064)	.257*** (.047)	.285*** (.057)	.195*** (.052)	.084 (.079)
Control Over the Body Index	.526*** (.053)	.534*** (.054)	.318*** (.048)	.211*** (.049)	.516*** (.045)	.539*** (.046)	.331*** (.050)	.214*** (.041)	.553*** (.042)	.509*** (.051)	.139*** (.043)	.355*** (.048)
Aspirations Index	.286*** (.060)	.251*** (.046)	.123** (.061)	-.013 (.065)	.217*** (.048)	.304*** (.051)	.046 (.053)	.069 (.057)	.238*** (.058)	.296*** (.045)	.016 (.061)	.087 (.054)
B. Education Related Outcomes												
Currently enrolled in school	-.029 (.022)	-.010 (.027)	.014 (.026)	-.013 (.030)	-0.025 (.021)	-.011 (.023)	.00009 (.028)	.003 (.025)	-.023 (.017)	-.018 (.024)	-.030 (.025)	.026 (.025)
If enrolled, hours spent on going to and attending school, homework and study per week	2.16 (1.44)	.969 (1.02)	.052 (1.31)	3.55* (1.97)	1.85 (1.30)	1.25 (.942)	2.70 (1.77)	.613 (1.35)	1.39 (.957)	1.78 (1.57)	-.037 (1.16)	5.03** (2.33)
If dropped out, plan to start/go back to school	.036 (.050)	.139** (.053)	.068 (.060)	.009 (.048)	.040 (.068)	.100** (.041)	.027 (.073)	.055 (.046)	.292* (.165)	.062 (.038)	.327 (.221)	.033 (.044)
Adolescent Girl Controls and Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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 indicators for branch areas. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry.

Table A6: Parental Beliefs

Coefficients, standard errors in parentheses, p-values

	Midline		Endline		Midline		Endline	
	Parent's Preferred Age At Marriage for a Woman				Parent's Preference for Man Being Income Earner	Parent's Preference for Woman or Both Being Income Earner(s)	Parent's Preference for Man Being Income Earner	Parent's Preference for Woman or Both Being Income Earner(s)
	Below Median	Above Median	Below Median	Above Median				
A. Indices								
Economic Empowerment Index	.268*** (.055)	.280*** (.051)	.152** (.059)	.101 (.071)	.267*** (.049)	.268*** (.056)	.086 (.064)	.183*** (.065)
Control Over the Body Index	.546*** (.049)	.518*** (.046)	.248*** (.053)	.271*** (.047)	.493*** (.050)	.572*** (.050)	.287*** (.045)	.237*** (.049)
Aspirations Index	.282*** (.053)	.257*** (.048)	.072 (.050)	.060 (.058)	.267*** (.045)	.258*** (.047)	.084 (.052)	.036 (.060)
B. Education Related Outcomes								
Currently enrolled in school	-.018 (.022)	-.015 (.022)	-.004 (.025)	.011 (.025)	-.006 (.022)	-.026 (.023)	-.004 (.024)	.017 (.026)
If enrolled, hours spent on going to and attending school, homework and study per week	1.29 (1.22)	1.79 (1.18)	1.18 (1.40)	1.88 (1.71)	1.46 (1.10)	1.25 (1.16)	.899 (1.33)	2.83* (1.64)
If dropped out, plan to start/go back to school	.130** (.050)	-.012 (.055)	.059 (.052)	.029 (.062)	.059 (.048)	.114** (.055)	.055 (.056)	.055 (.072)
Adolescent Girl Controls and Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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 indicators for branch areas. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry.

Table A7: Social Desirability Bias

Coefficients, standard errors in parentheses, standard deviations in brackets

	(1) Economic Empowerment Index		(2) Control Over the Body Index		(3) Aspirations Index	
	Midline	Endline	Midline	Endline	Midline	Endline
Treatment	.291*	.395**	.507***	.297*	.164	-.020
	(.149)	(.174)	(.160)	(.169)	(.172)	(.185)
Social Desirability Score	.017	.015	.003	-.007	-.012	-.031*
	(.011)	(.015)	(.015)	(.016)	(.015)	(.017)
Treatment * Social Desirability Score	-.003	-.029	.003	-.004	.012	.009
	(.016)	(.020)	(.018)	.019	(.019)	(.020)
Adolescent Girl Controls and Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes

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 indicators for branch areas. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then reconstruct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. The social desirability score is based on the individual scores respondents assigned to the following statement "I want to be a respectful person in my village." where respondents were asked whether this statement is true on a scale of 1-10 and where 1 indicated "not at all" and 10 indicated "a lot".

Table A8: First Stage Estimates

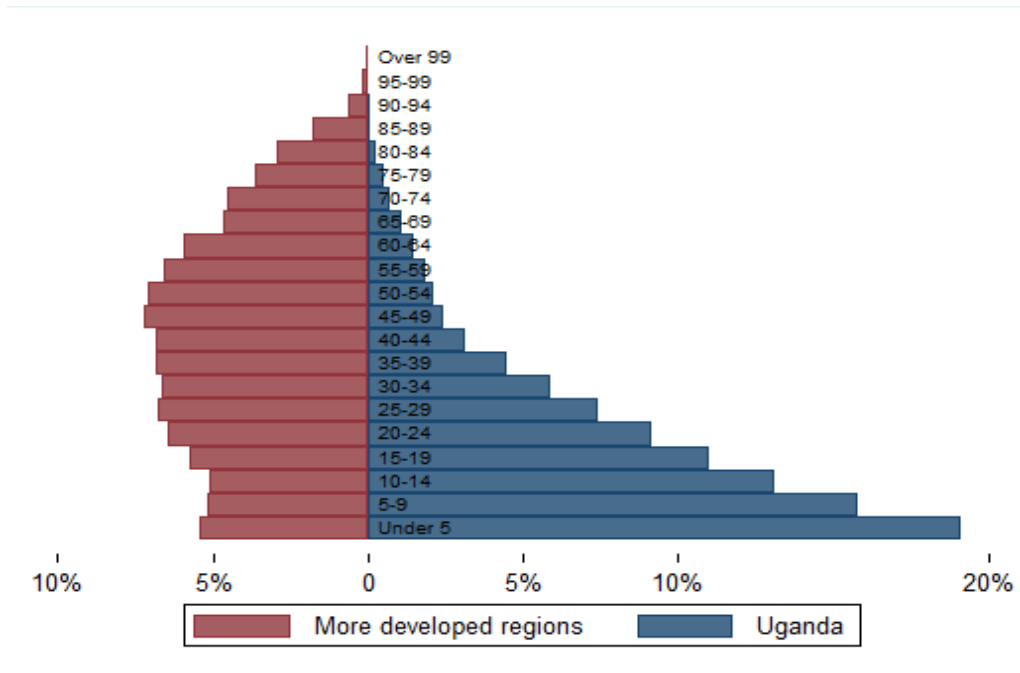
Probit Estimates, Marginal Effects Shown

Dependent Variable: Participation in ELA

	(1) Economic Empowerment Index		(2) Control Over the Body Index		(3) Aspirations Index	
	Midline	Endline	Midline	Endline	Midline	Endline
Distance to Nearest ELA Club (km)	-.056 (.051)	-.097 (.068)	-.052 (.052)	-.072 (.068)	-.054 (.052)	-.016 (.056)
Squared Distance to Nearest ELA Club	.013 (.016)	.017 (.022)	.011 (.016)	.010 (.022)	.012 (.016)	.002 (.017)
Treatment	.140*** (.018)	.142*** (.026)	.141*** (.018)	.151*** (.025)	.141*** (.018)	.131*** .021
Distance * Treatment	-.104* (.058)	-.070 (.078)	-.116** (.058)	-.093 (.078)	-.108* (.058)	-.119* (.063)
Squared Distance * Treatment	.052** (.021)	.053* (.029)	.059*** (.021)	.059** (.029)	.053** (.021)	.055** (.023)
Branch Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,984	2,943	3,985	2,942	3,985	2,942
Mean (sd) of predicted propensity for participants	.184 (.084)	.230 (.135)	.185 (.087)	.231 (.136)	.183 (.083)	.231 (.139)
Mean (sd) of predicted propensity for non-participants	.122 (.081)	.167 (.098)	.122 (.081)	.166 (.098)	.122 (.081)	.166 (.098)

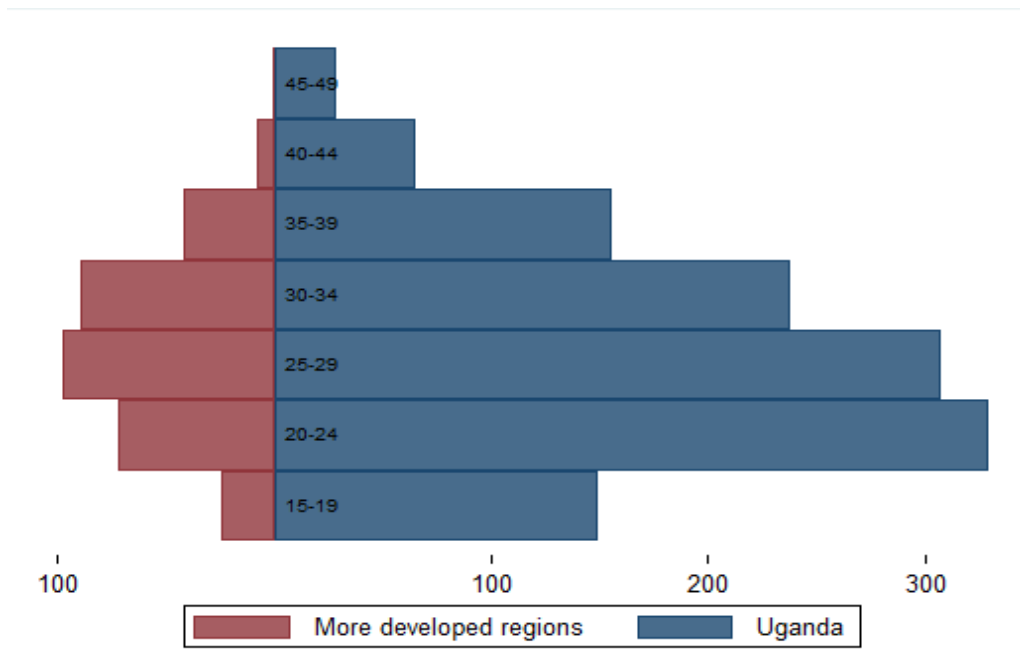
Notes: *** denotes significance at 1%, ** at 5%, and * at 10%. The dependent variable is whether the adolescent girl reports participating in the ELA club, at midline and at endline. Marginal effects from probit regressions are shown. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. In each specification, we control for the baseline value of the empowerment index, as well as the adolescent girl's age and a series of indicators for branch areas. The distance to the nearest club is defined for all girls in treatment and control communities. The samples are smaller than the usual midline and endline samples because of missing distance values. At the foot of each Column we report statistics on the implied propensities. We trim lower and upper 1% of values of the common support for the MTE estimation.

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.

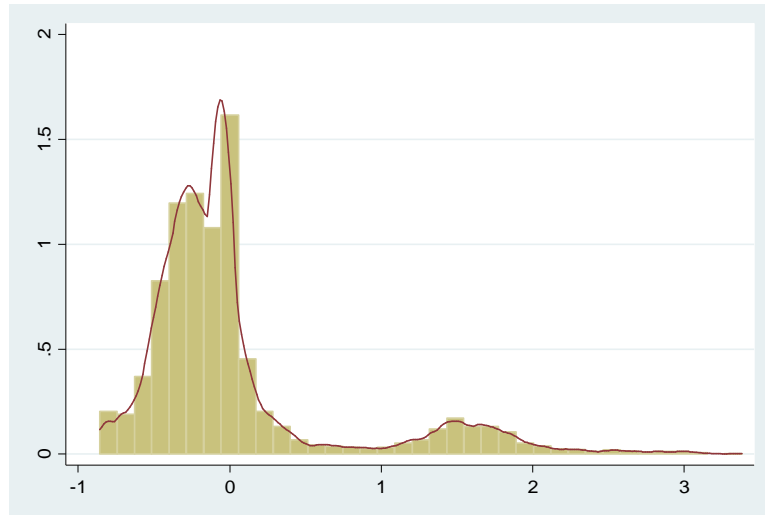
Figure 1B: Age-Specific Fertility Rate, 1995-2010



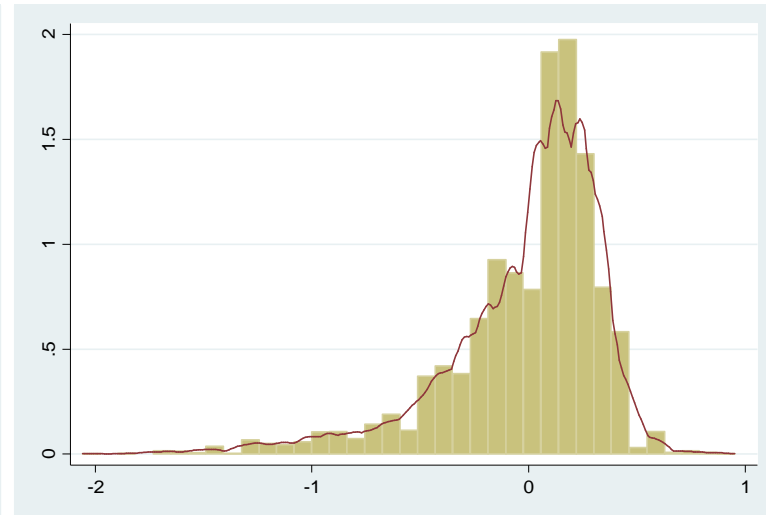
Notes: The data stems from the 2010 UN World Population Prospects data base. The fertility rate is measured by the number of births per 1,000 women. More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan.

Figure 2: Adolescent Girls Empowerment at Baseline
Sample: Adolescent Girls Surveyed at Baseline (N=5966)

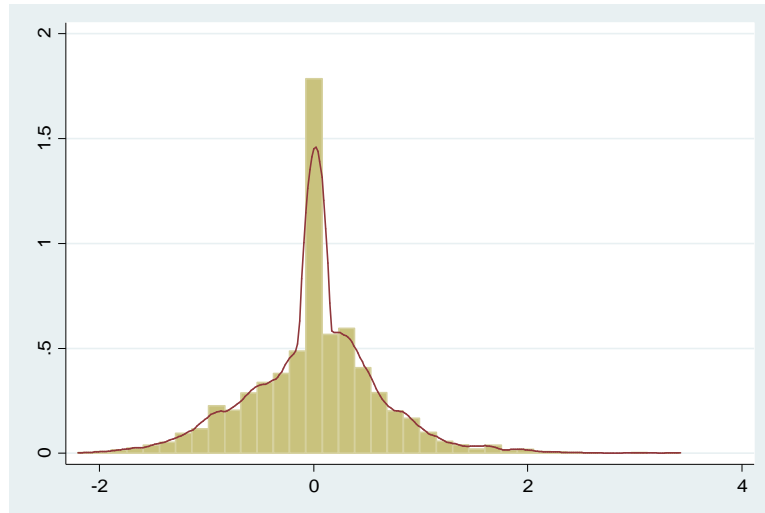
A. Economic Empowerment Index



B. Control Over the Body Index



C. Aspirations Index



Correlation Matrix

	Economic Empowerment	Control Over the Body	Aspirations
Economic Empowerment	1		
Control Over the Body	-.149	1	
Aspirations	.002	.078	1

Notes: The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. Each Panel shows the histogram and a kernel density estimate for each index, using the sample of all girls at baseline (N=5966).

Figure 3A: The ITT Impact at Midline of the ELA Program on Entrepreneurship Measures

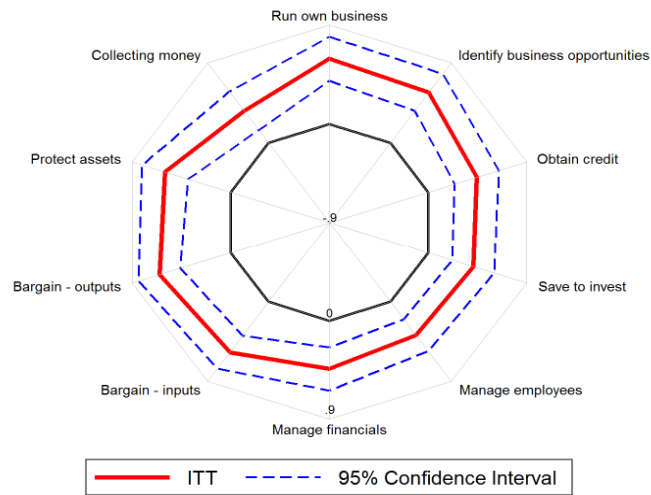
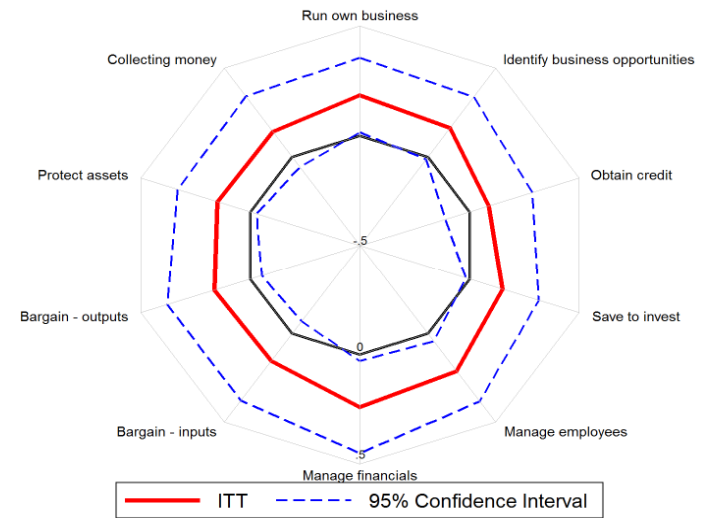


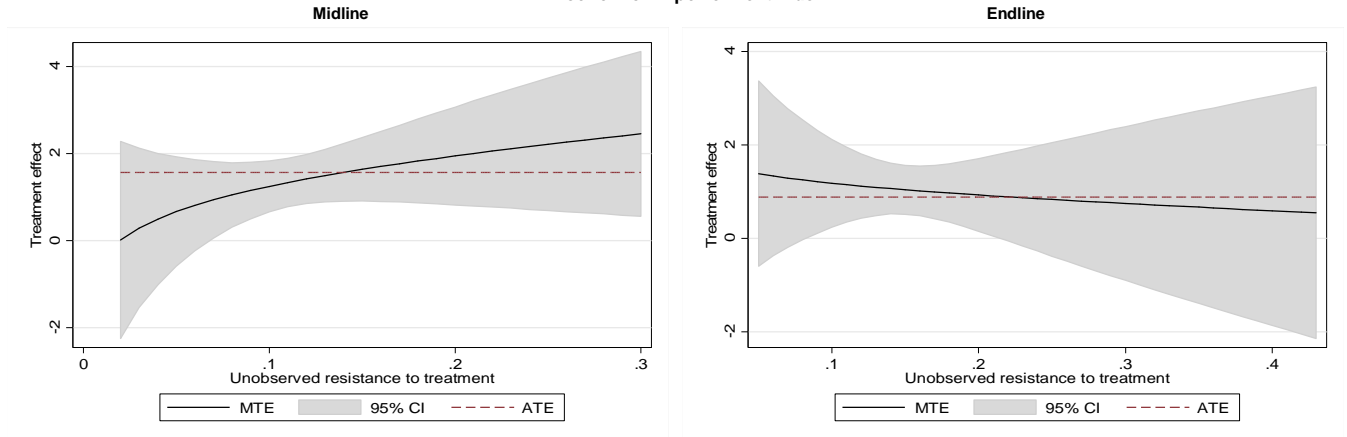
Figure 3B: The ITT Impact at Endline of the ELA Program on Entrepreneurship Measures



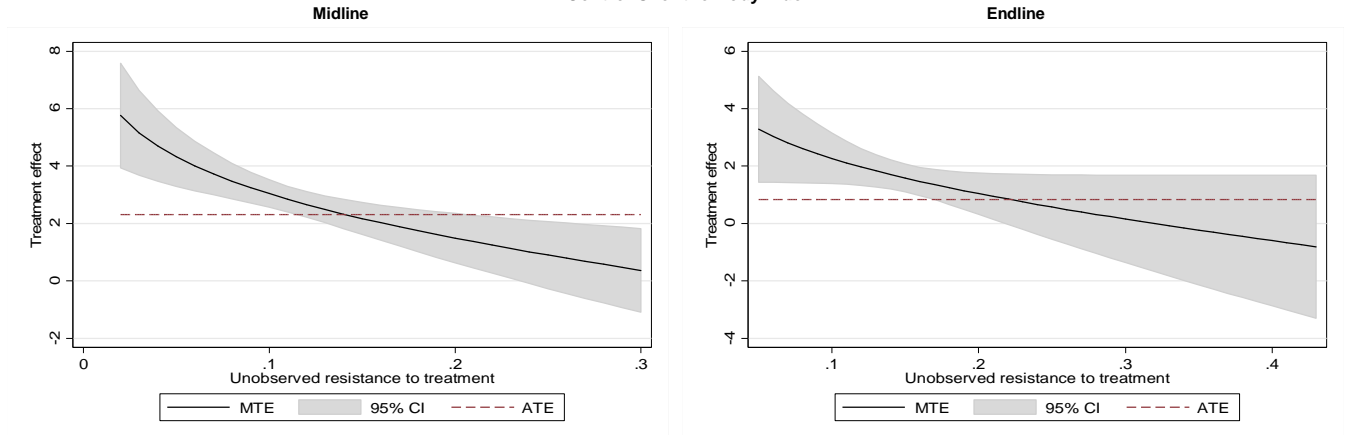
Notes: The control variables include the adolescent girl's age and a series of indicator variables for branch areas. The adolescents were asked to rank their ability on how well they can do the following activities on a scale of 1 to 10, 1 means they cannot do this activity and 10 is they definitely 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".

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".

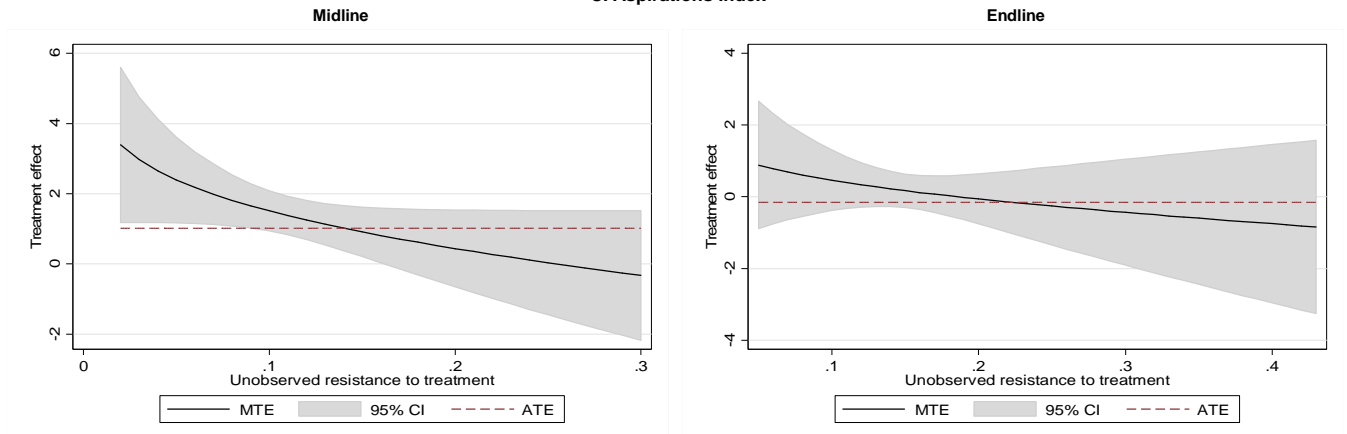
Figure 4: Marginal Treatment Effects
A. Economic Empowerment Index



B. Control Over the Body Index

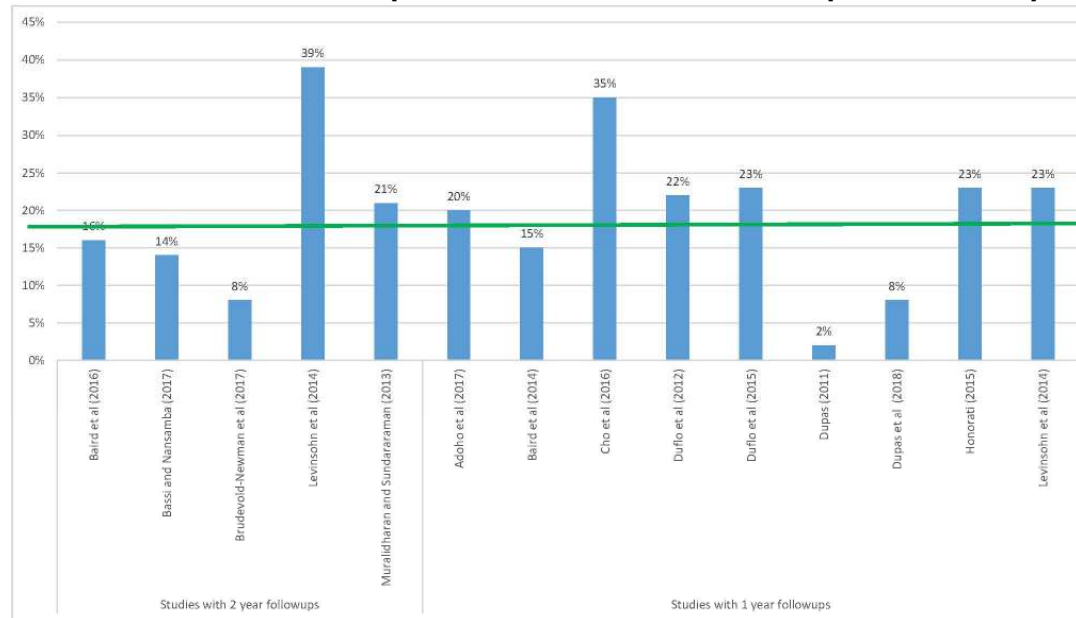


C. Aspirations Index



Notes: The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry. Each Panel shows the marginal treatment effects for the index, either at midline or endline, along with a 95% confidence interval. This is based on a parametric Normal assumption. In each Panel, the average treatment effect is also shown in the dashed horizontal line.

Figure A1: Attrition Rates in Comparable Studies on Youth Samples in Developing Countries



Included Studies

Adoho, F., S. Chakravarty, D. T. Korkoyah, M. Lundberg, A. Tasneem (2014) The Impact of an Adolescent Girls Employment Program: The EPAG Project in Liberia, World Bank Policy Research Working Paper No 6832.

S. Baird, E. Gong, C. McIntosh, B. Özler (2014) "The Heterogeneous Effects of HIV Testing", *Journal of Health Economics*, 37: 98-112.

Baird, S., C. McIntosh and B. Özler (2016) When the Money Runs Out: Evaluating the Longer term Impacts of a Two-year Cash Transfer Program, World Bank Policy Research Working Paper No 7901.

Bassi, V., and A. Nansamba (2017) Information Frictions in the Labor Market: Evidence from a Field Experiment in Uganda, mimeo, USC.

Brudevold-Newman, A., M. Honorati, P. Jakiela, O. Ozier (2017) A Firm of One's Own: Experimental Evidence on Credit Constraints and Occupational Choice, World Bank Policy Research Working Paper No 7977.

Cho, Y., D. Kalomba, A. M. Mobarak, and V. Orozco (2016) Gender Differences in the Effects of Vocational Training: Constraints on Women and Drop-out Behavior, mimeo, Yale.

Duflo, E., Hanna, R., Ryan, S. P. (2012) "Incentives Work: Getting Teachers to Come to School," *American Economic Review* 102: 1241-78.

Duflo, E., P. Dupas and M. Kremer (2015) "Education, HIV, and Early Fertility: Experimental Evidence from Kenya," *American Economic Review* 105: 2757-97.

Dupas, P. (2011) "Do Teenagers Respond to HIV Risk Information? Evidence from a Field Experiment in Kenya," *American Economic Journal: Applied Economics* 3: 1-36.

Dupas, P., E. Huillery and J. Seban (2018) "Risk Information, Risk Salience, and Adolescent Sexual Behavior: Experimental Evidence from Cameroon," *Journal of Economic Behavior and Organization* 145: 151-75.

Groh, M., N. Krishnan, D. Mckenzie and T. Vishwanath (2016) "The Impact of Soft Skills Training on Female Youth Employment: Evidence from a Randomized Experiment in Jordan," *IZA Journal of Labor and Development* 5: 1-23.

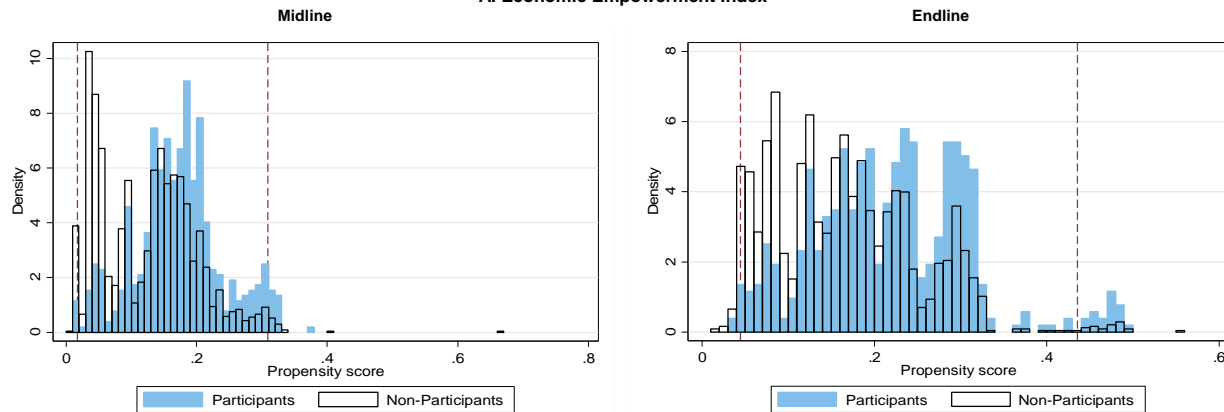
Honorati, M. (2015) The Impact of Private Sector Internship and Training on Urban Youth in Kenya, World Bank Policy Research Working Paper 7404.

Levinsohn, J., N. Rankin, G. Roberts and V. Schoer (2014) Wage Subsidies and Youth Employment in South Africa: Evidence from a Randomized Control Trial, Stellenbosch Economic Working Paper 02/14.

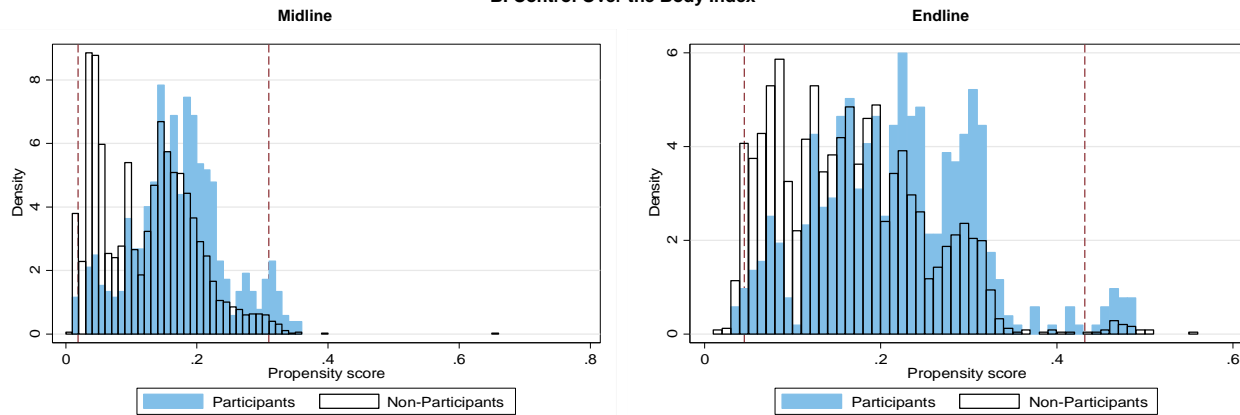
Muralidharan, K. and V. Sundararaman (2011) "Teacher Performance Pay: Experimental Evidence from India," *Journal of Political Economy* 119: 39-77.

Figure A2: Propensity Scores

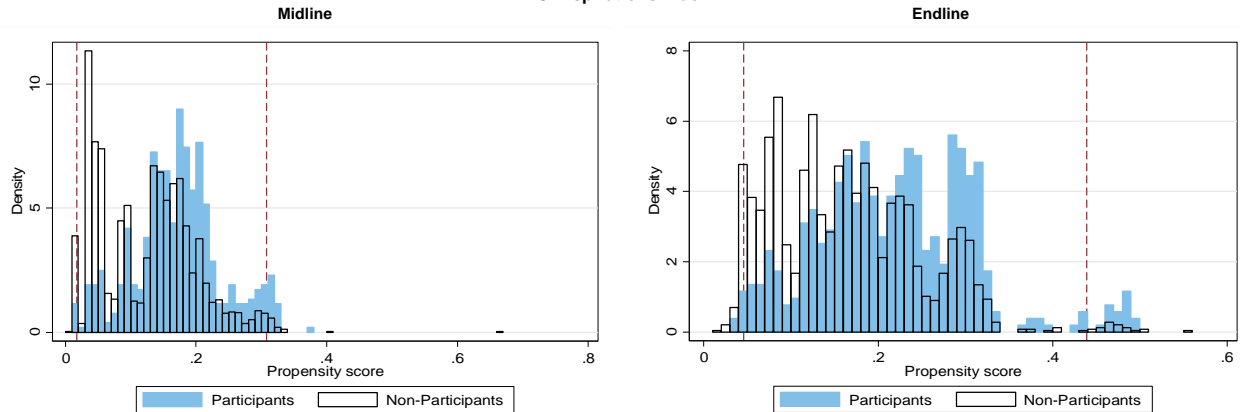
A. Economic Empowerment Index



B. Control Over the Body Index



C. Aspirations Index



Notes: Each panel shows the propensity score from the first stage, for participants and non-participants at midline and endline. We trim lower and upper 1% of values of the common support for the MTE estimation, as shown in the vertical dashed lines. The indices for economic empowerment, control over the body, and aspirations, each aggregates information over a range of relevant outcomes, where we first convert each subcomponent into a z-score, average across subcomponents and then re-construct a z-score of the average. The economic empowerment index has subcomponents based on a girl's entrepreneurial ability score, whether any IGA is engaged in, whether she is self-employed, wage employed, and her monthly expenditures on goods. The control over the body index has subcomponents using information on whether the adolescent has children, is married/cohabiting, had sex unwillingly in the last year, her pregnancy knowledge, her HIV knowledge, and if sexually active, whether she always uses condoms or other contraceptives. The aspirations index has subcomponents related to the gender empowerment index, what she views as a suitable age at marriage for a woman, her suitable age at marriage for a man, her preferred number of children, what she views as the suitable age for a woman to have her first child, the preferred age at which her daughters should marry, and her preferred age for her sons to marry.